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地球規模保健課題推進研究事業
(H29-地球規模-一般-002)

我が国の世界保健総会等における効果的なプレゼンスの確立
に関する研究

平成 29 年度 総括・分担研究報告書

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III. 参考資料

資料 1 Sakamoto H, Ezoe S, Hara K, Hinoshita E, Sekitani Y, Abe K, Inada H, Kato T, Komada K, Miyakawa M, Yamaya H, Yamamoto N, Abe SK, Shibuya K. **The G7 presidency and universal health coverage, Japan's contribution.** *Bulletin of the World Health Organization*. 2018; 96:355–359.

資料 2 Nomura S, Sakamoto H, Scott G, et al. (31 co-authors). **Population health and regional variations of disease burden in Japan, 1990–2015: a systematic subnational analysis for the Global Burden of Disease Study 2015.** *The Lancet*. 2017; 390(10101): 1521-38.

資料 3 Sakamoto H, Rahman MM, Nomura S, Okamoto E, Koike S, Yasunaga H et al. **Japan Health System Review.** Vol. 8 No. 1. New Delhi: World Health Organization, Regional Office for South-East Asia, 2018

資料 4 Nomura S, Shibuya K. **Improving Population Health in the Era of Superaging: Japan's Challenges and Opportunities.** In: Sean Connell, Shuhei Nomura, Kenji Shibuya and Benjamin Shobert. *Innovative Asia: Innovation Policy and the Implications for Healthcare and the Life Sciences*. Washington: The National Bureau of Asian Research; 2018.

資料 5 Rahman SM, Rahman MM, Gilmour S, Abe SK, Shibuya K. **Trends in, and projections of, indicators of universal health coverage in Bangladesh, 1995–2030: a Bayesian analysis of population-based household data.** *Lancet Glob Health*. 2018, 6(1): e84-e94

資料 6 Rahman MM, Parsons A, Rahman MS, Karan A, Abe SK, Bilano, Awan R, Gilmour S, Shibuya K. **Progress towards universal health coverage: a comparative analysis in five South Asian countries.** *JAMA Intern Med*. 2017 177(9): 1297-1305.

資料 7 Islam MR, Rahman MS, Islam Z, Zhang C, Sultana P, Rahman MM. **Inequalities in financial risk protection in Bangladesh: an assessment of universal health coverage.** *International Journal for Equity in Health.* 2017;16:59

資料 8 Global Health Diplomacy Workshop in Japan, Agenda

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一般-002）

平成 29 年度総括研究報告書

総括研究報告書

主任研究

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研究要旨

2016 年の G7 伊勢志摩サミット・神戸保健大臣会合では、議長国である日本が中心となり世界を巻き込んだ政策形成が行われ、グローバルヘルス分野における我が国のプレゼンスが確実に示された。G7 を終えた現在も、我が国が主導してグローバルヘルスの課題を前進させ、主要会合において効果的に議論を先導する役割を果たす必要がある。今年度はまず初めに G7 伊勢志摩サミットのプロセスを通じて我が国がグローバルヘルスにどのように貢献したかについて分析を行った。加えて、日本がグローバルヘルス分野優先領域として定めているユニバーサル・ヘルス・カバレッジ（UHC）については、現在世界的にも大きな政策目標となっており、我が国の知見がアジア諸国を中心とした発展途上国から求められている。また、低成長と少子高齢化の中で多くの課題が噴出し、我が国がどのように対応していくかが世界の注目を集めている。このような状況を踏まえ、WHO の Asia-Pacific Health Observatory（APO）の枠組みを活用し、我が国の保健医療制度の現状と課題及び将来像を、実証的かつ包括的に分析した「Health Systems in Transition (HIT)」を刊行した。加えて、人口動態や疾病構造の劇的な変化が都道府県レベルでどのような影響を及ぼしているかを詳細に分析した。さらには、このようにして得られた知見が、今後 UHC の達成を目指している各国においてどの程度有用であるかを検証するために、アジア地域を中心とした各国の UHC 達成状況について評価を行った。なお日本・諸外国共に UHC を含めた今後のグローバル・ヘルスの推進には人材育成が急務であることから、本研究ではタイ公衆衛生省等と協力し、ワークショップの開催並びに人材開発プログラムの策定を実施した。

これらの研究から得られた知見は、今後 UHC 達成を目指す各国にとって、社会経済状況や疾病構造の変化とそれが保健医療政策に及ぼす影響についての対処を講じるために有用となるとともに、我が国が国際会議等の場で UHC の議論に参画する際の基盤となる知識を提供するものである。

A. 研究目的

2016年のG7伊勢志摩サミット・神戸保健大臣会合では、議長国である日本が中心となり世界を巻き込んだ政策形成が行われ、グローバルヘルス分野における我が国のプレゼンスが確実に示された。G7を終えた現在も、我が国が主導してグローバルヘルスの課題を前進させ、主要会合において効果的に議論を先導する役割を果たす必要がある。しかし、これまで、国際的議論の場における戦略的介入に関する系統的な分析は我が国では行われていない。

政策分析と定量的分析の2つのアプローチを有機的に用いて、今後のWHO主要会合において我が国がより効果的にイニシアチブを取るための方策を提案する。先のG7に向けて我が国の国際保健外交政策の現場に参画し政策指針をまとめた実績ある研究者が、政府及びWHO関係者らと共同で分析を行うために、成果が確実に期待できる。さらに、特に若手の政府人材を含む将来の国際保健人材に対し会議等でのスピーチや交渉、ファシリテーションの能力開発、効果的・戦略的介入のためのワークショップ開催を行うとともに、政府代表団に同行し実際の各種会合において直接的な技術支援も提供する。

上記目的を視野に平成29年度は以下4つの研究を実施する。

- 1) 2016年G7伊勢志摩サミットを通じた、我が国のグローバルヘルス分野への貢献に関する分析
- 2) 我が国がグローバルヘルス分野の重点課

題としてあげるUHCに焦点を当て、我が国の医療保健制度を包括的に分析し、諸外国がUHC達成を目指すうえで有用な知見の抽出

- 3) 上記2)の成果がどのように諸外国にとって有用となりうるかを検討するために、アジア諸国を中心とした低中所得国におけるUHC達成状況の評価
- 4) タイと共同でグローバルヘルス領域の人材育成ワークショップの開催並びに人材育成プログラムの開発

本研究の成果は、我が国のグローバルヘルスにおけるプレゼンスと知的貢献の強化に直接資するものであり、我が国の国際保健外交戦略とも合致した内容である。主な成果物は、政府へ向けたWHO主要会合のための戦略提言書、学術論文、効果的・戦略的介入のためのマニュアル開発とワークショップ開催である。若手人材の能力開発や政府代表団への技術支援は、我が国における保健医療政策分析人材の知的・人的貢献のプールを作ることにも視野に入れている。

B. 研究方法

平成29年度は主に以下を実施する。

1. 第71回WHO総会視察(5月:ジュネーブ):5月に開催予定のWHO総会に向けて我が国の重要議題や比較優位生がある議題を中心に、過去の議論の経緯を分析するとともに、分担研究者・研究協力者数名が政府代表団に同行し、会議における討議内容や状況、具体的な進行の様子や、我が国及び主要参加国(G7・新興国)のプレゼンスや貢献の様子

を視察する。

2. タイとの共同ワークショップの開催：日本（東京）及びタイの双方で保健関連会合における両国のプレゼンスや貢献に係る課題を中心に情報交換を行う。また会議における政府関係者のスピーチや交渉、ファシリテーションの能力開発を目的としたワークショップを開催する。

3. APO との協働：タイ IHPP（International Health Policy Program）と東京大学国際保健政策学教室がリサーチハブを務める Asia Pacific Observatory (APO)内における研究協力、および研究を通じたアジア域内の若手研究者の能力強化も行なっていく。

C. 研究結果

G7 を通じた我が国の貢献については、実際に G7 伊勢志摩のプロセスに関わった研究者・行政官を中心に、UHC を取り上げて分析を行い、その成果は WHO bulletin に掲載された。平成 30 年以降についても引き続き、Health Security、Antimicrobial Resistance、医薬品 R&D、結核対策、非感染性疾患（NCDs）等の主要課題における我が国の貢献について検証を行って行く。

グローバルヘルスにおける我が国のプレゼンス向上を目指す上で、グローバルヘルスの主要課題について我が国での現状及び課題についても適切に把握することが必要である。平成 29 度は UHC に焦点を当て、世界で最も高齢化が進んだ日本の医療制度を英語で包括的に取りまとめた Japan Health Systems in Transition (HiT) レポートを刊行し

た。本レポートは今後広く、日本の保健医療制度を参照する際の有用なツールとなることが期待される。

東京大学国際保健政策学教室（GHP）並びに、タイ IHPP（International Health Policy Programme）では、WHO が事務局をホストするパートナーシップである Asia Pacific Observatory (APO) のリサーチハブに任命されている。今回の HiT レポートの刊行はこの APO の活動の一環でもある。また、APO は政策研究を通じてアジア太平洋域内における、政策実務者並びに若手研究者の能力強化を行うことをその活動目的の一つとして掲げており、リサーチハブである GHP および IHPP は APO の各種活動を通じて技術支援を提供している。具体的には、APO の board meeting に計 3 回参加し、APO が実施する各種プロジェクトに対する技術的支援を提供した他、スリランカにおける HiT レポート作成支援を行なっている。平成 30 年度は引き続き APO の活動に参画し、諸外国における HiT レポートの作成を支援するとともに、IHPP を中心にアジア域内のグローバルヘルス主要課題に関する共同研究を行なっていく。

なお、APO の活動については、2017 年 7 月に日本がホストした日 ASEAN 保健大臣会合成果物に当たる日 ASEAN 保健大臣会合宣言にも明記されており、当教室が実施する研究支援活動は、日 ASEAN 保健大臣宣言の着実な履行を示す一助ともなる。

日本の医療制度研究に並行して、我が国の健康指標についても包括的検証を行なった。少子高齢化及び疾病構造の変化が医療制度にもたらす影響は日本全体の課題であるが、その影響は地域（都道府県）によって大きく異なる。GDB（Global Burden of Disease）の手法を用いて、1990年から2015年の間における各都道府県における平均寿命、健康寿命、主要死因、DALY及びリスク因子等に関する都道府県レベルでの変化に関する分析を行った。1990年から2015年の間で、平均寿命は4.3年、健康寿命は3.5年の伸びが見られたが、同時に都道府県間の格差も2.5年から3.1年(平均寿命)、2.3年から2.7年(健康寿命)へと拡大が見られた。都道府県格差が生じる要因としてリスク因子、医療インプット（医療従事者数等）の分析を行ったが有意差は得られなかった。平成30年度は都道府県の健康格差を生む要因についてより詳細な分析を行っていく予定である。

上記2)の成果がどのように諸外国にとって有用となりうるかを検討するために、アフガニスタン、パキスタン、ネパール、バングラデシュ、インドの合計5カ国におけるUHC達成状況の評価を実施した。平成30年度は対象国を拡大するとともに、1),2)で得られた知見を踏まえ、UHC分野において我が国がより良い貢献をできるための各種方策について提言を取りまとめて行く。

D. 考察

1) 本研究の成果は、我が国のグローバルヘルスにおけるプレゼンスと知的貢献の強化に直接資する。つまりそれは、国際貢献とい

う観点のみならず、我が国の国際保健外交戦略とも合致した内容である。2) 本研究の主な成果物としては、政府へ向けたWHO主要会合のための戦略提言書及び学術論文のみならず、効果的・戦略的介入のためのマニュアル開発とワークショップ開催である。これまで重点的に分析されてこなかった我が国のWHO等会合におけるプレゼンスや優位性、弱点を包括的に分析し、保健医療研究者と政策決定者の連携をとりながら、より戦略的・効果的なイニシアチブの取り方を提案する。本研究を通して得られた手法や成果はすべて一般公開し、広く社会へ還元していく。3) 本研究では、若手の政府人材を含む将来の国際保健人材に対し会議等でのスピーチや交渉、ファシリテーションの能力開発を行うとともに、我が国における保健医療政策分析人材の知的・人的貢献のプールを作ることも視野に入れる。

E. 結論

2016年G7伊勢志摩サミット及び関連会合を通じて我が国はグローバルヘルスを積極的に牽引してきた。とりわけ、現在、グローバルヘルスにおける最重要課題であるUHCへの貢献は大きい。我が国では1961年に国民皆保険制度を達成し、以降人口動態や疾病構造の変化を踏まえて数々の制度改革を繰り返し、現在では世界有数の健康指標を達成している。一方で、アジア地域の多くの国では未だUHC達成の途上であり、我が国がこれまで経験してきた成功例・失敗例の双方が有用となりうる。我が国が今後も引き続き当該分野においてリーダーシップを発揮すると

ともに、UHC 以外の重要課題 (Health Security、NCDs 等) においても同様のリーダーシップを発揮することが望まれる。

F. 健康危険情報

特になし

G. 研究発表

1. 論文発表

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Sakamoto H, Rahman MM, Nomura S, Okamoto E, Koike S, Yasunaga H et al. **Japan Health System Review**. Vol. 8 No. 1. New Delhi: World Health Organization, Regional Office for South-East Asia, 2018

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Rahman SM, Rahman MM, Gilmour S, Abe SK, Shibuya K. Trends in, and projections of, indicators of universal health coverage in Bangladesh, 1995–2030: a Bayesian analysis of population-based household data. *Lancet Glob Health*. 2018, 6(1): e84-e94

Rahman MM, Parsons A, Rahman MS, Karan A, Abe SK, Bilano, Awan R, Gilmour S, Shibuya K. Progress towards universal health coverage: a comparative analysis in five South Asian countries. *JAMA Intern Med*. 2017 177(9): 1297-1305.

Islam MR, Rahman MS, Islam Z, Zhang C, Sultana P, Rahman MM. Inequalities in financial risk protection in Bangladesh: an assessment of universal health coverage. *International Journal for Equity in Health*. 2017;16:59

2. 学会発表

特になし

H. 知的財産権の出願・登録状況

(予定を含む。)

1. 特許取得

特になし

2. 実用新案登録

特になし

3. その他

特になし

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平成 29 年度分担研究報告書

Japan's contribution to global health – leveraging G7 presidency

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研究要旨

Universal Health Coverage (UHC) is defined as health coverage where everyone could have an access to the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective with adequate financial protection and is one of the major targets among the Sustainable Development Goals (SDGs). There is now more momentum than ever for achieving UHC by 2030. Also, the world is now facing rapidly ageing society regardless of their economic growth and it is estimated that by 2050, 80% of older people will be living in low- and middle- income countries. Because such demographic changes can significantly influence a country's health system, we must consider the implications of an ageing society when we accelerate our efforts toward UHC. As the G7 president in 2016 as well as the most aged country in the world, Japan accelerated this agenda by showing strong political commitment to UHC and active ageing. With the objective of providing a model for global health diplomacy based on its experience as the G7 president, in this research, we analyzed how Japan could put UHC and active ageing at the top of the political agenda on a global level.

A . 研究目的

According to the World Health Organization (WHO), universal health coverage (UHC) “means that all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship.” One main aim of the Agenda for Sustainable Development, as adopted at the United Nations (UN) General Assembly in 2015, is to achieve such coverage by 2030.

For several decades, the Japanese government has prioritized global health in its international diplomacy. For example, in all of the summits of the Group of Seven (G7) industrialized nations that Japan has hosted, global health has been a main item on the agenda. Japan initiated the creation of the Global Fund to Fight AIDS, Tuberculosis and Malaria and promoted global efforts dedicated to health systems strengthening. When Japan last held the G7 presidency, in 2016, much of its focus was on global health and, particularly, on UHC. In the promotion of UHC to the top of the political agenda at a global level, the experience that the Japanese government gained in 2016, in terms of global health diplomacy, could serve as a useful cornerstone.

In April–June 2016, we conducted interviews with employees of the Japanese ministries of finance, foreign affairs and health, labour and welfare who worked in departments connected to global health. Our aims were to investigate the preparatory process behind the 2016 G7 summit – which was held in the Ise-Shima area of Japan on 26–27 May 2016 – and its related meetings, investigate how the Japanese government obtained consensus among the diverse stakeholders involved in the summit and determine which people and which other factors appeared most important in the global promotion of UHC.

B . 研究方法

We conducted interviews with staff members employed by departments connected to global health at the Ministry of Health, Labour and Welfare (MHLW), the Ministry of Foreign Affairs (MOFA) and the Ministry of Finance (MOF) of Japan in 2016. The purpose of the interviews was to ascertain the preparatory process of the G7 and its related meetings, how the government got consensus among diverse stakeholders in the G7 and its related meetings’ outcome documents, and who and what were key influential factors for attaining the highest political attention towards UHC. Based on these findings, we analyzed the political processes behind UHC according to Shiffman’s framework. Proposed by J. Shiffman et al in 2016, this framework established a method for analyzing global health networks. Though this framework was originally applied to stakeholder analysis, it is now widely used for political analysis, especially in the global health realm. It consists of three categories: (1) actor, (2) policy environment, and (3) issue characteristics. The *actor* category consists of leadership, governance, composition, and framing strategies, while the *policy environment* includes allies and opponents, funding, and norms. *Issue characteristics* refer to severity, tractability, and affected groups.

C . 研究結果

Local setting

By 2016 there was already some precedent for Japan's prioritization of UHC. For several decades, Japan had promoted health systems strengthening – in conjunction with the idea of human security – as a central tenet of its foreign policy. For example, such strengthening was placed high on the agenda of the G8 summit in 2008, which took place at the Japanese town of Toyako. Within Japan, the political will to include UHC as a top priority within the G7 agenda was already present during preparations for the 2016 G7 summit in Ise-Shima and the 2016 G7 health ministers' meeting in Kobe. At the same time, UHC was already central to the global health agenda – as clearly indicated in the sustainable development goals. There was no apparent opposition, from other G7 governments, to the inclusion of UHC on the main agenda of the 2016 G7 summit in Japan. In collaboration with WHO and under the leadership of Chancellor Angela Merkel, the German government, in particular, had already made considerable efforts to promote and support UHC. Responding to the need for health systems strengthening – as indicated in the conclusions of the 2015 G7 summit, which was held in the German village of Krün – Germany began to develop a roadmap towards UHC in 2015. After the 2016 G7 summit, Germany hosted the first meeting of G20 health ministers and this resulted in the so-called Berlin Declaration, which indicated the health ministers' continuous support for UHC.

Approach

In the preparations for the 2016 G7 summit, the strongest drivers for Japan's prioritization of UHC appeared to be three high-level Japanese champions of global health: Prime Minister Shinzo Abe; Yasuhisa Shiozaki – a former Minister of Health, Labour and Welfare; and Professor Keizo Takemi – a member of the House of Councilors.

In 2013, Shinzo Abe had made health one of the main pillars of his new strategy to promote Japan's economic growth and expressed his interest in global health in general and the global achievement of UHC in particular. In 2015, he published an article in *The Lancet* – entitled “Japan's vision for a peaceful and healthier world” – in which he explained how Japan's priorities, as holders of the G7 presidency in 2016, would include UHC. Though it remains unusual for a head of state to summarize their political priorities via a medical journal, this article helped demonstrate the Japanese government's unwavering commitment to the support of UHC globally. Prime Minister Abe also raised the issue of UHC, as an agenda item, in bilateral meetings with several other heads of state and, ultimately, initiated dialogue with G7 governments to cultivate the wider support that enabled Japan to prioritize UHC on the agendas of the 2016 G7 summit and its related meetings.

By 2016, Yasuhisa Shiozaki recognized the main strengths of Japan's health system and the need to communicate more widely with the global community, in an era of globalization. In conveying strong political messages to the global community at several international conferences, he has been a vocal advocate for global health and UHC. Like Prime Minister Abe, he has published articles in internationally

recognized journals while maintaining dialogues, on UHC, with health ministers and heads of international organizations.

Professor Keizo Takemi has drawn on his robust academic and policy-making background and published internationally-recognized papers that appear to have substantially influenced the advisory processes associated with the 2016 G7 summit. He led and coordinated domestic negotiations for the health agenda at the summit while hosting several meetings with relevant ministry officials.

In 2015–2016, Japan hosted several G7 preparatory committee meetings. At these meetings, Japan chaired dialogues, with other G7 nations, that led to the drafting of the main outcome documents of the 2016 G7 summit and related meetings – i.e. the G7 Ise-Shima Declaration and the G7 Kobe Communiqué– and the identification of points of consensus. Over the same period, Japan hosted a series of UHC-relevant conferences: a side event to the Seventieth UN General Assembly in 2015; an international conference on UHC in Tokyo in 2015; and – with Germany as a co-host – a side event to the Sixty-ninth World Health Assembly in 2016. At these conferences, Japan used the outcomes of earlier G7 summits as launch-pads for UHC-focused discussions with the representatives of G7 and other governments.

The Sixth Tokyo International Conference on African Development, held in August 2016, was the first such conference to make health a major agenda item. At the 2016 conference, Yasuhisa Shiozaki and the then President of the World Bank Group, Dr Jim Yong Kim, co-chaired a thematic session entitled “Promoting resilient health systems for quality of life.” In the subsequent negotiations on the conference outcomes, Yasuhisa Shiozaki and relevant ministry officials led the debate – among the representatives of many African countries and international organizations – that ultimately led to the so-called Nairobi Declaration and Nairobi Implementation Plan and the outlines of a framework for interventions to support UHC in Africa. By hosting such high-level events, Japan deepened the UHC debate both within and outside of the G7. The resultant outcome documents, which are widely distributed and read, serve to promote the UHC agenda globally.

Relevant changes

Although the G7 summit in 2016 encouraged the global community’s continued commitment to UHC, that commitment may have been weakened when, in the same year, the UN’s Secretary-General, WHO’s Director-General and several other strong advocates for UHC were replaced. At the end of 2017, however, the participants at the UHC Forum in Tokyo – who included the new Secretary-General, new Director-General and high-level politicians from all over the world – professed their sustained support for UHC.

Changes in financial trends that supported UHC were observed. Historically, UHC and health systems strengthening have been under-funded and most donor funding has gone to vertical programmes, such as those directed at human immunodeficiency virus. In 2016, however, there was a transition in which some

organizations, such as the Global Fund, began to invest in health systems strengthening and UHC. The Global Fund, together with the World Bank Group, announced that it would contribute 24 billion United States dollars (US\$) to those African countries that attempted to achieve UHC by using the framework developed at a side event to the Sixth Tokyo International Conference on African Development. Throughout 2016, when it held the G7 presidency, Japan committed US\$ 1.1 billion to global health institutions. This financial support demonstrated Japan's strong political commitment to addressing the global health challenges highlighted at the 2016 G7 summit.

D . 結論

In Japan in 2016, three strong champions for UHC came to the fore: Shinzo Abe, Yasuhisa Shiozaki and Keizo Takemi. Strong leadership can push issues to the top of the political agenda very effectively and the hosting of high-level political dialogue, both within and outside of G7, can be a very strong driver in promoting a policy agenda. The outcomes of the 2016 G7 summit and related meetings in Japan – e.g. the the G7 Ise-Shima Declaration and the G7 Kobe Communiqué – are expected to be the basis for future policy-making. Although G7 is an influential body with respect to global health, it cannot raise awareness and move forward the global health agenda optimally without the support of other stakeholders and expansion of the debate beyond G7. In 2019, the G20 summit and the UN high-level meeting on UHC should provide further opportunities for promoting UHC at scale.

One remaining potential issue is that, in the global promotion of UHC, Japan has had several powerful allies and no obvious vocal opponents. It has been suggested that too many allies can be detrimental and lead to policy fragmentation. Countries may squabble over the control and development of global policy. Although the UHC2030 platform was launched as an international framework to coordinate the efforts, by relevant stakeholders and various initiatives, to develop UHC globally, the coordination is still a work-in-progress. Ultimately, however, UHC2030 is expected to catalyse various initiatives and leverage the expertise of all relevant stakeholders.

E . 研究発表

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2. 学会発表

特になし

F. 知的財産権の出願・登録状況

(予定を含む。)

1. 特許取得

特になし

2. 実用新案登録

特になし

3. その他

特になし

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平成 29 年度分担研究報告書

Context and challenges of Japan's health system

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研究要旨

UHC（すべての人に基本的な保健サービスを支払い可能な価格で普及させること）が大きな政策目標となったグローバルヘルス分野において、我が国の知見がアジア諸国を中心とした発展途上国から求められている。また、低成長と少子高齢化の中で多くの課題が噴出し、我が国がどのように対応していくかが世界の注目を集めている。UHC は WHO 総会をはじめとして各種国際会議にて必出の議題となっており、また 2019 年には UHC に関する国連ハイレベル会合の開催も予定されており、UHC に関する議論は今後も盛り上がる事が予想される。本研究は、WHO 総会等の主要会合における日本のプレゼンス向上を大目標に掲げるものであるが、とりわけ、G7 伊勢志摩サミット以降日本が牽引し、また今後国際的にも議論が盛り上がるであろう UHC に焦点を当て、UHC を推進する上で我が国の比較優位性を抽出するものである。主な研究目的は 1) WHO Asia-Pacific Health Observatory (APO) の枠組みを活用し、我が国の保健医療制度の現状と課題及び将来像を、実証的かつ包括的に分析すること、 2) Global Burden of Disease (GBD)の枠組みを用い、人口動態や疾病構造の劇的な変化が都道府県レベルでどのような影響を及ぼしているかを明らかにすることで、UHC 達成に必要な格差解消への示唆を得ることである。得られた成果については 2018 年 2 月に Japan Health System Review (HiT レポート) の形で公表した他、peer-reviewed journal にも各種成果を発表している。これらの研究から得られた知見は、UHC 達成を目指す各国にとって、社会経済状況や疾病構造の変化とそれが保健医療政策に及ぼす影響についての対処を講じるために有用となるとともに、今後、国際会議等の場における UHC 関連議論において、我が国が積極的に打ち出す内容への基盤となるものである。

A．研究目的

近年、わが国の優れた保健医療制度の持続可能性は、人口や政治経済の諸要因によって脅かされている。研究代表者は、2015年、20年後の保健医療のあり方を検討する厚生労働大臣の私的懇談会「保健医療2035」の座長を務めた。既存の枠組みや制約にできるだけとらわれず、システムとしての保健医療のあり方の転換や求められる変革の方向性を議論した。保健医療のパラダイムが大きく変わる中で、わが国がとるべき道は次の3つであることを提言した。第1に、「保健医療の価値を高める」ことである。換言すれば、より良い医療をより安く享受できるように、医療の質の向上や効率化を促進し、地域主体でその特性に応じて保健医療を再編していくことである。2つ目は、「個人の主体的選択を社会で支える」ことである。患者は基本的に受け身であり、どの医療機関にかかるべきかなどの情報を持っていない。今後は、人々が自ら健康の維持や増進に主体的に関与できるようにする。また、健康は個人の自助努力のみで維持・増進できるものではなく、個人を取り巻く職場や地域などの様々な社会環境、いわゆる「健康の社会的決定要因」を考慮することが求められる。最後に、「日本が世界の保健医療をけん引する」ことである。日本がグローバルなルールづくりに積極的に関与し、諸外国の保健医療水準を向上させることで、わが国の保健医療の向上や経済成長に資する好循環を生み出す。高齢化、生活習慣病のまん延や医師不足は、日本の地域医療のみならず世界共通の課題であり、我が国からの発信は世界的に大きなインパクトが

ある。

このような「保健医療2035に掲げられた」日本が世界の保健医療を牽引する」というビジョンを達成するためには、その基盤として我が国の保健医療制度を包括的に分析し、且つ保健政策立案や保健介入における優先順位決定を適切に行うことが必要不可欠である。本研究は、WHOのAsia Pacific Observatory on Health Systems and Policies (APO)との連携のもと、我が国の保健医療制度の現状と課題、そして、将来像を実証的かつ包括的に分析し、グローバルヘルス政策に資することを主な目的とする。

B．研究方法

本研究では、APOの枠組みを活用し、我が国の保健医療制度について包括的な分析を行うとともに、都道府県別の疾病負荷分析を行う。そのために、疫学、統計学、計量経済学、情報工学などの数量分析手法を駆使し、国内外の疾病負荷研究統括の実績のある研究代表者のリーダーシップのもと、異なる学問分野で実績のある研究者が連携して行う学際的な共同研究を推進する。それぞれ関連した研究項目に関して、時空間ベイズモデル、ベイズ統計を用いた小地域推計 (small area analysis)、疾病のミクロシミュレーション、系統的レビュー、メタ分析、メタ回帰分析、世帯調査等の個票分析などの数量分析を行う。さらに、本研究成果をより多くの研究者や一般の方が利用できるように、HiTレポートについては印刷の上、広く関係者に配布するとともに、得られた研究成果については既

存のデータビジュアル化のためのウェブツールに広く公開する。本研究を今後の世界標準とするためにも、報告書作成や内外の専門誌への投稿、国民への発信等を通じて、研究成果を広く社会へ還元する。実際に筆者らが実施した先行研究の成果については MEDITECH FINDER (<http://meditechfinder.org/en/>) というサイトに掲載し広く一般公開を行っているが、本研究成果についても順次掲載予定である。

C . 研究結果

C.1. 平均寿命及び健康寿命

1990 年から 2015 年の間に日本全体での平均余命は 4.2 年(79 歳から 83.2 歳)延長したが、都道府県の間でその進捗には差異があり、平均寿命の伸びが一番短い沖縄県では 3.2 年の伸長だったのに対し、滋賀では 4.8 年の伸長が見られた。同時期に都道府県間の平均余命格差(平均余命が最も長い県と最も短い県の差異)も 2.5 年から 3.1 年へと拡大を見せた。健康寿命は 1990 年の 70.4 歳から 2015 年には 73.9 歳へと延長したが、平均寿命と同様に都道府県間の格差は同時期に 2.3 年から 2.7 年へと拡大した。

C.2. 主要死因、DALYs、YLLs、YLDs

1990 年から 2015 年の間で、死亡率については日本全体では 29.0%の減少が見られたが、こちらも地域格差が大きく、一番減少率が高い滋賀県では 32.4%だったのに対し、減少率が一番低い沖縄県では 22.0%だった。DALYs、YLLs、YLDs の減少率はそれぞれ 19.8%、33.4%、3.5%であったが、この結果からは総

死亡に比較して若年死亡が大幅に減少したことを示唆している。上位 3 位の死因は 1990 年から 2015 年まで一貫して脳血管疾患、心血管疾患、呼吸器疾患となっている。これら主要死因による死亡率は 1990 年から大幅に減少したものの(各々 -19.3%、-11.6%、-6.5%の減少率)、2005 年以降は年間の減少率に男女共鈍化が見られており、さらに上位 10 死因のうち、アルツハイマー病だけは唯一年齢調整死亡率の上昇が見られた。

主要死因の年齢調整死亡率は都道府県間によって差が大きく、例えば、脳血管疾患による死亡率が一番高い岩手県(10 万人当たり 62.0 人)と一番低い滋賀県(10 万人当たり 37.9 人)の間では 1.6 倍の開きがあった(10 万人当たり 37.9 人)。DALY についても都道府県間での差異を分析したところ、脳血管疾患や虚血性心疾患と行った生存を脅かし得る疾患については 47 都道府県の間で大きな違いが見られたのに対し、例えば腰痛や感覚器障害と行った、致死性ではない疾患については都道府県の間で有意差は見られなかった。

C.3. 主要危険因子

全死因のうち、47.1%は危険因子が同定可能であった：行動様式に由来するリスクが 33.7%、代謝リスクが 24.5%、環境および職業上のリスクが 6.7%であった。同様に、DALYs のうち 34.5%はリスク要因が同定可能であった。行動様式に由来するリスクのうち、主なものとして食塩摂取や喫煙習慣が挙げられるが、これら高リスク行動様式を有す

る割合と都道府県間の健康指標の間には優位な相関関係は見られず、先に報告した平均寿命や疾患別死亡率、DALYs の地域差を説明する結果とはならなかった。

最後に、都道府県間における健康指標格差の要因として、各地域における医療資源の投入状況の関係（人口当たりの医療従事者数、一人当たり医療費）についても分析を行ったが、総死亡率及び DALYs のいずれについても有意差は得られなかった。

D . 結論

我が国は 1989 年から一貫して世界第 1 位の平均寿命を誇っているが（東日本大震災があった 2011 年は除く）これは特に心血管疾患及び悪性新生物による死因が減少したことが大きい。しかしながら、2005 年を境に年齢調整死亡率・DALYs とともに減少のスピードは鈍化を見せており、「保健医療 2035」で提示されたようなパラダイムシフトが今まさに求められていると言える。

平均寿命や健康寿命の地域格差は拡大傾向にあり、先行研究でも指摘されてきた通り、北日本に行くにつれその健康指標は悪化が見られる。これは、人口動態や疾病構造の変化への対応が地域間で公平ではなかったことを示唆するものであり、今後は各都道府県の事情に合わせた医療制度の構築が求められる。このような地域格差を生む要因として、生活習慣（食塩摂取や喫煙）との関連性を分析したが有意差は得られなかった。この結果からは医療制度の差といったその他の誘因

によって地域差が惹起されている可能性があるが、他方で、地域レベルにおける危険因子に関するデータが本研究では不十分だった可能性もあり、この点については今後、さらなる検証が必要である。同様に、地域レベルでの医療資源の投入（人口当たりの医療従事者数、一人当たり医療費）と健康指標の地域間格差についても分析を行ったが有意差が得られなかった。今後は、健康指標に影響を与えるその他の社会経済的要因について分析が必要である。

全世界的に共通であるが過去 25 年の間に死亡率は大きな減少を見せた。我が国においてもその傾向は同じであるが、他方、主要死因については依然として脳血管疾患・心血管疾患・呼吸器系感染症となっている。言い換えれば、我々はこれら主要死因に対する方策をさらにスケールアップすることが必要である。同時に、政策決定プロセスの中に費用対効果の視点を取り、有用な予防手段への積極的な投資を進めていくことが必要である。

日本人の死因に寄与する主要なリスクファクターのうち、行動様式に関するリスクが最大であるが、中でも喫煙対策は喫緊の課題である。2020 年に東京オリンピック開催を控えている我が国において、タバコフリーオリンピックの開催は責務でもあり、より一層の対策強化が求められる。

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2. 学会発表

Japan Health System Review – launch event
Prince Mahidol Award Conference, Feb 2018

F. 知的財産権の出願・登録状況

(予定を含む。)

1. 特許取得

特になし

2. 実用新案登録

特になし

3. その他

特になし

厚生労働科学研究費補助金（地球規模保健課題推進研究事業）

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平成 29 年度分担研究報告書

Health care financing in low- and middle- income countries

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研究要旨

Achieving universal health coverage is one of the key targets in the newly adopted Sustainable Development Goals of the United Nations. To investigate progress toward universal health coverage in 5 South Asian countries and assess inequalities in health services and financial risk protection indicators. In a population-based study, nationally representative household survey data from Afghanistan, Bangladesh, India, Nepal, and Pakistan were used to calculate relative indices of health coverage, financial risk protection, and inequality in coverage among wealth quintiles. The study was conducted from June 2012 to February 2016. Three dimensions of universal health coverage were assessed: access to basic services, financial risk protection, and equity. Composite and indicator-specific coverage rates, stratified by wealth quintiles, were then estimated. Slope and relative index of inequality were used to assess inequalities in service and financial indicators.

Access to basic care varied substantially across all South Asian countries. Financial risk protection was generally low as well in all South Asian countries. Access to at least 4 antenatal care visits, institutional delivery, and presence of skilled attendant during delivery were at least 3 times higher among the wealthiest mothers in Afghanistan, Bangladesh, Nepal, and Pakistan compared with the rates among poor mothers. Access to institutional delivery was 60 to 65 percentage points higher among wealthy than poor mothers in Afghanistan, Bangladesh, Nepal, and Pakistan compared with 21 percentage points higher in India. Coverage was least equitable among the countries for adequate sanitation, institutional delivery, and the presence of skilled birth attendants. Health coverage and financial risk protection was low, and inequality in access to health care remains a serious issue for these South Asian countries. Greater progress is needed to improve treatment and preventive services and financial security

A . 研究目的

In the United Nations' newly adopted Sustainable Development Goals, universal health coverage is promoted as an essential precondition for health and human security, particularly in low- and lower middle-income countries. The main goal of universal health coverage is to ensure that everyone who needs health care services is able to gain access to them without incurring financial hardship. The key targets of universal health coverage are to achieve at least 80% essential health service coverage and 100% protection from catastrophic health payment and impoverishment by 2030. Universal health coverage is now seen as an important component in the response to the global epidemic of noncommunicable diseases (NCDs), managing the epidemiologic transition and ensuring affordable and equitable access to care.

All World Health Organization member states have committed to universal health coverage and all developing countries are already pursuing universal health coverage policies with the intention of extending health coverage, but at the present only 20 developing countries have been identified as having made good progress toward universal health coverage. Effective and continuous monitoring and tracking are necessary to ensure that policymakers can manage new initiatives efficiently and program development continues in line with Sustainable Development Goal 3-related indicators.

The World Health Organization proposed 3 core dimensions of universal health coverage: the proportion of a population covered by existing health care systems, the range of health care services available to a population, and the extent of financial risk protection available to local populations. These dimensions are interdependent and can be measured in several ways. Assessing the services' coverage and financial risk protection indicators is the most commonly recommended method by the World Health Organization to track the progress toward universal health coverage, as these indicators help to define where a country may best seek to improve its health care system. Assessment is particularly lacking in the South Asian region, where health systems are typically underfunded and poorly functioning, which can impede data gathering and tracking.

Many South Asian countries are simultaneously facing the double burden of disease and low health service coverage; patients' out-of-pocket payments remain the most common source of funding for health care in these countries. Inequality is another concern in these countries, and disadvantaged populations are often unable to afford health care services. Inadequate public funding for health services, limited access to health insurance plans, and high out-of-pocket payments can trigger asset depletion, indebtedness, and reductions in essential consumption, leading to financial catastrophe, impoverishment, and reduced access

to health care services.

To measure and track countries' progress toward universal health coverage, we estimated a range of indicators of service coverage and financial risk protection using primary survey data from 5 South Asian countries: Afghanistan, Bangladesh, India, Nepal, and Pakistan. We examined service coverage indicators reflecting health promotion, disease prevention, and specific treatment areas. We assessed the extent of financial risk protection by measuring the incidence of catastrophic and impoverishing health expenditures associated with out-of-pocket payments. We also calculated measures of equity among wealth quintiles in each country, and composite indices were generated for country-level comparisons. The study was conducted from June 2012 to February 2016.

B . 研究方法

Data Sources

For each country, we used the most recent country-specific, nationally representative, primary survey data to calculate estimates of health coverage and financial risk protection indicators based on previously described statistical methods of health coverage modeling⁴: Afghanistan (2014 and 2015), Bangladesh (2010 and 2014), India (2012 and 2014), Nepal (2014 and 2015), and Pakistan (2014). Data were deidentified. Data were purchased from the selected countries, which had already obtained approval in conducting their surveys. In addition,

we obtained data for gross domestic product, health expenditure, life expectancy, total fertility rate, and other demographic statistics from the World Bank.

Main Outcome Measures and Analysis

Indicators for each dimension of universal health coverage, along with measures of overall equitability, were calculated from the aforementioned survey database on standard techniques, which are summarized herein.

Health Service Coverage

Health service tracking is typically assessed through coverage of prevention measures and treatment measures. To be consistent with previous studies, we estimated a composite coverage index (CCI) for each country based on 8 interventions from 4 specialties (family planning, maternity care, child immunization, and case management).

$$CCI = 1/4 \left(FPS + \frac{SBA + ANCS}{2} + \frac{2 \cdot DPT3 + MSL + BCG}{4} + \frac{ORT + CPNM}{2} \right)$$

where ANCS indicates antenatal care with a skilled attendant; BCG, BCG immunization; CPNM, care-seeking for pneumonia; DPT3, 3 doses of diphtheria-tetanus-pertussis immunization; FPS, family planning needs satisfied; MSL, measles immunization; ORT, oral rehydration therapy for children with diarrhea; and SBA, presence of a skilled birth attendant.

Similar to previous studies, we used random-effects meta-analysis (Stata command: `metaprop_one`) to estimate the mean proportion for the composite prevention index based on 11 prevention indicators and the composite treatment index based on 4 treatment indicators. We compared this pooled mean proportion from meta-analysis with the arithmetic mean proportion across health-related indicators, which is a commonly used alternative measurement of coverage, and found almost identical results. For comparison purposes, we did not include diabetes and hypertension treatment indicators in the composite treatment index estimation because these 2 indicators were available for only Bangladesh and India. We assessed the diabetes and hypertension treatment indicators separately.

Financial Risk Protection

Financial risk protection was assessed through incidence of catastrophic and impoverishing out-of-pocket health payments. Household expenditure is treated as catastrophic if it exceeds a threshold of 10% of household total consumption expenditure. Health expenditure was defined as impoverishing when a non-poor household became poor due to out-of-pocket payments for health care. Impoverishment was estimated using total household consumption expenditure calculated separately with and without out-of-pocket payments for health care.

Measures of Inequality

To summarize wealth-based inequalities in health service coverage and financial risk, we used 2 indices: slope index of inequality (SII) and relative index of inequality (RII). We calculated both indices using logistic regression models that take into account the whole population distribution of wealth. The SII and RII were estimated by regressing health service and financial indicators outcomes against an individual's relative rank in the cumulative distribution of wealth. The SII expresses the absolute difference in coverage in percentage points between the extremes of the wealth distribution (from top to bottom) and gives an idea of the actual effort that will be needed to close the gap. A positive value of SII indicates that intervention coverage is higher in wealthy households compared with poor ones; for example, measles vaccine coverage among the wealthy population is 60 percentage points higher than among the poor population. By contrast, the RII measures the ratio of intervention coverage for poor and wealthy households and provides an idea about the degree of inequity; for example, polio vaccine coverage in the wealthiest households is 1.3 $([1.3 - 1] \cdot 100\% = 30\%)$ times higher than in the poorest households.

C . 研究結果

Sociodemographic Context

There were notable differences in wealth, health indicators, and health systems across South Asian countries (**Table 1**). The 5 included South

Asian countries have a population of 1.72 billion, with the largest in India (1.31 billion) and smallest in Nepal (28 million). Poverty rate as a percentage of the population ranged from 21.9% (India) to 35.8% (Afghanistan). Gross domestic product spending on health varies: 8.2% in Afghanistan, 2.8% in Bangladesh, 4.7% in India, 5.8% in Nepal, and 2.6% in Pakistan. Women have a longer life expectancy than men in all 5 South Asian countries, ranging from 61.6 years in Afghanistan to 72.9 years in Bangladesh. A total of 335 373 households were included in this study.

Health Service Coverage

Table 2 presents a set of tracer indicators with summary measures of prevention and treatment intervention coverage in the most recent survey year. Access to basic care varied substantially across all South Asian countries, with mean rates of overall prevention coverage of 53.0% (95% CI, 42.2%-63.6%) in Afghanistan, 76.5% (95% CI, 61.0%-89.0%) in Bangladesh, 74.2% (95% CI, 57.0%-88.1%) in India, 76.8% (95% CI, 66.5%-85.7%) in Nepal, and 69.8% (95% CI, 58.3%-80.2%) in Pakistan. Access to specific prevention services varied similarly, with mean rates of adequate sanitation and measles immunization of 33.7% (95% CI, 33.1%-34.3%) and 60.1% (95% CI, 58.8%-61.4%) in Afghanistan, 68.8% (95% CI, 68.1%-69.5%) and 86.2% (95% CI, 84.5%-87.9%) in Bangladesh, 57.9% (95% CI, 57.5%-58.3%) and 70.7% (95% CI, 70.4%-71.0%) in India, 74.4% (95% CI,

73.6%-75.2%) and 89.7% (95% CI, 87.8%-91.6%) in Nepal, and 74.0% (95% CI, 73.6%-74.3%) and 70.6% (95% CI, 69.6%-71.6%) in Pakistan.

The mean treatment coverage also varied across all 5 South Asian countries, with a coverage rate of 51.2% (95% CI, 45.2%-57.1%) in Afghanistan, 44.8% (95% CI, 37.1%-52.5%) in Bangladesh, 83.5% (95% CI, 54.4%-99.1%) in India, 57.8% (95% CI, 50.1%-65.4%) in Nepal, and 50.4% (95% CI, 37.1%-63.6%) in Pakistan. The national coverage of institutional delivery and skilled birth attendance had rates of 52.0% (95% CI, 51.2%-52.7%) and 54.2% (95% CI, 53.5%-54.9%) in Afghanistan, 37.5% (95% CI, 36.1%-38.8%) and 42.1% (95% CI, 40.7%-43.4%) in Bangladesh, 82.2% (95% CI, 81.7%-82.8%) and 39.6% (95% CI, 38.7-40.4) in India, 55.2% (95% CI, 53.0%-57.3%) and 55.6% (95% CI, 53.4%-57.7%) in Nepal, and 61.9% (95% CI, 61.2%-62.7%) and 65.1% (95% CI, 64.4%-65.8%) in Pakistan, respectively. The composite coverage index related to maternal and child health interventions ranged from 54.2% (95% CI, 51.3%-57.1%) (Afghanistan) to 71.0% (95% CI, 68.9%-73.1%) (Bangladesh).

Financial Risk Protection

In all of the study countries, a large proportion of total health expenditures comes from private sources, and out-of-pocket payments are the main sources of funding for health care in Afghanistan, Bangladesh, and India (**Table 1**). A

total of 15.3% (95% CI, 14.7%-16.0%) of households in Afghanistan, 15.8% (95% CI, 14.9%-16.8%) in Bangladesh, 17.9% (95% CI, 17.7%-18.2%) in India, 11.8% (95% CI, 11.8%-11.9%) in Nepal, and 4.4% (95% CI, 4.0%-4.9%) in Pakistan incurred catastrophic health payments (**Table 3**). Of nonpoor households in Afghanistan, Bangladesh, India, and Nepal, 2.9% to 4.9% became poor due to health care costs; this occurred in only 1.4% of households in Pakistan (**Table 3**).

Inequalities in Universal Health Coverage Indicators

The country-specific coverage of prevention and treatment interventions for each quintile in the 5 selected countries is presented in the **Figure**, and the magnitude of inequality as assessed by the RII for each intervention is presented in **Table 4**. Among the prevention and treatment interventions, the most inequitable interventions in most South Asian countries were adequate sanitation, presence of a skilled birth attendant during delivery, institutional delivery, and at least 4 antenatal care visits (except India). Coverage of at least 4 antenatal care visits among wealthy mothers was approximately 11 times higher in Bangladesh, 9 times higher in Pakistan, and 5 times higher in both Afghanistan and Nepal than that among poor mothers. Access to institutional delivery among wealthy mothers was at least 4 times higher in Bangladesh, Afghanistan, and Nepal than poor mothers. Greater inequalities were also observed for

skilled birth attendance coverage, where women in the wealthy population were at least 5 times more likely to have received this service than were women in the poor population in Afghanistan, Bangladesh, and Nepal. Access to institutional delivery was 60 to 65 percentage points higher among wealthy than poor mothers in Afghanistan, Bangladesh, Nepal, and Pakistan compared with 21 percentage points higher in India.

A greater pro-wealthy inequality was also observed for the composite prevention index, composite treatment index, and composite coverage index in all 5 countries (**Figure**). The overall mean treatment coverage among wealthy households was higher by 49 percentage points in Nepal, 40 percentage points in Pakistan and Afghanistan, 36 points in Bangladesh, and 23 points in India than among poor households. In the composite prevention index, a greater pro-wealthy inequality was found in Pakistan (37 percentage points), followed by Afghanistan (31 points), Nepal (27 points), Bangladesh (26 points), and India (18 points). Wide inequality was observed in the management of NCDs (**Table 4**) among the 2 countries for which data were available. Approximately 42% of persons with hypertension received medication to control their blood pressure in Bangladesh compared with 70% in India. In both countries, the poor population was less likely to receive diabetes and hypertension treatment than the wealthy population.

The proportion of financial catastrophe varied substantially across household socioeconomic profiles. On average, wealthy households were more likely to incur catastrophic health expenditures compared with poor households in all South Asian countries except Pakistan, where almost equal proportions of poor and wealthy families incurred financial catastrophe (**Table 3**).

Discussion

To our knowledge, this study is the first attempt to assess the progress toward universal health coverage in select South Asian countries through a comprehensive range of indicators. Our findings show that the mean coverage of populations with essential health care services and financial risk protection against catastrophic health expenditure and impoverishment is low. Inequality in coverage of health services, especially maternal health interventions and financial risk protection, is common in all 5 South Asian countries.

The present study showed that indicators with similar levels of overall coverage often have very different degrees of inequality. The overall prevention coverage ranged from 53.0% in Afghanistan to 76.8% in Nepal and 76.5 % in Bangladesh, while the mean treatment coverage ranged from 44.8% in Bangladesh to 83.5% in India. A composite coverage index related to reproductive, maternal, and child health interventions was the lowest in Afghanistan and highest in Bangladesh. Greater inequality was

seen in both prevention and treatment indicators. Consistent with previous studies, the most inequitable health service indicators in the present study were adequate sanitation, at least 4 antenatal care visits with skilled health personnel, institutional delivery, and the presence of skilled health personnel at birth in most South Asian countries. In all of these indicators, the mean coverage was substantially lower in the poorest population than the wealthy population.

Among prevention indicators, coverage of all child immunization and access to improved drinking water reached the 80% universal health coverage target both at the national and quintile-specific levels only in Bangladesh and Nepal. Despite the large investment in maternal and child health programs in low- and middle-income countries, coverage of most maternal health interventions among the poor population was still low and far from the 80% threshold across all 5 South Asian countries. Similar to another study, professional antenatal care visits and skilled birth attendance at time of birth in the present study had the lowest coverage in Afghanistan compared with the other South Asian countries. In Sustainable Development Goal 3, health intervention coverage of 80% of targets for the poorest population remains out of reach in the immediate future. Therefore, particular efforts should be made to expand the provision of cost-effective priority services to provide a foundation for future developments of low- and middle-priority

services.

In Sustainable Development Goal 3, prevention and promotion of NCDs are also given top priority. However, our study found that approximately 58% of the hypertensive patients in Bangladesh and 30% of those in India were not receiving medication to control hypertension. This percentage contrasts sharply with that in the United States, where 62% of patients with hypertension were receiving antihypertensive treatment and 50% had control of their condition in 2007-2008.

In the case of diabetes management, approximately 57% of diabetic patients in the United States received oral antidiabetic drugs in 2003-2004 and 57% had controlled glycemic levels. Our study found that approximately 38% of patients with diabetes in Bangladesh and 82% in India were receiving antidiabetic treatment. However, our study found greater pro-wealthy inequality in diabetes and hypertension management in these 2 countries.

The low coverage of NCD treatment might be due to high treatment costs. One study found that approximately 12% of households with a patient who had hypertension or diabetes were borrowing money or selling household assets to cope with treatment costs. The US population also experiences significant out-of-pocket spending on NCDs, and diabetes, heart disease, back pain, and hypertension dominate US health

care spending. The most expensive condition, diabetes, accounted for the highest personal health care spending in 2013 in the United States (\$101.4 billion), followed by ischemic heart disease (\$88.1 billion), low back and neck pain (\$87.6 billion), and hypertension (\$83.9 billion) treatment.³³ Therefore, the increasing burden of high treatment cost will also increase national health expenditure and put a substantial burden on the health system unless the health system incorporates an effective strategy to protect households from such high-cost diseases.

On average, more than 1 in 10 households in most of the South Asian region incurred financial catastrophe, and 3% of nonpoor households became poor due to health care costs. Wealthy households in the South Asian countries were more likely to incur catastrophic health payment compared with disadvantaged households. The major reasons for this lower financial risk among the poor population may be due to the low ability to pay and decisions by a significant proportion of poor populations to forego available health care because of financial constraints. In India, some health insurance plans target poor populations; however, reimbursements are lacking for outpatient services and medicines, which is the major reason that people incur high out-of-pocket payments in India.⁸ Nepalese community-based health insurance also offers a special subsidized rate to the extremely poor population. Despite this special attention, disadvantaged populations in Nepal still face

significant financial risk. Similarly, Afghanistan and Bangladesh lack a formal social safety net, and citizens remain financially insecure. Consequently, approximately 15% of households in Afghanistan and Bangladesh were facing financial catastrophe. This level represents a significant challenge for the universal health coverage goal of ensuring 100% financial protection against catastrophic and impoverishing health care payments by 2030.

Although health services coverage is high among wealthy populations in all 5 South Asian countries, the existing health systems fail to ensure equitable access to essential health services and protect households from financial risk associated with health care costs. Health systems reform is therefore essential. Reforms should include strong political commitment, increased government spending on health through budget reallocation, improved service delivery, proper monitoring of subsidized programs, ensuring standardized costs for both official and unofficial fees across all public facilities, and reconsidering both the demand side (committing to proper risk-pooling mechanisms for the whole population, expanding benefits, and reducing cost-sharing) and the supply side (expansion of infrastructure, human resources for health, and health services).

Limitations

Our study has some weaknesses. The first of these is that NCD treatment-related indicators,

including diabetes and hypertension, are lacking in Afghanistan, Nepal, and Pakistan. Although NCDs are now the leading cause of the burden of disease, the availability of data to measure access to basic interventions was limited, at least in these surveys, and did not permit accurate characterization of access. Development of ongoing monitoring systems for the prevalence of NCDs, NCD risk factors, access to NCD care, and quality of care is a challenge for measurement of progress toward universal health coverage. It was also not possible to assess the quality or effectiveness of services available in the countries analyzed. Data availability and quality issues resulted in certain countries being excluded from parts of the analysis, which may limit generalizability. However, our study benefited from the use of a wide range of metrics, including treatment indicators as well as typical prevention and promotion indicators, where data permitted.

D . 結論

Universal health coverage is a crucial step forward for South Asian countries seeking to ensure access to essential health services without imposing financial risk upon citizens. Recent improved service provision in certain key areas is encouraging and highlights the increasing enthusiasm and momentum behind the universal health coverage movement. However, the ultimate challenge for policymakers is not merely to improve clinical services but also to ensure equity in service and treatment coverage

and protection against health care-related financial hardship. The journey toward universal health coverage is far from complete, but with proper attention to access and equity in health, even the poorest nations in South Asia can make steady progress toward achieving health care for all.

E . 研究発表

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2. 学会発表

特になし

F . 知的財産権の出願・登録状況

(予定を含む。)

1. 特許取得

特になし

2. 実用新案登録

特になし

3. その他

特になし

Table 1. Key Socioeconomic and Population Characteristics of the Selected South Asian Countries

Table 1. Key Socioeconomic and Population Characteristics of the Selected South Asian Countries^a

| Indicator | Afghanistan | Bangladesh | India | Nepal | Pakistan |
|--|-------------|------------|---------|-------|----------|
| Socioeconomic | | | | | |
| Total population in 2015, millions, No. | 32.53 | 161.00 | 1311.05 | 28.51 | 188.92 |
| GDP, 2014, US\$ billion | 12.9 | 119.0 | 1600.3 | 12.0 | 151.6 |
| GDP per person, 2014, US\$ | 408.9 | 747.8 | 1235.5 | 425.7 | 819.3 |
| Literacy rate in 2011-2013, % ^b | | | | | |
| Female | 17.6 | 56.2 | 59.3 | 48.8 | 42.0 |
| Male | 45.4 | 63.2 | 78.9 | 71.7 | 67.0 |
| Age dependency ratio in 2014 ^c | 89.8 | 53.7 | 53.1 | 63.7 | 65.8 |
| Poverty in 2011-2012, % of population ^d | 35.8 | 31.5 | 21.9 | 25.2 | NA |
| Health expenditures in 2014 | | | | | |
| Percentage of GDP in THE | 8.2 | 2.8 | 4.7 | 5.8 | 2.6 |
| PHE, % of THE | 35.8 | 27.9 | 30.0 | 40.3 | 35.2 |
| PvtHE, % of THE | 64.2 | 72.1 | 70.0 | 59.7 | 64.8 |
| Out-of-pocket expenditure, % of THE | 63.9 | 67.0 | 62.4 | 47.7 | 56.3 |
| Private insurance, % of PvtHE | NA | NA | 5.0 | NA | 1.0 |
| Life, Birth, and Death | | | | | |
| Mean life expectancy at birth in 2014, y | | | | | |
| Men | 59.2 | 70.4 | 66.6 | 68.2 | 65.3 |
| Women | 61.6 | 72.9 | 69.5 | 71.1 | 67.2 |
| Mean births per woman in 2014, No. | 4.8 | 2.2 | 2.4 | 2.2 | 3.6 |
| NMR per 1000 live births in 2015, % | 35.5 | 23.3 | 27.7 | 22.2 | 45.5 |
| IMR per 1000 live births in 2015, % | 66.3 | 30.7 | 37.9 | 29.4 | 65.8 |
| U5MR per 1000 live births in 2015, % | 91.1 | 37.6 | 47.7 | 35.8 | 81.1 |
| MMR per 100 000 live births in 2013 | 400.0 | 170.0 | 190.0 | 190.0 | 170.0 |

Abbreviations: GDP, gross domestic product; IMR, infant mortality rate; MMR, maternal mortality ratio; NA, not applicable; NMR, neonatal mortality rate; PHE, public health expenditure; PvtHE, private health expenditure; THE, total health expenditure; U5MR, under age 5 years mortality rate.

^a Data are from the World Bank.¹⁹

^b Literacy rate percentage in individuals aged 15 years or older.

^c Age dependency based on working-age population.

^d Poverty headcount ratio at national poverty line.

Table 2. National Coverage of Health Services in 5 South Asian Countries

| Indicator | Coverage, % (95% CI) | | | | |
|--------------------------------------|----------------------|------------------|-------------------------------|------------------|------------------|
| | Afghanistan | Bangladesh | India | Nepal | Pakistan |
| Prevention | | | | | |
| Improved water | 65.3 (64.7-65.8) | 97.8 (97.5-98.0) | 97.9 (97.8-98.0) | 93.3 (92.8-93.7) | 93.3 (93.1-93.5) |
| Adequate sanitation | 33.7 (33.1-34.3) | 68.8 (68.1-69.5) | 57.9 (57.5-58.3) | 74.4 (73.6-75.2) | 74.0 (73.6-74.3) |
| FP needs satisfied | 47.9 (47.3-48.5) | 83.9 (83.3-84.6) | 38.5 (38.1-38.9) | 66.3 (65.3-67.3) | 65.1 (64.5-65.7) |
| ≥1 ANC visit | 57.6 (56.8-58.4) | 63.8 (62.4-65.1) | 96.5 (96.3-96.8) | 67.9 (65.9-69.9) | 77.9 (77.3-78.5) |
| ≥4 ANC visits | 17.3 (16.7-17.9) | 24.6 (23.4-25.9) | 84.2 (83.6-84.7) ^a | 48.4 (46.2-50.5) | 44.6 (43.9-45.4) |
| DPT3 immunization | 58.3 (57.0-59.6) | 91.3 (89.9-92.6) | 59.9 (59.5-60.2) | 87.1 (85.0-89.1) | 66.6 (65.6-67.6) |
| Measles immunization | 60.1 (58.8-61.4) | 86.2 (84.5-87.9) | 70.7 (70.4-71.0) | 89.7 (87.8-91.6) | 70.6 (69.6-71.6) |
| BCG immunization | 73.8 (72.7-74.9) | 97.9 (97.2-98.6) | 87.0 (86.7-87.2) | 95.4 (94.1-96.7) | 87.2 (86.5-87.9) |
| Polio3 immunization | 65.3 (64.1-66.6) | 91.5 (90.2-92.9) | 87.5 (87.3-87.8) | 90.8 (89.0-92.6) | 78.0 (77.1-78.9) |
| Care-seeking for pneumonia | 61.6 (60.0-63.1) | 42.0 (37.2-46.7) | 96.4 (96.1-96.7) | 50.1 (44.9-55.4) | 75.8 (74.2-77.4) |
| Exclusive breastfeeding | 43.3 (41.6-45.1) | 55.3 (51.5-59.1) | 59.0 (58.7-59.3) | 56.9 (52.3-61.4) | 21.7 (20.4-23.0) |
| Treatment^b | | | | | |
| ARI treatment | 54.4 (52.8-55.9) | 34.3 (29.9-39.0) | 96.1 (95.7-96.4) | 74.9 (70.4-79.4) | 34.4 (32.6-36.1) |
| Oral rehydration therapy | 40.7 (39.7-41.7) | 66.1 (61.6-70.5) | 94.8 (94.2-95.3) | 45.9 (42.0-49.7) | 39.9 (38.9-40.9) |
| Skilled birth attendance | 54.2 (53.5-54.9) | 42.1 (40.7-43.4) | 39.6 (38.7-40.4) | 55.6 (53.4-57.7) | 65.1 (64.4-65.8) |
| Institutional delivery | 52.0 (51.2-52.7) | 37.5 (36.1-38.8) | 82.2 (81.7-82.8) | 55.2 (53.0-57.3) | 61.9 (61.2-62.7) |
| Hypertension treatment | NA | 42.3 (39.4-45.2) | 70.4 (69.8-71.0) | NA | NA |
| Diabetes treatment | NA | 38.3 (34.0-42.8) | 82.4 (81.8-82.9) | NA | NA |
| Composite Indexes^c | | | | | |
| Coverage | 54.2 (51.3-57.1) | 71.0 (68.9-73.1) | 68.9 (68.1-69.8) | 67.5 (65.6-69.4) | 67.7 (66.0-69.4) |
| Prevention | 53.0 (42.2-63.6) | 76.5 (61.0-89.0) | 74.2 (57.0-88.1) | 76.8 (66.5-85.7) | 69.8 (58.3-80.2) |
| Treatment | 51.2 (45.2-57.1) | 44.8 (37.1-52.5) | 83.5 (54.4-99.1) | 57.8 (50.1-65.4) | 50.4 (37.1-63.6) |

Abbreviations: ANC, antenatal care; ARI, acute respiratory infection; DPT3, 3 doses of diphtheria-tetanus-pertussis vaccine; FP, family planning; NA, not applicable; Polio3, 3 doses of polio vaccine.

^a Three or more ANC visits.

^b Diabetes and hypertension were not included to estimate the composite treatment index because these 2 indicators were not available in Afghanistan, Nepal, and Pakistan.

^c Composite prevention index was developed based on 11 prevention indicators,

and composite treatment index was based on 4 treatment indicators by random-effects meta-analysis. Composite coverage index was a weighted mean of 8 interventions (FP needs satisfied, skilled birth attendant, ANC with skilled attendant, DPT3 immunization, measles immunization, BCG immunization, oral rehydration therapy for children with diarrhea, and care-seeking for pneumonia) from 4 specialties (FP, maternity care, child immunization, and case management).

Table 3. Inequality in Catastrophic Health Payments in 5 South Asian Countries

Table 3. Inequality in Catastrophic Health Payments in 5 South Asian Countries

| Country (Year of Survey) | % (95% CI) | | | | |
|--------------------------|------------------------------------|----------------|-------------------------------------|---------------------|------------------------------|
| | Financial Burden | | Inequality in Catastrophic Payments | | Relative Index of Inequality |
| | Catastrophic Payments ^a | Impoverishment | Poorest Quintile | Wealthiest Quintile | |
| Afghanistan (2014) | 15.3 (14.7-16.0) | 2.9 (2.6-3.2) | 13.4 (12.0-14.9) | 17.1 (15.7-18.6) | 1.2 (1.0-1.4) |
| Bangladesh (2010) | 15.8 (14.9-16.8) | 4.9 (4.5-5.4) | 10.9 (9.5-12.5) | 22.0 (19.5-24.7) | 2.5 (2.0-3.0) |
| India (2012) | 17.9 (17.7-18.2) | 3.4 (3.3-3.6) | 13.3 (12.9-13.8) | 24.1 (23.5-24.7) | 2.1 (1.9-2.3) |
| Nepal (2015) | 11.8 (11.8-11.9) | 3.5 (3.5-3.6) | 8.3 (8.3-8.4) | 17.1 (23.5-24.7) | 2.3 (1.6-3.0) |
| Pakistan (2014) | 4.4 (4.0-4.9) | 1.4 (1.0-1.7) | 4.9 (4.0-6.0) | 4.7 (3.9-5.7) | 1.2 (1.0-1.4) |

^a Catastrophic payments at 10% threshold of total consumption.

Table 4. Magnitude of Inequalities by Intervention in 5 South Asian Countries

| Indicator | Relative Index of Inequality (95% CI) | | | | |
|--------------------------------------|---------------------------------------|-----------------|----------------------------|---------------|---------------|
| | Afghanistan | Bangladesh | India | Nepal | Pakistan |
| Prevention | | | | | |
| Improved water | 3.2 (2.6-3.8) | 1.1 (1.0-1.1) | 1.0 (1.0-1.0) | 1.2 (1.2-1.3) | 0.9 (0.9-1.0) |
| Adequate sanitation | 15.7 (9.7-21.8) | 3.2 (2.7-3.7) | 4.7 (4.4-5.1) | 1.7 (1.5-1.9) | 6.4 (5.9-6.8) |
| FP needs satisfied | 2.0 (1.5-2.4) | 1.0 (0.9-1.1) | 1.8 (1.7-1.9) | 1.1 (1.0-1.1) | 1.6 (1.2-1.9) |
| ≥1 ANC visit | 1.7 (1.5-1.9) | 3.0 (2.6-3.5) | 1.1 (1.0-1.1) | 3.0 (2.5-3.6) | 2.0 (1.9-2.1) |
| ≥4 ANC visits | 5.1 (3.6-6.6) | 10.8 (7.3-14.4) | 1.2 (1.1-1.3) ^a | 4.8 (3.6-6.1) | 8.7 (7.8-9.5) |
| DPT3 immunization | 1.7 (1.4-1.9) | 1.2 (1.1-1.4) | 1.4 (1.4-1.5) | 1.1 (1.0-1.2) | 1.9 (1.3-2.6) |
| Measles immunization | 1.2 (1.1-1.4) | 1.3 (1.2-1.5) | 1.2 (1.2-1.3) | 1.1 (1.0-1.2) | 1.7 (1.2-2.2) |
| BCG immunization | 1.5 (1.3-1.6) | 1.1 (1.0-1.1) | 1.2 (1.2-1.2) | 1.0 (1.0-1.1) | 1.3 (1.1-1.5) |
| Polio3 immunization | 1.2 (1.1-1.3) | 1.2 (1.1-1.3) | 1.2 (1.3-1.2) | 1.1 (1.0-1.2) | 1.3 (1.1-1.5) |
| Care-seeking for pneumonia | 1.3 (1.0-1.7) | 1.3 (0.5-2.2) | 1.1 (1.0-1.2) | 1.6 (0.8-2.4) | 1.4 (1.2-1.5) |
| Exclusive breastfeeding | 1.1 (0.8-1.4) | 1.0 (0.6-1.5) | 1.0 (1.0-1.0) | 1.0 (0.4-1.6) | 1.0 (0.8-1.3) |
| Treatment^b | | | | | |
| ARI treatment | 1.2 (0.8-1.5) | 0.5 (0.3-0.8) | 1.1 (1.0-1.2) | 1.6 (1.2-2.0) | 1.1 (0.8-1.4) |
| Oral rehydration therapy | 0.9 (0.7-1.2) | 0.9 (0.5-1.2) | 1.1 (1.0-1.1) | 1.2 (0.8-1.6) | 1.3 (1.1-1.5) |
| Skilled birth attendance | 5.1 (4.2-5.9) | 5.5 (4.4-6.7) | 4.4 (3.8-5.0) | 4.7 (3.7-5.8) | 3.4 (3.2-3.7) |
| Institutional delivery | 4.8 (4.0-5.6) | 6.8 (5.2-8.4) | 1.3 (1.2-1.4) | 4.1 (3.1-5.1) | 3.6 (3.3-3.9) |
| Hypertension treatment | NA | 2.2 (1.7-2.6) | 1.3 (1.2-1.3) | NA | NA |
| Diabetes treatment | NA | 5.8 (3.2-8.5) | 1.2 (1.2-1.3) | NA | NA |
| Composite Indexes^c | | | | | |
| Coverage | 1.7 (1.5-2.0) | 1.4 (1.0-1.9) | 1.3 (1.3-1.4) | 1.5 (1.4-1.6) | 1.7 (1.6-1.8) |
| Prevention | 1.8 (1.4-2.3) | 1.4 (1.0-1.9) | 1.3 (1.0-1.6) | 1.5 (1.1-1.8) | 1.8 (1.3-2.3) |
| Treatment | 2.2 (1.1-3.4) | 2.3 (0.5-4.2) | 1.3 (0.7-2.0) | 2.5 (1.3-3.8) | 2.3 (1.1-3.5) |

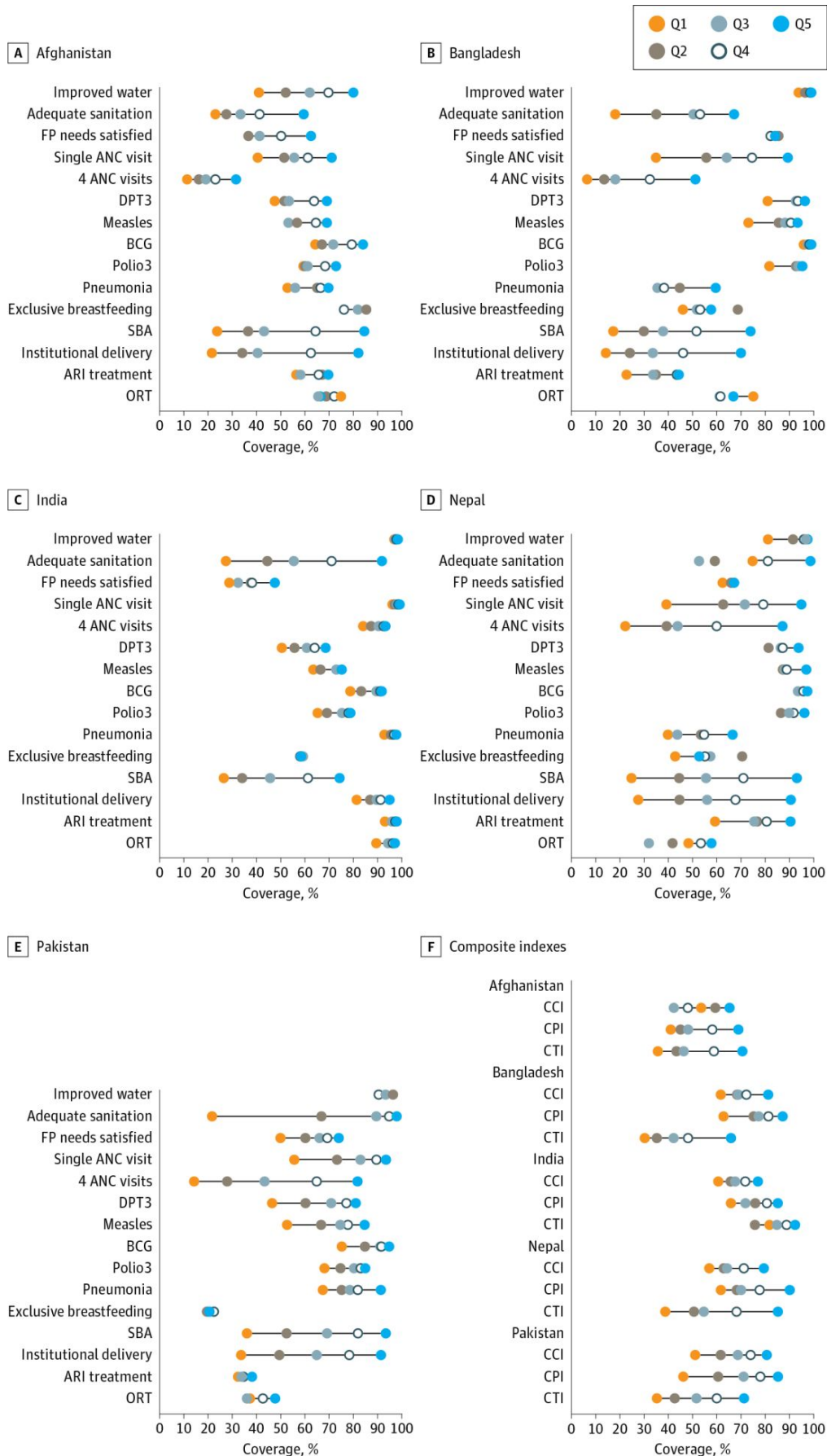
Abbreviations: ANC, antenatal care; ARI, acute respiratory infection; DPT3, 3 doses of diphtheria-tetanus-pertussis vaccine; FP, family planning; NA, not applicable; Polio3, 3 doses of polio vaccine.

^a Three or more ANC visits.

^b Diabetes and hypertension were not included to estimate the composite treatment index because these 2 indicators were not available in Afghanistan, Nepal, and Pakistan.

^c Composite prevention index was developed based on 11 prevention indicators, and composite treatment index was based on 4 treatment indicators by random-effects meta-analysis. Composite coverage index was a weighted mean of 8 interventions (FP needs satisfied, skilled birth attendant, ANC with skilled attendant, DPT3 immunization, measles immunization, BCG immunization, oral rehydration therapy for children with diarrhea, and care-seeking for pneumonia) from 4 specialties (FP, maternity care, child immunization, and case management).

Figure



厚生労働科学研究費補助金（地球規模保健課題推進研究事業）

「我が国の世界保健総会等における効果的なプレゼンスの確立に関する研究」(H29-地球規模-
一般-002)

平成 29 年度分担研究報告書

Global Health Diplomacy Workshop

| | | | |
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研究要旨

グローバル・ヘルスの重要性が高まっている中、我が国が主導してグローバルヘルスの課題を前進させ、主要会合において効果的に議論を先導する役割を果たすためには、そのようなことを可能とする人材の育成が急務である。本研究は、同じようにグローバルヘルス領域での人材育成を優先課題として掲げるタイと協力し、日・タイ双方の将来を担う若手人材に対し会議でのスピーチや交渉、効果的・戦略的介入、ファシリテーション等の能力開発を行うものである。

研修は年に2回（日・タイ 各1回）、3～4日の日程で開催され、参加者たちはグローバルヘルスの概況から具体的な交渉術まで、グローバルヘルス領域における基礎的スキルについて包括的に学ぶ。研修の最後には参加者全員に対してアンケート調査を実施し今後 WHO 総会等国際会議に参加する際や、日々の業務においてどのような点が有用だったか聞き取りを行う。得られたアンケート結果を踏まえ、次年度以降の人材開発研修プログラム案の策定を行う。

A．研究目的

グローバル・ヘルスの重要性が高まっている中、我が国が主導してグローバルヘルスの課題を前進させ、主要会合において効果的に議論を先導する役割を果たすためには、そのようなことを可能とする人材の育成が急務である。本研究は、同じようにグローバルヘルス領域での人材育成を優先課題として掲げるタイと協力し、日・タイ双方の将来を担う若手人材に対し会議でのスピーチや交渉、効果的・戦略的介入、ファシリテーション等の能力開発を行うものである。

B．研究方法

年に2回（日本・タイ 各1回）で、グローバルヘルス領域の中でも特に保健外交に焦点を当てた研修を開催する。対象は、厚生労働省/保健省、アカデミア、NGO 職員等グローバルヘルスに関わる若手とする。また、日本とタイ以外にも、グローバルヘルス領域における人材開発に興味を有する国については参加を促す（フィリピン、ラオス等）。

研修は2泊3日～3泊4日の日程で行い、扱う内容については主に以下の内容とする。1) グローバルヘルスの概況、2) グローバルヘルスのアクターの変化、3) グローバルヘルスの主要課題の傾向、4) WHO 総会等の WHO governing body における意思決定プロセスのあり方、5) WHO 総会等における効果的なインターベンションの構築方法、6) 国際会議等における交渉術。

ワークショップ終了時点で参加者全員を対

象としたアンケート調査を実施し、今後 WHO 総会等国際会議に参加する際や、日々の業務においてどのような点が有用だったか聞き取りを行う。得られたアンケート結果を踏まえ、次年度以降の人材開発研修プログラム案の策定を行う。

C．研究結果

平成 29 年度には5月に3泊4日の日程でタイにて、11月には2泊3日の日程で日本にて研修を開催した（プログラム詳細については参考資料として掲載）。日本での研修には合計11カ国から41名の参加があった他、公衆衛生省及びマヒドン大学より有識者を招聘し、研修全般に渡り支援を受けた。

日本での研修では、最初に外務省国際保健政策室並びに東京女子医科大学熱帯学・国際環境教室より、グローバルヘルスの概況、グローバルヘルス領域のアクターの変化、現在のグローバルヘルスにおける主要課題等についてご講義いただいた。その後、WHO 総会における主要議題のうち、「がん患者における緩和ケア」並びに「保険医療人材の国境を超えた移動」の2つについて、参加者各自に発言を作成してもらい、実際に発言・プレゼンテーションを実施した。交渉術に関しては、2017年5月の第70回 WHO 総会において議論が紛糾した「小児の肥満予防」を取り上げ、参加者各自をスタンスの異なる複数の国に割り振り、実際の交渉の練習をおこなった。研修後のアンケート調査では、大半の参加者から参考になったという好意的なフィードバックが得られた。一方で、WHO 総会等の

国際会議に参加できる機会は非常に限られているため、発言や交渉の練習等については、実際に会議に参加しない場合でも有用なものとなるよう、次年度以降はさらなる工夫が必要であるという一面も明らかになった。

3. その他
特になし

D. 結論

我が国がグローバルヘルスを牽引していく上で、グローバルヘルス領域で活躍できる人材の育成は急務であるが、今までは体系的なトレーニングの機会は限られていた。今回実施した研修は包括的にグローバルヘルス領域の全体像を学べるとともに、発言や交渉等に実践も含まれており、参加者にとって非常に満足度の高いものとなった他、日本及びタイ双方における人的ネットワークの構築にも貢献した。今年度のフィードバックを踏まえ内容を改定し、次年度以降も継続して人材育成研修を実施していくことが望ましい。

E. 研究発表

1. 論文発表

特になし

2. 学会発表

特になし

F. 知的財産権の出願・登録状況

(予定を含む。)

1. 特許取得

特になし

2. 実用新案登録

特になし

The G7 presidency and universal health coverage, Japan's contribution

Haruka Sakamoto,^a Satoshi Ezoe,^b Kotono Hara,^c Eiji Hinoshita,^c Yui Sekitani,^b Keishi Abe,^b Haruhiko Inada,^b Takuma Kato,^b Kenichi Komada,^b Masami Miyakawa,^d Hiroyuki Yamaya,^b Naoko Yamamoto,^b Sarah Krull Abe^a & Kenji Shibuya^a

Problem If universal health coverage (UHC) is to be achieved globally, it needs sustained promotion and political awareness and support.

Approach During its presidency of the Group of Seven (G7) industrialized nations in 2016, Japan aimed to raise the issue of UHC to the top of the global health agenda.

Local setting Japan has promoted a health agenda at all of the G7 summits since 2000 that it has hosted. Human security has been the core foundation of Japan's foreign diplomacy for several decades and, consequently, there was no apparent opposition within Japan to the inclusion of UHC on the agenda of the summit in 2016. Other G7 governments appeared keen to promote such coverage.

Relevant changes Since the 2016 summit, UHC has remained a central agenda item for the United Nations and World Health Organization, even though the leaders of both these global organizations have changed. In 2017, Japan hosted the UHC Forum in Tokyo. The participants, who were the heads of United Nations agencies, politicians and other decision-makers from all over the world, showed their continued commitment towards UHC.

Lessons learnt In the raising of awareness of an item on the global health agenda, high-level champions are critical. Although they may be very diverse, all relevant stakeholders need to be connected and allowed to discuss policies with each other. Having too many allies can, however, lead to policy fragmentation, especially when there is commitment from the highest echelons within each country.

Abstracts in **عربي, 中文, Français, Русский and Español** at the end of each article.

Introduction

According to the World Health Organization (WHO), universal health coverage (UHC) “means that all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship.”¹ One main aim of the Agenda for Sustainable Development, as adopted at the United Nations (UN) General Assembly in 2015, is to achieve such coverage by 2030.²

For several decades, the Japanese government has prioritized global health in its international diplomacy. For example, in all of the summits of the Group of Seven (G7) industrialized nations (Canada, France, Germany, Italy, Japan, United Kingdom of Great Britain and Northern Ireland and the United States of America) that Japan has hosted, global health has been a main item on the agenda. When Japan last held the G7 presidency, in 2016, much of its focus was on global health and, particularly, on UHC. In the promotion of UHC to the top of the political agenda at a global level, the experience that the Japanese government gained in 2016, in terms of global health diplomacy, could serve as a useful cornerstone.

In April–June 2016, we conducted interviews with employees of the Japanese ministries of finance, foreign affairs and health, labour and welfare who worked in departments connected to global health. Our aims were to investigate the preparatory process behind the 2016 G7 summit, which was held in the Ise-Shima area of Japan on 26–27 May 2016, and its related meetings, investigate how the Japanese government obtained consensus among the diverse stakeholders involved in

the summit and determine which people and which other factors appeared most important in the global promotion of UHC.

Local setting

By 2016 there was already some precedent for Japan's prioritization of UHC. For several decades, Japan had promoted health systems strengthening, in conjunction with the idea of human security, as a central tenet of its foreign policy. For example, such strengthening was placed high on the agenda of the G8 summit in 2008, which took place in Toyako.³ Within Japan, the political will to include UHC as a top priority within the G7 agenda was already present during preparations for the 2016 G7 summit in Ise-Shima and the 2016 G7 health ministers' meeting in Kobe. At the same time, UHC was already central to the global health agenda, as clearly indicated in the sustainable development goals.² There was no apparent opposition, from other G7 governments, to the inclusion of UHC on the main agenda of the 2016 G7 summit in Japan. In collaboration with WHO and under the leadership of Chancellor Angela Merkel, the German government, in particular, had already made considerable efforts to promote and support UHC. Responding to the need for health systems strengthening, as indicated in the conclusions of the 2015 G7 summit, which was held in the German village of Krün,⁴ Germany began to develop a roadmap towards UHC in 2015.⁵ After the 2016 G7 summit, Germany hosted the first meeting of G20 health ministers and this resulted in the so-called Berlin Declaration, which indicated the health ministers' continuous support for UHC.⁶

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Approach

In the preparations for the 2016 G7 summit, the strongest drivers for Japan's prioritization of UHC appeared to be three high-level Japanese champions of global health: Prime Minister Shinzo Abe; Yasuhisa Shiozaki, a former Minister of Health, Labour and Welfare; and Professor Keizo Takemi, a member of the House of Councillors.

In 2013, Shinzo Abe had made health one of the main pillars of his new strategy to promote Japan's economic growth⁷ and expressed his interest in global health in general and the global achievement of UHC in particular.⁸ In 2015, he published an article in *The Lancet* – entitled “Japan's vision for a peaceful and healthier world”, in which he explained how Japan's priorities, as holders of the G7 presidency in 2016, would include UHC.⁹ Though it remains unusual for a head of state to summarize their political priorities via a medical journal, this article helped demonstrate the Japanese government's unwavering commitment to the support of UHC globally. Prime Minister Abe also raised the issue of UHC, as an agenda item, in bilateral meetings with several other heads of state and, ultimately, initiated dialogue with G7 governments to cultivate the wider support that enabled Japan to prioritize UHC on the agendas of the 2016 G7 summit and its related meetings.

By 2016, Yasuhisa Shiozaki recognized the main strengths of Japan's health system and the need to communicate more widely with the global community, in an era of globalization. In conveying strong political messages to the global community at several international conferences, he has been a vocal advocate for global health and UHC.¹⁰ Like Prime Minister Abe, he has published articles in internationally recognized journals while maintaining dialogues, on UHC, with health ministers and heads of international organizations.

Keizo Takemi has drawn on his academic and policy-making background and published papers that appear to have influenced the advisory processes associated with the 2016 G7 summit. He led and coordinated domestic negotiations for the health agenda at the summit while hosting several meetings with relevant ministry officials.

In 2015–2016, Japan hosted several G7 preparatory committee meetings.

Box 1. Summary of main lessons learnt

- In the raising of awareness of an item on the global health agenda, high-level champions are critical.
- Although they may be very diverse, all relevant stakeholders need to be connected and allowed to discuss policies with each other.
- Having too many allies can lead to policy fragmentation, especially when there is commitment from the highest echelons within each country.

At these meetings, Japan chaired dialogues, with other G7 nations, that led to the drafting of the main outcome documents of the 2016 G7 summit and related meetings, i.e. the G7 Ise-Shima Declaration⁴ and the G7 Kobe Communiqué,¹¹ and the identification of points of consensus. Over the same period, Japan hosted a series of UHC-relevant conferences: a side event to the Seventieth UN General Assembly in 2015; an international conference on UHC in Tokyo in 2015; and with Germany as a co-host, a side event at the Sixty-ninth World Health Assembly in 2016. At these conferences, Japan used the outcomes of earlier G7 summits as launch-pads for UHC-focused discussions with the representatives of G7 and other governments.

The Sixth Tokyo International Conference on African Development, held in August 2016, was the first such conference to make health a major agenda item.¹² At the 2016 conference, Yasuhisa Shiozaki and the then President of the World Bank Group, Dr Jim Yong Kim, co-chaired a thematic session entitled “Promoting resilient health systems for quality of life.” In the subsequent negotiations on the conference outcomes, Yasuhisa Shiozaki and relevant ministry officials led the debate, among the representatives of many African countries and international organizations, that ultimately contributed to the so-called Nairobi Declaration and Nairobi Implementation Plan and the outlines of a framework for interventions to support UHC in Africa.^{13,14} By hosting such high-level events, Japan deepened the UHC debate both within and outside of the G7.¹¹ The resultant outcome documents, which are widely distributed and read, serve to promote the UHC agenda globally.

Relevant changes

Although the G7 summit in 2016 encouraged the global community's continued commitment to UHC, that commitment may have been weakened

when, in the same year, the UN's Secretary-General, WHO's Director-General and several other strong advocates for UHC were replaced. At the end of 2017, however, the participants at the UHC Forum in Tokyo, who included the new Secretary-General, new Director-General and high-level politicians from all over the world, professed their sustained support for UHC.

Changes in financial trends that supported UHC were observed. Historically, UHC and health systems strengthening have been under-funded and most donor funding has gone to vertical programmes, such as those directed at human immunodeficiency virus. In 2016, however, there was a transition in which some organizations, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, began to invest in health systems strengthening and UHC. The Global Fund, together with the World Bank Group, announced that it would contribute 24 billion United States dollars (US\$) to those African countries that attempted to achieve UHC by using the framework developed at a side event to the Sixth Tokyo International Conference on African Development.¹⁵ Throughout 2016, when it held the G7 presidency, Japan committed US\$ 1.1 billion to global health institutions.¹⁶ This financial support demonstrated Japan's strong political commitment to addressing the global health challenges highlighted at the 2016 G7 summit.

Lessons learnt

The main lessons learnt from the G7-based Japanese promotion of UHC are summarized in **Box 1**. Strong leadership can push issues to the top of the political agenda very effectively¹⁷ and the hosting of high-level political dialogue, both within and outside of G7, can be a very strong driver in promoting a policy agenda. The outcomes of the 2016 G7 summit and related meetings in Japan^{4,11} are expected to be the basis for future policy-making. Although G7 is an influential body with respect to

global health, it cannot raise awareness and move forward the global health agenda optimally without the support of other stakeholders and expansion of the debate beyond G7. In 2019, the G20 summit and the UN high-level meeting on UHC should provide further opportunities for promoting UHC at scale.

One remaining potential issue is that, in the global promotion of UHC,

Japan has had several powerful allies and no obvious vocal opponents. It has been suggested that too many allies can be detrimental and lead to policy fragmentation.¹⁸ Governments may disagree over the control and development of global policy. Although the UHC2030 platform was launched as an international framework to coordinate the efforts, by relevant stakeholders

and various initiatives, to develop UHC globally, the coordination is still a work-in-progress.¹⁹ Ultimately, however, UHC2030 is expected to catalyse various initiatives and leverage the expertise of all relevant stakeholders. ■

Competing interests: None declared.

ملخص

رئاسة مجموعة الدول السبع والتغطية الصحية على المستوى العالمي، إسهام اليابان

ومنظمة الصحة العالمية، حتى مع التغييرات التي طرأت على رئاسة هاتين المنظمتين العالميتين. وفي 2017، استضافت اليابان منتدى التغطية الصحية الشاملة في طوكيو. أبدى المشاركون - من رؤساء وكالات الأمم المتحدة والسياسيين وغيرهم من صانعي القرار من جميع أنحاء العالم - التزامهم المستمر نحو التغطية الصحية الشاملة. الدروس المستفادة في إطار جهود رفع الوعي بأحد بنود جدول الأعمال الصحية العالمية، فمن الحتمي اكتساب التأكيد من جانب جهات رفيعة المستوى. وعلى الرغم من التباين الكبير بين الجهات المعنية، فهناك ضرورة للتواصل بين جميع تلك الجهات، والساح لها بمناقشة السياسات مع بعضها البعض. ولكن وجود العديد من الجهات المؤيدة قد يؤدي إلى تجزؤ السياسات، وخاصة عند وجود التزام من المستويات العليا داخل كل دولة.

المشكلة إذا كان لا بد من تحقيق التغطية الصحية الشاملة، فالأمر بحاجة إلى الترويج المستدام بالإضافة إلى الدعم والوعي السياسي. الأسلوب خلال رئاسة اليابان لمجموعة الدول الصناعية السبع سنة 2016، فقد عمدت إلى طرح قضية التغطية الصحية الشاملة على قمة جدول أعمال الصحة العالمية.

المواقع المحلية عملت اليابان على الترويج لجدول الأعمال الصحية في جميع مؤتمرات قمة الدول السبعة التي استضافتها منذ عام 2000. وبحكم تركيز اليابان على الأمن البشري كدعامة أساسية لدبلوماسيتها الخارجية على مدار العديد من العقود، فلم تكن هناك معارضة بادية من قبل اليابان لتضمين التغطية الصحية الشاملة في مؤتمر القمة سنة 2016. وعلى الجانب الآخر، بدت حكومات مجموعة الدول السبع الأخرى حريصة على تعزيز مثل تلك التغطية. التغييرات ذات الصلة منذ انعقاد مؤتمر القمة سنة 2016، ظلت التغطية الصحية الشاملة بنداً رئيساً في جدول أعمال الأمم المتحدة

摘要

日本担任七国集团 (G7) 轮值主席国期间对全民健康覆盖的贡献

问题 如果要在全球范围内实现全民健康覆盖 (UHC)，需持续推进工作、提高政治意识，并获得政策支持。

方法 在 2016 年担任七国集团轮值主席国期间，日本致力于将全民健康覆盖 (UHC) 问题提到全球医疗卫生发展议程的首要位置。

当地状况 自 2000 年以来，日本在历届七国集团 (G7) 峰会期间均提出了医疗卫生议程。数十年来，人类安全问题一直是日本外交政策的核心基石。因此，将全民健康覆盖 (UHC) 列入 2016 年七国集团峰会议程时，日本国内并未出现明显的反对声音。其他七国集团 (G7) 成员国也积极促进此项事业的发展。

相关变化 自 2016 年七国集团峰会以来，尽管联合

国和世界卫生组织的领导者不断更迭，但全民健康覆盖 (UHC) 始终是这两大全球性组织的核心议程。2017 年，日本在东京举办了全民健康覆盖 (UHC) 论坛。来自世界各地的与会者（联合国有关机构领导者、政客以及其他决策制定者）展现了愿意继续致力于全民健康覆盖 (UHC) 事业发展的决心。

经验教训 高水准捍卫者对提高全球医疗卫生议程的认识至关重要。尽管捍卫者的组织形式可能不尽相同，但所有的利益相关者都需要联合起来、彼此交流、协商策略。但是，成员过多也可能会造成政策分裂，尤其在各国最高阶层参与的情况下

Résumé

Présidence du G7 et couverture sanitaire universelle: contribution du Japon

Problème Une promotion durable ainsi qu'une prise de conscience et un soutien politiques sont indispensables pour parvenir à une couverture sanitaire universelle à l'échelle mondiale.

Approche En 2016, dans le cadre de sa présidence du Groupe des sept pays les plus industrialisés (G7), le Japon s'est proposé de mettre la question de la couverture sanitaire universelle au premier plan du programme mondial d'action sanitaire.

Environnement local Depuis 2000, le Japon assure la promotion d'un programme d'action sanitaire lors de chacun des sommets du G7 qu'il accueille. La sécurité humaine constituant le principal fondement de la diplomatie internationale du Japon depuis plusieurs décennies, il n'y eu aucune opposition apparente au sein du pays à l'égard de l'inclusion de la question de la couverture sanitaire universelle dans l'ordre du jour du sommet de 2016. D'autres gouvernements de pays membres du G7 se sont montrés désireux de promouvoir cette question.

Changements significatifs Depuis le sommet de 2016, la couverture sanitaire universelle est un point central de l'ordre du jour pour l'Organisation des Nations Unies et l'Organisation mondiale de la Santé, malgré un changement de dirigeants au sein de ces deux organisations mondiales. En 2017, le Japon a accueilli le Forum de la couverture sanitaire universelle à Tokyo. Les participants, à savoir les responsables d'organismes des Nations Unies, des responsables politiques et d'autres décideurs du monde entier, ont affirmé leur engagement durable à l'égard de la couverture sanitaire universelle.

Leçons tirées Des défenseurs de haut vol sont essentiels pour sensibiliser à l'importance d'une question du programme mondial d'action sanitaire. Malgré leurs éventuelles différences, il est fondamental que toutes les parties prenantes soient liées et puissent discuter ensemble de la politique à mener. Un nombre trop important de défenseurs peut néanmoins entraîner une fragmentation politique, en particulier lorsque l'engagement provient des échelons les plus élevés au sein de chaque pays.

Резюме

Председательство в «Большой семерке» и всеобщий охват медико-санитарными услугами, вклад Японии

Проблема Для обеспечения всеобщего охвата медико-санитарными услугами на глобальном уровне необходимо постоянное содействие, политическая осведомленность и поддержка.

Подход В период своего председательства в группе промышленно развитых стран «Большой семерки» (G7) в 2016 году Япония поставила перед собой задачу поднять вопрос о всеобщем охвате медико-санитарными услугами на первое место в глобальной повестке дня в области здравоохранения.

Местные условия Япония продвигала повестку дня в области здравоохранения на всех саммитах «Большой семерки», которые она проводила с 2000 года. В течение нескольких десятилетий безопасность человека была основой внешней политики и дипломатии Японии, и, следовательно, в Японии не было явного противодействия включению всеобщего охвата медико-санитарными услугами в повестку дня саммита в 2016 году. Другие правительства стран «Большой семерки» оказались также заинтересованы в содействии такому охвату.

Осуществленные перемены Начиная с саммита 2016 года всеобщий охват медико-санитарными услугами остается центральным

пунктом повестки дня для Организации Объединенных Наций и Всемирной организации здравоохранения, несмотря на то что сменились лидеры обеих этих глобальных организаций. В 2017 году Япония провела в Токио Форум по вопросам всеобщего охвата медико-санитарными услугами. Участники, будучи руководителями представительств Организации Объединенных Наций, политиками и другими ответственными лицами, принимающими решения, со всего мира, продемонстрировали свою неизменную приверженность вопросам всеобщего охвата медико-санитарными услугами.

Выводы В повышении осведомленности о пункте глобальной повестки дня в области здравоохранения важнейшее значение имеют лидеры высокого уровня. Все соответствующие заинтересованные стороны должны быть объединены в этом вопросе, несмотря на различие мнений, и должны иметь возможность обсуждать политику друг с другом. Тем не менее слишком большое количество союзников может привести к разрозненности мнений в политике, особенно когда в каждой стране прослеживается вовлеченность высших эшелонов в решение глобальных вопросов.

Resumen

La presidencia del G7 y la cobertura sanitaria universal, la contribución de Japón

Situación Si se pretende lograr una cobertura sanitaria universal (CSU) en el mundo, se necesitan la promoción sostenida, y la conciencia y el apoyo políticos.

Enfoque Durante su presidencia en 2016 del Grupo de los Siete (G7) formado por las 7 naciones industrializadas, Japón se propuso elevar el tema de la CSU hasta el primer puesto de la agenda global de salud.

Marco regional Japón ha promovido una agenda de salud en todas las cumbres del G7 que ha celebrado desde el año 2000. La seguridad humana ha sido el fundamento de la diplomacia internacional de Japón desde hace ya varias décadas y, en consecuencia, no hubo oposición aparente dentro de Japón para la inclusión de la CSU en la agenda de la cumbre de 2016. Otros estados miembros del G7 parecieron entusiastas para promover esta cobertura.

Cambios importantes Desde la cumbre de 2016, la CSU ha permanecido como un punto central de la agenda para las Naciones Unidas y la Organización Mundial de la Salud, incluso después del cambio de los líderes de estas dos organizaciones. En 2017, Japón fue

sede del Foro de CSU en Tokio. Los participantes, integrados por jefes de las agencias de las Naciones Unidas, políticos y otros tomadores de decisiones de todo el mundo, mostraron su compromiso ininterrumpido con la CSU.

Lecciones aprendidas Para elevar la conciencia de un punto de la agenda global de salud, son fundamentales los defensores de alto nivel. Aunque pueden ser muy diversas, todas las partes interesadas importantes necesitan estar vinculadas y autorizadas para debatir políticas entre ellas. Sin embargo, tener demasiados aliados puede conducir a la fragmentación de la política, especialmente cuando existe el compromiso de los rangos más altos de cada país.

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Population health and regional variations of disease burden in Japan, 1990–2015: a systematic subnational analysis for the Global Burden of Disease Study 2015



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Summary

Background Japan has entered the era of super-ageing and advanced health transition, which is increasingly putting pressure on the sustainability of its health system. The level and pace of this health transition might vary across regions within Japan and concern is growing about increasing regional variations in disease burden. The Global Burden of Diseases, Injuries, and Risk Factors Study 2015 (GBD 2015) provides a comprehensive, comparable framework. We used data from GBD 2015 with the aim to quantify the burden of disease and injuries, and to attribute risk factors in Japan at a subnational, prefecture-level.

Methods We used data from GBD 2015 for 315 causes and 79 risk factors of death, disease, and injury incidence and prevalence to measure the burden of diseases and injuries in Japan and in the 47 Japanese prefectures from 1990 to 2015. We extracted data from GBD 2015 to assess mortality, causes of death, years of life lost (YLLs), years lived with disability (YLDs), disability-adjusted life-years (DALYs), life expectancy, and healthy life expectancy (HALE) in Japan and its 47 prefectures. We split extracted data by prefecture and applied GBD methods to generate estimates of burden, and attributable burden due to known risk factors. We examined the prefecture-level relationships of common health system inputs (eg, health expenditure and workforces) to the GBD outputs in 2015 to address underlying determinants of regional health variations.

Findings Life expectancy at birth in Japan increased by 4.2 years from 79.0 years (95% uncertainty interval [UI] 79.0 to 79.0) to 83.2 years (83.1 to 83.2) between 1990 and 2015. However, the gaps between prefectures with the lowest and highest life expectancies and HALE have widened, from 2.5 to 3.1 years and from 2.3 to 2.7 years, respectively, from 1990 to 2015. Although overall age-standardised death rates decreased by 29.0% (28.7 to 29.3) from 1990 to 2015, the rates of mortality decline in this period substantially varied across the prefectures, ranging from –32.4% (–34.8 to –30.0) to –22.0% (–20.4 to –20.1). During the same time period, the rate of age-standardised DALYs was reduced overall by 19.8% (17.9 to 22.0). The reduction in rates of age-standardised YLDs was very small by 3.5% (2.6 to 4.3). The pace of reduction in mortality and DALYs in many leading causes has largely levelled off since 2005. Known risk factors accounted for 34.5% (32.4 to 36.9) of DALYs; the two leading behavioural risk factors were unhealthy diets and tobacco smoking in 2015. The common health system inputs were not associated with age-standardised death and DALY rates in 2015.

Interpretation Japan has been successful overall in reducing mortality and disability from most major diseases. However, progress has slowed down and health variations between prefectures is growing. In view of the limited association between the prefecture-level health system inputs and health outcomes, the potential sources of regional variations, including subnational health system performance, urgently need assessment.

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Introduction

Japan is one of the fastest ageing countries in the world with a population that has started to shrink since 2008 mainly due to a low fertility rate.¹ The number of Japanese people aged 65 years or older has nearly quadrupled in the past 40 years to 27% of the total population in 2016,²

making Japan the country with the highest proportion of elderly people in the world.³ This figure is expected to increase to 35% of the population by 2040, and to 40% by 2060.⁴ The ageing population has a substantial effect on disease structure, turning Japan into the advanced stage of epidemiological transitions—ie, elderly Japanese people

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Research in context

Evidence before this study

Japan is one of the most successful countries in the world for many health indicators, but the level and pace of progress in health are not unique across the country and concern is growing about increasing health variations in Japan and its prefectures. These trends suggest Japan is experiencing a more complex process of health transition than historically observed; however, to our knowledge, no systematic and comprehensive study has been implemented to explore the variation within the country. Attributable risks have been calculated for some causes (eg, tobacco smoking and alcohol consumption) and for some disorders (eg, cancer) but are not available in a comprehensive framework covering multiple risks and diseases because no single accessible data source describing disease burden by cause exists in Japan.

Added value of this study

To our knowledge, this study is the first to assess GBD results at the prefecture level in Japan, using a range of routine and published data sources. Our comprehensive subnational comparisons within Japan's 47 prefectures provide new insights into health trends and determinants, particularly in light of the rapid population ageing process and growing regional variations in health.

experience more chronic and multimorbidity, which require long-term care and put pressures on health-care expenditure and use of resources.⁵ However, the pace of epidemiological transitions as well as population decline varies substantially by region,^{6,7} and such regional variations could have great influence on the performance of regional health systems and population health outcomes.⁸ In Japan, regional variations in health outcomes, its causes, performance of regional health systems, and the effects of social determinants of health are becoming increasingly complex with the country's transition to a super-ageing society.^{5,9,10}

Although regional health variations associated with communicable diseases have been narrowing over time globally, disease burden due to non-communicable diseases (NCDs) and injury varies markedly across regions.¹¹⁻¹³ Previous subnational studies in the UK,¹¹ Mexico,¹² and China¹³ shed light on the importance of the subnational estimates of disease burden. These enabled policy makers to improve understanding of the health needs of each region and to inform domestic health policy making.¹¹⁻¹³ The issue of regional variations in health is especially relevant in Japan, as the country is confronted by a super-ageing population and increasing health expenditure.⁸ In this context, what is happening in Japan—the country at the forefront of the world's hyper-ageing societies—has many implications for other countries. However, to our knowledge, no systematic subnational comparative assessment of disease burden and risk factors have been done in the context of Japan.¹⁴

Implications of all available evidence

Despite substantial reductions in the mortality and disability from most preventable diseases and improvement in life expectancy since 1990, many leading causes of death varied markedly at prefecture level in Japan. National and local health policies should therefore address region-specific health interventions in the most at-risk prefectures, aiming at dealing with regional variations in health. Preventive public health measures still have a huge capacity to reduce the continuing burden of preventable diseases via scaling up of investment in research and development of new and better prevention, treatment, and care strategies. Increasing levels of multimorbidity—because of the growing effect of survivorship, together with the super-ageing population—need to be addressed in Japan's recent health system reforms, in which a range of public services spanning health and social care services that respond to the specific needs, contexts, and circumstances of individual patients are offered. Although health in Japan is improving, substantial opportunities exist for a healthier population in Japan via modifiable risk factor approaches throughout life, especially through tackling of unhealthy diet and tobacco smoking.

Empirical evidence in Japan would be immensely helpful to reveal the features of an ageing society in the advanced stage of epidemiological transition, and understanding how to respond to regional health variations.

Using the latest data from the Global Burden of Diseases, Injuries, and Risk Factors Study 2015 (GBD 2015), we compared mortality, causes of death, years of life lost (YLLs), years lived with disability (YLDs), disability-adjusted life-years (DALYs), life expectancy at birth, and healthy life expectancy at birth (HALE, the average number of years that a newborn can expect to live in full health), as well as attributable risk factors in Japan's 47 prefectures—the country's first-order administrative division. This study comes at a time when both national and local health policy makers are reviewing and assessing priorities for action in light of the rapidly ageing population and growing regional health variation.^{6,7} This subnational analysis we report here supports mapping of the disease burden in Japan; and contributes to national and region-specific health policies.

Methods

Overview

GBD 2015 provides updated and improved data and methods from previous GBD versions (2010 and 2013).¹⁵⁻¹⁸ We used data from GBD 2015 for 315 causes and 79 risk factors of death, disease, and injury incidence and prevalence to measure the burden of diseases and injuries in Japan and in the 47 Japanese prefectures from 1990 to 2015. The population demographic of each

prefecture can be found elsewhere.⁴ The methods used in GBD 2015, including the systematic approach to collating cause of death from different countries, the mapping across different revisions and national variants of the International Classification of Diseases and Injuries and Related Health Problems (ICD), redistribution of deaths assigned to so-called garbage codes, and the cause of death modelling approach used for each cause, have been described in detail elsewhere.^{15–18} Unless indicated otherwise, we present results in terms of age-standardised rates, as derived from world population standards developed for GBD 2015.¹⁵

Our estimates for each measure (eg, deaths, DALYs, life expectancy) depend on the Bayesian approach and, unless noted otherwise, 95% uncertainty intervals (UIs)—also known as credible intervals—are presented along with them. These UIs include uncertainty in our estimates that depend on the sample size of data, adjustments to different sources of all-cause mortality, and cause-of-death model specification and estimation. Uncertainty from all of these sources is propagated into the final quantities of interest by taking 1000 draws from the posterior distribution of each component quantity of interest.^{15–18} We were unable to quantify and include uncertainty in garbage code redistribution algorithms—statistical models adopted in GBD 2015 to reassign deaths in garbage codes to more specific causes of death.¹⁵ In this study, we focus on specific data and analyses used to quantify mortality, causes of death, YLLs, YLDs, DALYs, life expectancy at birth and HALE at birth.

Mortality, cause of death, life expectancy, and YLLs

We used national population censuses and national and prefecture-level records on all-cause mortality derived from Japan's national vital registration systems. Vital registration data from 1990 to 2013 were included to align with GBD 2015, which spans 25 years from 1990 to 2015. Additional details on the full range of data sources are in the appendix (pp 10–25). Details for GBD 2015 estimation methods for all-cause mortality have been reported previously.^{15,19}

As described previously,^{15,20} an expanded cause-of-death database was constructed for GBD 2015. To generate estimates on cause-specific mortality rate, we analysed prefecture-level vital registration data from 1990 to 2013. We sought to account for vital registration data quality and completeness, which included adjustment of cause-of-death data and standardisation of data to align with cause classifications and hierarchies in the GBD 2015 study.¹⁵ We then systematically identified causes of death that could not or should not be classified as underlying causes of death (so-called garbage codes), and applied standard GBD 2015 garbage code redistribution algorithms. To examine the changes in life expectancy at birth in 2015 from 2005, we have applied the life expectancy cause-

specific decomposition method developed by Beltran-Sanchez, Preston, and Canudas-Romo.²¹ We computed YLLs using the standard GBD methods whereby we multiplied each death by the reference life expectancy at each age. The reference life expectancy at birth is 86.59 years, which is based on the lowest observed death rates for each 5-year age group in populations larger than 5 million.¹⁵

Disease and injury incidence, prevalence, and YLDs

Data sources used for quantifying non-fatal outcomes in Japan are in the appendix (pp 10–25). We used DisMod-MR 2.1, an updated Bayesian-regression analytic tool,¹⁶ to synthesise consistent estimates of disease incidence, prevalence, remission, excess mortality, and cause-specific mortality rates. Details of the estimation method, including the source code are published in the methods appendix of GBD 2015 publications.¹⁶ Following GBD 2015 methods,¹⁶ we multiplied prevalence of each sequela by the disability weight for the corresponding health state to calculate YLDs for the particular sequela. The sum of all YLDs for relevant sequelae equated to overall YLDs for each disease. GBD 2015 used the same disability weights as in GBD 2013, details of which including data collection and disability weight construction, have been described previously.²²

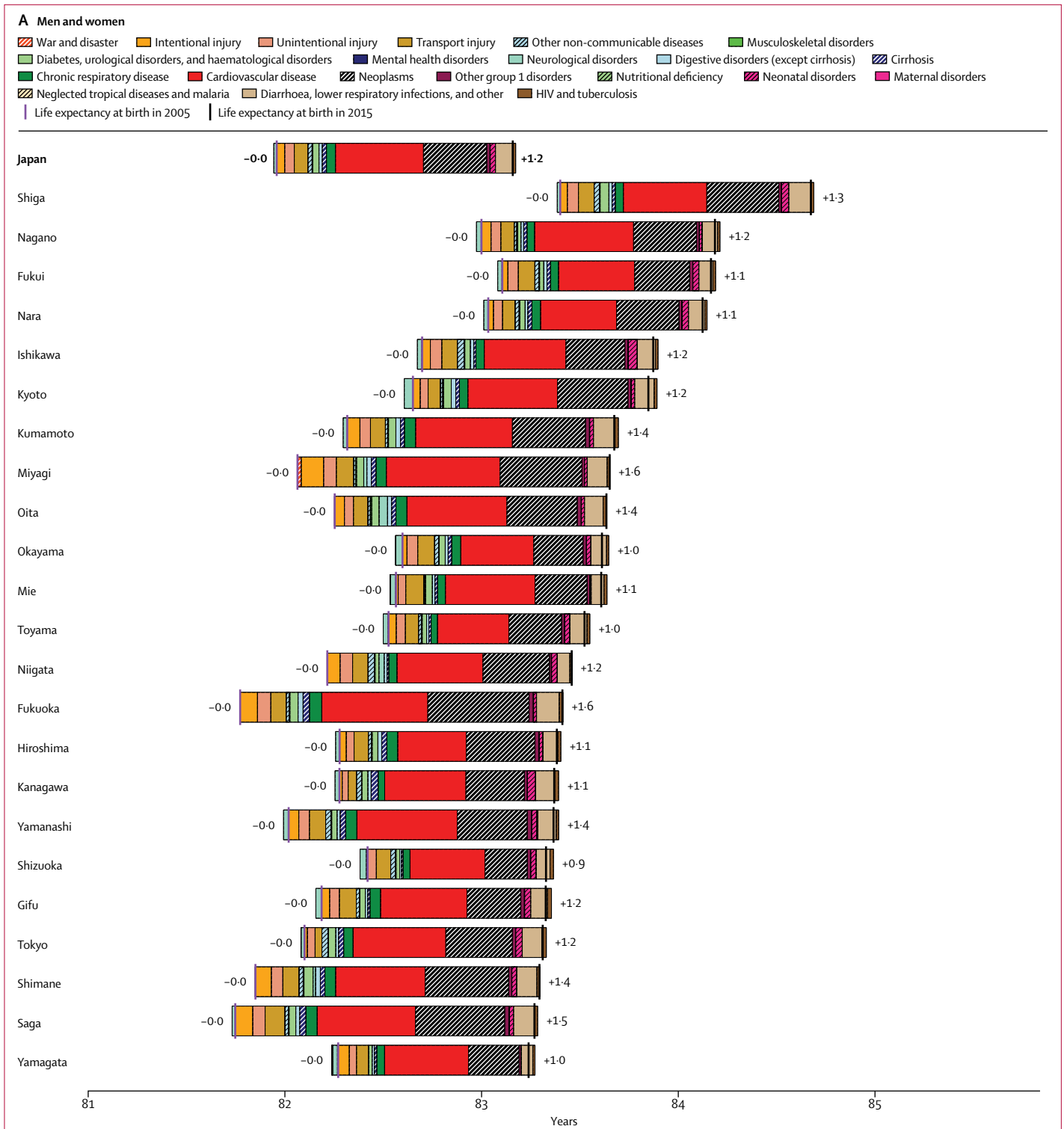
DALYs, HALE, and attributable risks

Following GBD 2015 methods,¹⁷ national and prefecture-level DALYs were computed by summing YLLs and YLDs for each cause, age, and sex in 1990, 2005, and 2015. HALE was calculated for Japan and each prefecture using multiple-decrement life tables and estimated YLDs per person.¹⁷ To calculate risk-attributable fractions of disease burden by cause, we modelled the effects of risk exposure levels, documented relative risks associated with risk exposure and specific health outcomes, and computed counterfactual levels of risk exposure on estimates of national and prefecture-level deaths, YLLs, YLDs, and DALYs. Detailed descriptions of the GBD 2015 methods for risk factor assessment and attribution are found elsewhere.¹⁸

Health system inputs and health outcomes in 2015

Health systems are important underlying determinants of health and are mainly responsible for health variations.²³ Correlations of prefecture-level per capita health expenditure and number of health workforce per population (physicians, registered nurses, and public health nurses)—common inputs for health system and major control levers for the Japanese health policy—to health outcomes in 2015, such as mortality and DALYs were calculated using Pearson's correlation coefficients. We also used a univariate linear regression analysis to assess the association between them. We extracted data for total health expenditure per capita for each prefecture in 2015 and the number of physicians, registered nurses,

See Online for appendix



(Figure 1 continues on next page)

and public health nurses for each prefecture in 2014 from the database maintained by the Ministry of Health, Labour and Welfare of Japan.^{24–26}

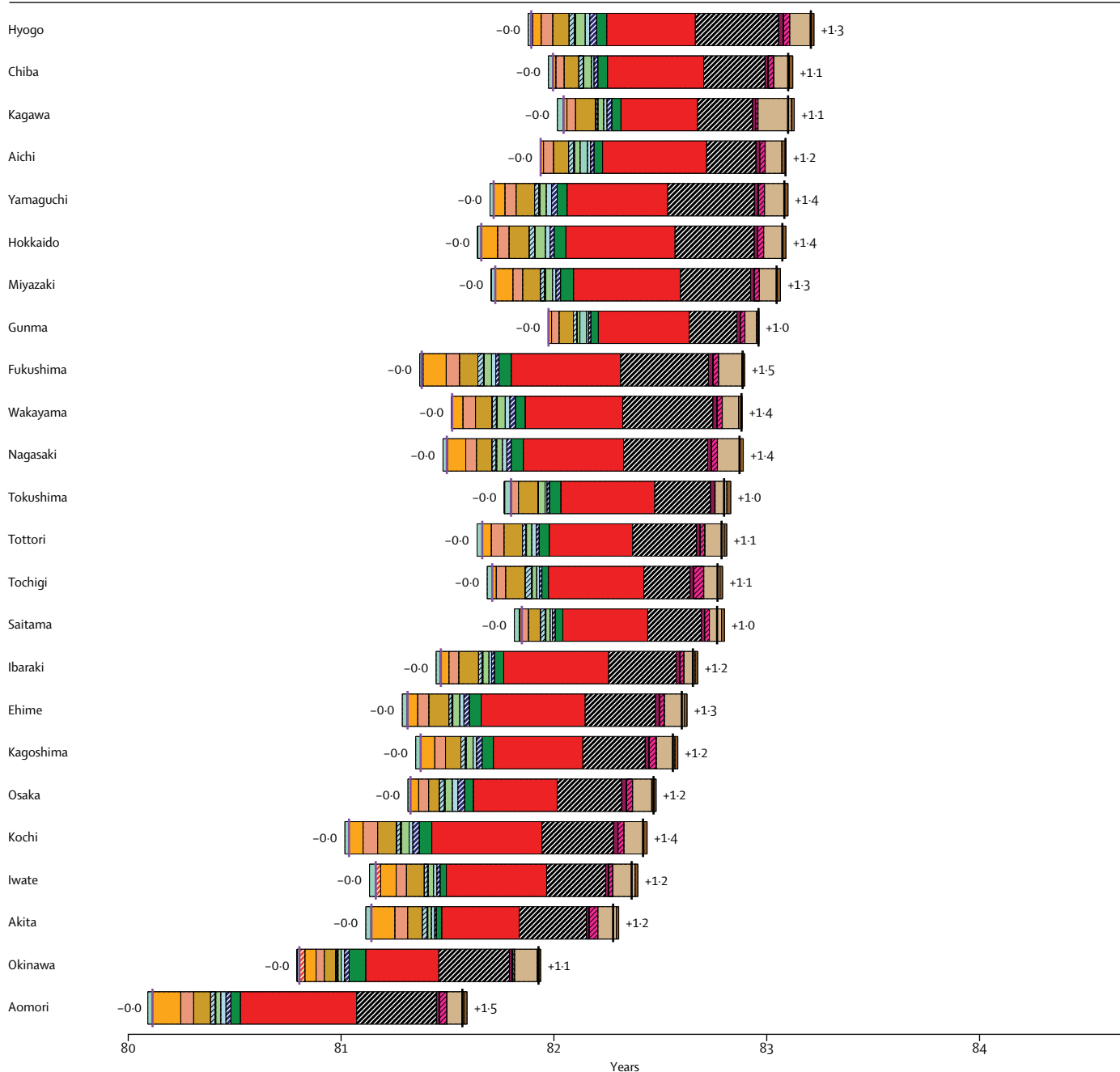
Role of the funding source

The funder of the study had no role in the study design, data collection, data analysis, data interpretation, or

A Men and women (continued)

▨ War and disaster
 ▨ Intentional injury
 ▨ Unintentional injury
 ▨ Transport injury
 ▨ Other non-communicable diseases
 ▨ Musculoskeletal disorders
▨ Diabetes, urological disorders, and haematological disorders
 ▨ Mental health disorders
 ▨ Neurological disorders
 ▨ Digestive disorders (except cirrhosis)
 ▨ Cirrhosis
▨ Chronic respiratory disease
▨ Cardiovascular disease
▨ Neoplasms
▨ Other group 1 disorders
▨ Nutritional deficiency
▨ Neonatal disorders
▨ Maternal disorders
▨ Neglected tropical diseases and malaria
▨ Diarrhoea, lower respiratory infections, and other
▨ HIV and tuberculosis

| Life expectancy at birth in 2005
 | Life expectancy at birth in 2015



(Figure 1 continues on next page)

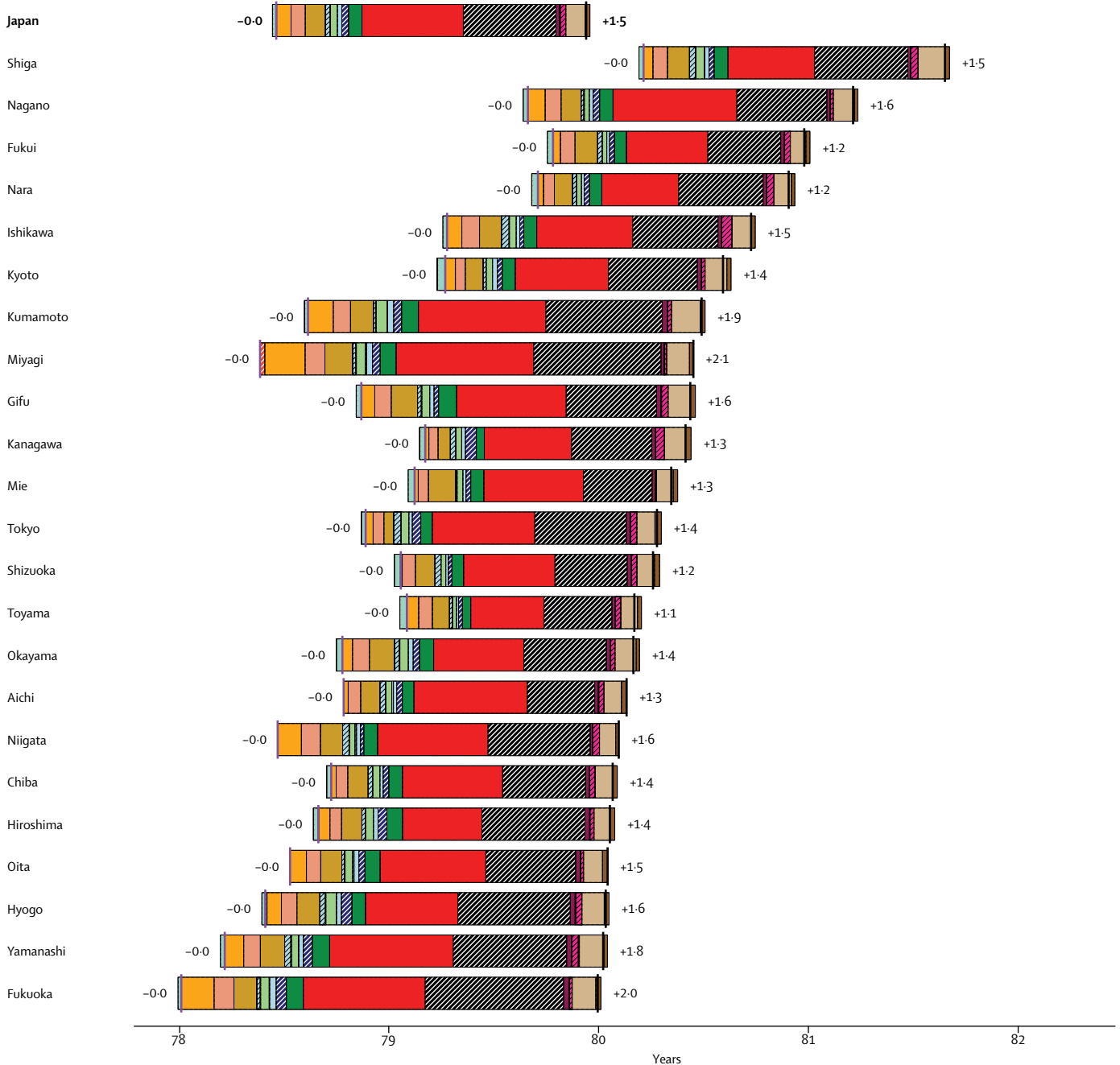
writing of the paper. All authors had full access to all the data in the study and had final responsibility to submit for publication.

Results

Between 1990 and 2015, a 4.2-year increase in life expectancy at birth was recorded in Japan, rising from

B Men

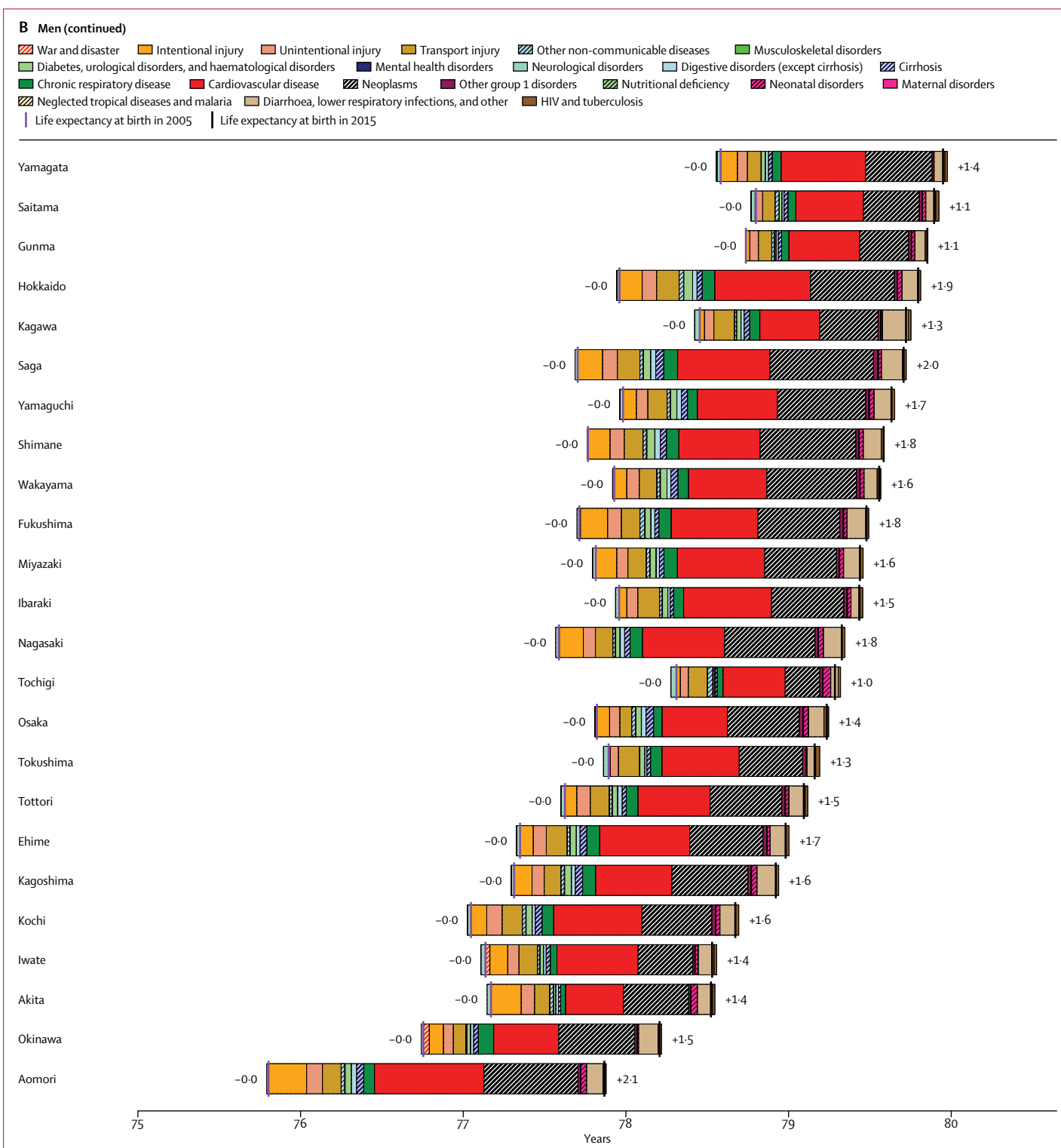
■ War and disaster ■ Intentional injury ■ Unintentional injury ■ Transport injury ■ Other non-communicable diseases ■ Musculoskeletal disorders
■ Diabetes, urological disorders, and haematological disorders ■ Mental health disorders ■ Neurological disorders ■ Digestive disorders (except cirrhosis) ■ Cirrhosis
■ Chronic respiratory disease ■ Cardiovascular disease ■ Neoplasms ■ Other group 1 disorders ■ Nutritional deficiency ■ Neonatal disorders ■ Maternal disorders
■ Neglected tropical diseases and malaria ■ Diarrhoea, lower respiratory infections, and other ■ HIV and tuberculosis
| Life expectancy at birth in 2005 | Life expectancy at birth in 2015



(Figure 1 continues on next page)

79.0 years (95% UI 79.0–79.0) to 83.2 years (83.1–83.2; appendix pp 26–31). The life expectancy at birth in 2015 was 79.9 years (79.9–80.0) for men and 86.3 years

(86.3–86.4) for women. Okinawa recorded the smallest improvement of 3.2 years, whereas Saga had the largest gains of 4.8 years in the same period. The gap

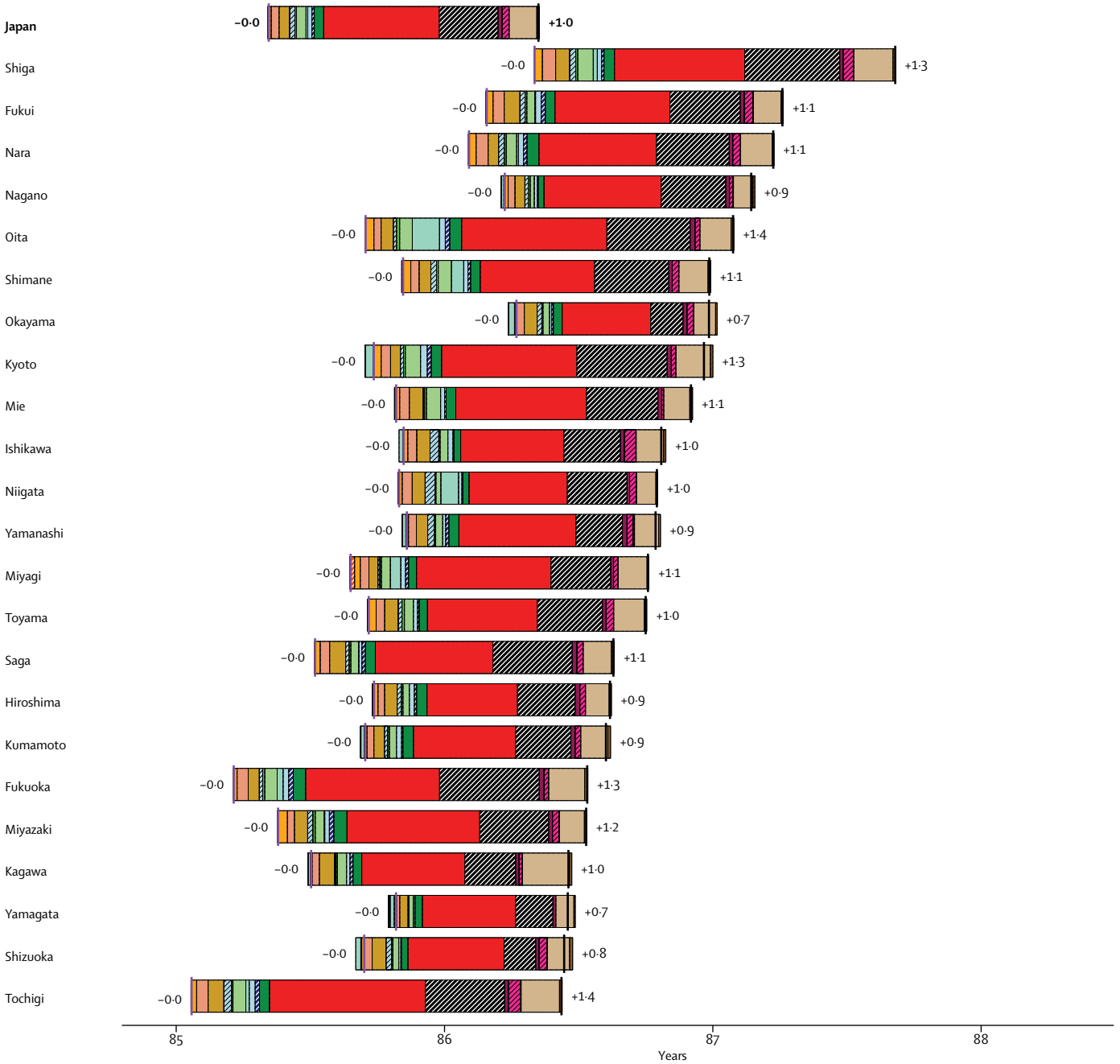
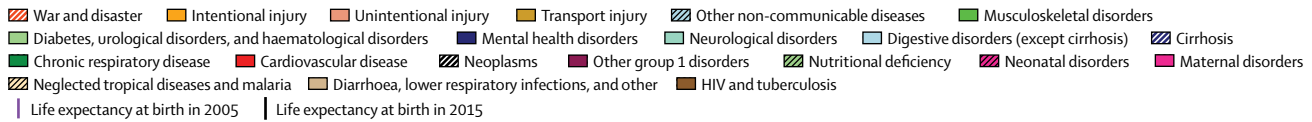


(Figure 1 continues on next page)

between prefectures with the lowest and highest life expectancies in 1990 was 2.5 years. By 2015, the longevity gap widened to 3.1 years.

Healthy life expectancy (HALE) at birth rose from 70.4 years (95% UI 67.8–72.6) in 1990 to 73.9 years (71.3–76.3) in 2015 (appendix pp 26–31). In 2015, HALE

C Women



(Figure 1 continues on next page)

was 71.5 years (69.1–73.7) for men and 76.3 years (73.3–78.9) for women. The approximate 9-year gap between life expectancy at birth and HALE at birth

observed in 1990 has been static until 2015 (appendix pp 26–31). The gap between prefectures with the lowest and highest HALE in 1990 was 2.3 years. As with life

C Women (continued)

▨ War and disaster ▨ Intentional injury ▨ Unintentional injury ▨ Transport injury ▨ Other non-communicable diseases ▨ Musculoskeletal disorders
▨ Diabetes, urological disorders, and haematological disorders ▨ Mental health disorders ▨ Neurological disorders ▨ Digestive disorders (except cirrhosis) ▨ Cirrhosis
▨ Chronic respiratory disease ▨ Cardiovascular disease ▨ Neoplasms ▨ Other group 1 disorders ▨ Nutritional deficiency ▨ Neonatal disorders ▨ Maternal disorders
▨ Neglected tropical diseases and malaria ▨ Diarrhoea, lower respiratory infections, and other ▨ HIV and tuberculosis
| Life expectancy at birth in 2005 | Life expectancy at birth in 2015

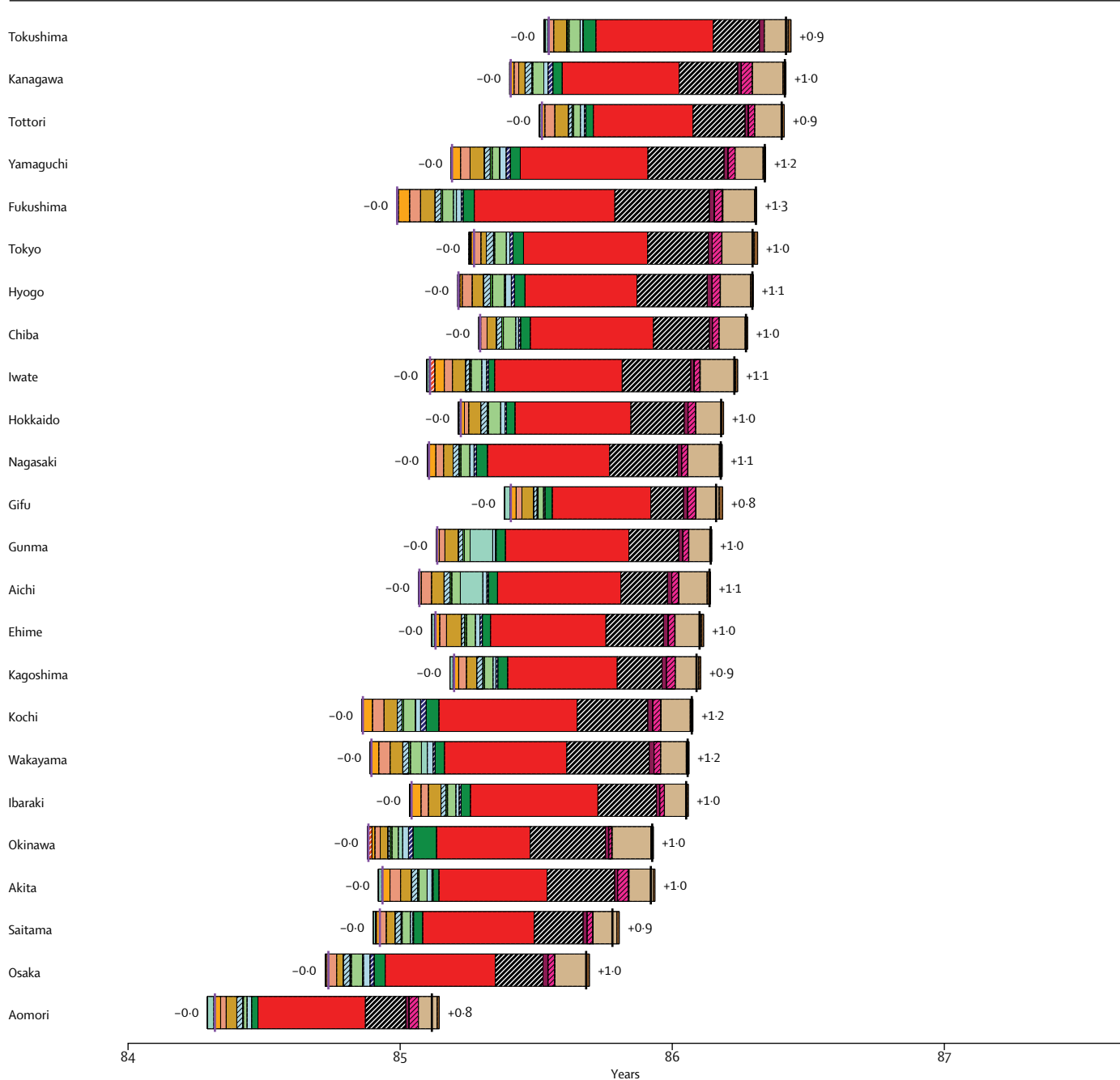
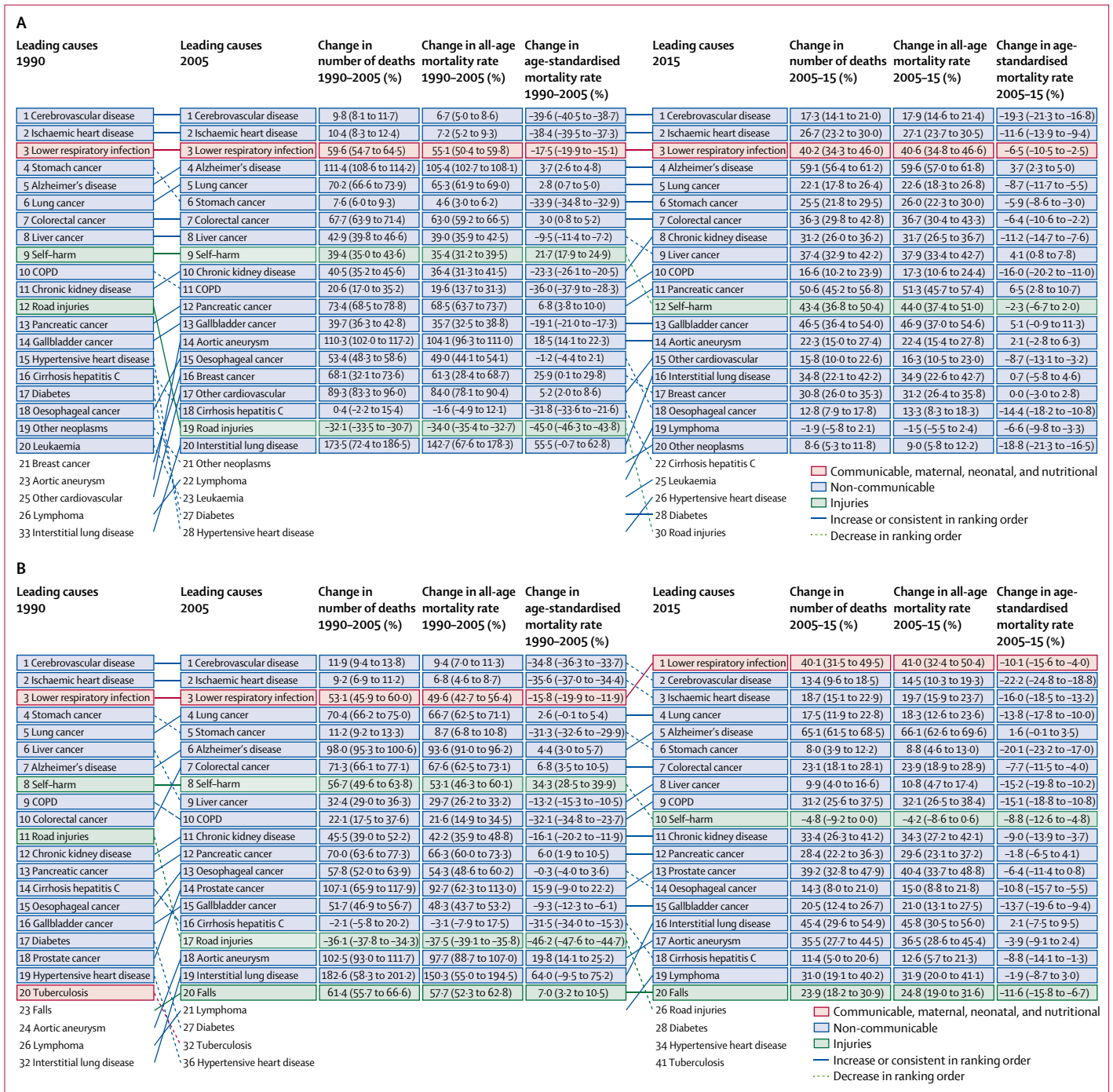


Figure 1: Life expectancy at birth in Japan and the 47 prefectures in 2015 and its change from 2005 to 2015 decomposed into the contribution of GBD level 2 cause group for (A) both sexes combined, (B) men, and (C) women

Causes to the left of the 2005 life expectancy values reflect causes that contributed to reduced life expectancy between 2005 and 2015. Causes to the right of the 2005 life expectancy values reflect causes that contributed to increased life expectancy between 2005 and 2015. GBD=Global Burden of Diseases, Injuries, and Risk Factors.



(Figure 2 continues on next page)

expectancy, this gap in HALE among prefectures increased by 2015 to 2.7 years.

All-cause age-standardised death rates decreased by 29.0% (95% UI 28.7–29.3) between 1990 and 2015, falling from 584.1 deaths per 100 000 people (583.2–585.1) in 1990 to 414.8 deaths per 100 000 people (413.3–416.4) in 2015 (appendix pp 26–31). Prefecture-level reductions

in all-cause age-standardised death rates largely varied from 22.0% (20.1–24.0) in Okinawa to 32.4% (30.0–34.8) in Shiga between 1990 and 2015. During the same time period, the rate of age-standardised DALYs reduced by 19.8% overall (17.9–22.0). The reduction in the rate of age-standardised YLLs was 33.4% (33.0–33.8; appendix pp 32–37), indicating a proportionately larger reduction

C

| Leading causes 1990 | Leading causes 2005 | Change in number of deaths 1990-2005 (%) | Change in all-age mortality rate 1990-2005 (%) | Change in age-standardised mortality rate 1990-2005 (%) | Leading causes 2015 | Change in number of deaths 2005-15 (%) | Change in all-age mortality rate 2005-15 (%) | Change in age-standardised mortality rate 2005-15 (%) |
|-------------------------------|-------------------------------|--|--|---|-------------------------------|--|--|---|
| 1 Cerebrovascular disease | 1 Cerebrovascular disease | 8.1 (5.4 to 11.0) | 4.4 (1.8 to 7.2) | -44.6 (-45.8 to -43.2) | 1 Cerebrovascular disease | 20.8 (17.0 to 25.4) | 21.0 (17.1 to 25.5) | -17.5 (-20.0 to -14.4) |
| 2 Ischaemic heart disease | 2 Ischaemic heart disease | 11.6 (7.8 to 15.0) | 7.7 (4.2 to 11.0) | -43.1 (-44.9 to -41.5) | 2 Ischaemic heart disease | 34.8 (28.6 to 39.9) | 34.9 (28.7 to 40.0) | -8.0 (-12.0 to -4.8) |
| 3 Lower respiratory infection | 3 Alzheimer's disease | 119.8 (116.4 to 123.2) | 112.3 (109.0 to 115.6) | 2.8 (1.4 to 4.2) | 3 Alzheimer's disease | 55.8 (52.8 to 57.9) | 55.9 (53.0 to 58.0) | 5.0 (3.2 to 6.4) |
| 4 Alzheimer's disease | 4 Lower respiratory infection | 67.6 (61.7 to 74.1) | 61.9 (56.2 to 68.1) | -18.7 (-21.4 to -15.9) | 4 Lower respiratory infection | 40.1 (33.6 to 47.2) | 40.3 (33.7 to 47.3) | -6.0 (-10.4 to -1.3) |
| 5 Stomach cancer | 5 Colorectal cancer | 63.5 (57.6 to 68.9) | 57.9 (52.2 to 63.1) | -2.9 (-6.0 to 0.0) | 5 Colorectal cancer | 28.4 (23.0 to 34.9) | 28.6 (23.2 to 35.0) | -5.5 (-9.2 to -1.2) |
| 6 Colorectal cancer | 6 Stomach cancer | 1.4 (-1.0 to 3.9) | -2.1 (-4.4 to 0.3) | -39.6 (-40.9 to -38.2) | 6 Lung cancer | 34.4 (27.7 to 41.7) | 34.7 (27.9 to 41.8) | -0.5 (-5.1 to 4.5) |
| 7 Chronic kidney disease | 7 Lung cancer | 69.4 (62.9 to 76.8) | 63.6 (57.4 to 70.7) | 0.8 (-2.9 to 4.8) | 7 Chronic kidney disease | 38.8 (28.6 to 49.0) | 38.8 (28.8 to 49.1) | -5.4 (-11.7 to 0.8) |
| 8 Lung cancer | 8 Chronic kidney disease | 36.1 (28.9 to 44.0) | 31.4 (24.5 to 39.0) | -30.4 (-33.9 to -26.8) | 8 Stomach cancer | 9.3 (4.4 to 15.3) | 9.6 (4.5 to 15.4) | -19.9 (-23.4 to -15.6) |
| 9 Self-harm | 9 Liver cancer | 70.7 (64.0 to 77.3) | 64.9 (58.4 to 71.2) | 0.0 (-3.5 to 3.6) | 9 Pancreatic cancer | 47.3 (39.8 to 54.8) | 47.4 (40.0 to 54.9) | 10.0 (4.7 to 15.3) |
| 10 Hypertensive heart disease | 10 Breast cancer | 68.0 (31.9 to 73.5) | 60.1 (27.5 to 67.5) | 28.0 (2.5 to 31.9) | 10 Breast cancer | 22.3 (14.9 to 27.5) | 22.1 (15.0 to 27.6) | 2.8 (-2.0 to 7.0) |
| 11 COPD | 11 Pancreatic cancer | 77.3 (69.5 to 86.1) | 71.4 (63.7 to 79.7) | 5.9 (1.5 to 10.8) | 11 Liver cancer | 18.3 (11.0 to 27.0) | 18.6 (11.1 to 27.1) | -14.4 (-19.6 to -8.3) |
| 12 Gallbladder cancer | 12 Self-harm | 9.2 (6.2 to 12.6) | 5.5 (2.5 to 8.7) | -3.9 (-6.6 to -1.1) | 12 COPD | 30.5 (22.5 to 41.6) | 31.1 (22.7 to 41.6) | -11.0 (-16.1 to -3.5) |
| 13 Breast cancer | 13 Gallbladder cancer | 30.1 (26.3 to 34.1) | 25.6 (21.9 to 29.5) | -27.5 (-29.4 to -25.6) | 13 Gallbladder cancer | 13.5 (1.0 to 26.9) | 13.9 (1.2 to 27.0) | -19.1 (-27.9 to -9.6) |
| 14 Liver cancer | 14 COPD | 18.0 (12.5 to 36.8) | 16.1 (8.8 to 31.9) | -40.1 (-42.7 to -30.8) | 14 Other cardiovascular | 50.6 (41.7 to 60.8) | 51.0 (41.9 to 60.9) | 2.5 (-3.2 to 8.8) |
| 15 Pancreatic cancer | 15 Other cardiovascular | 113.2 (103.3 to 124.2) | 106.0 (96.4 to 116.3) | 10.6 (6.0 to 15.5) | 15 Self-harm | 5.5 (-0.3 to 12.0) | 5.6 (-0.2 to 12.2) | -2.0 (-6.5 to 2.8) |
| 16 Diabetes | 16 Aortic aneurysm | 120.3 (107.2 to 133.4) | 112.7 (100.1 to 125.4) | 15.6 (9.1 to 22.0) | 16 Aortic aneurysm | 68.7 (59.8 to 78.0) | 68.8 (60.1 to 78.1) | 17.5 (11.7 to 23.6) |
| 17 Road injuries | 17 Hypertensive heart disease | -35.8 (-41.3 to -29.8) | -38.0 (-43.3 to -32.2) | -68.6 (-71.1 to -65.8) | 17 Hypertensive heart disease | 41.2 (27.8 to 56.1) | 41.6 (27.9 to 56.2) | -5.5 (-13.7 to 3.7) |
| 18 Cardiomyopathy | 18 Other neoplasms | 47.4 (39.1 to 53.3) | 42.2 (34.3 to 48.0) | -5.5 (-8.2 to -2.4) | 18 Other neoplasms | 34.7 (26.8 to 41.7) | 34.7 (27.0 to 41.9) | 1.9 (-3.7 to 6.4) |
| 19 Ovarian cancer | 19 Ovarian cancer | 36.8 (32.1 to 41.3) | 32.1 (27.6 to 36.5) | -1.2 (-4.1 to 2.0) | 19 Urinary diseases | 84.6 (69.6 to 99.3) | 84.9 (69.8 to 99.5) | 24.7 (15.3 to 34.4) |
| 20 Cervical cancer | 20 Lymphoma | 95.8 (36.6 to 105.7) | 77.3 (32.0 to 98.6) | 15.8 (-13.0 to 21.0) | 20 Lymphoma | 39.2 (25.6 to 48.5) | 39.1 (25.7 to 48.7) | 2.1 (-4.1 to 6.9) |
| 22 Other neoplasms | 23 Diabetes | | | | 22 Ovarian cancer | | | |
| 24 Other cardiovascular | 25 Cardiomyopathy | | | | 25 Cardiomyopathy | | | |
| 26 Aortic aneurysm | 26 Cervical cancer | | | | 28 Diabetes | | | |
| 29 Lymphoma | 29 Urinary diseases | | | | 30 Cervical cancer | | | |
| 37 Urinary diseases | 30 Road injuries | | | | 38 Road injuries | | | |

■ Communicable, maternal, neonatal, and nutritional
■ Non-communicable
■ Injuries
— Increase or consistent in ranking order
- - - Decrease in ranking order

Figure 2: GBD level 3 causes of death in Japan in 1990, 2005, and 2015 for (A) both sexes combined, (B) men, and (C) women, with all-age and age-standardised death rate change. Ranking is based on the number of deaths from each cause. Percentage change in number of deaths and in all-age and age-standardised death rates are shown with 95% UI in parentheses. Alzheimer's disease=Alzheimer's disease and other dementias. Cirrhosis hepatitis C=cirrhosis of the liver due to hepatitis C. COPD=chronic obstructive pulmonary disease. GBD=Global Burden of Diseases, Injuries, and Risk Factors.

in premature mortality when compared with overall mortality. By contrast, reduction in rates of age-standardised YLDs was very small between 1990 and 2015 (3.5% [2.6-4.3]).

In the 10 years between 2005 and 2015, all 47 prefectures had more than 1 year of life expectancy gains (figure 1), but the gap in the gains between prefectures was distinctive. Across the prefectures, decreased mortality because of cardiovascular diseases (mostly cerebrovascular diseases and ischaemic heart diseases) and neoplasms or cancers was the leading driver of increased life expectancy.

The leading causes of death using broad disease categories (level 3 in the GBD cause hierarchy) are in figure 2. The top three causes of death in 1990 (cerebrovascular diseases, ischaemic heart diseases, and lower respiratory infection) remained at the top in 2015, despite substantial declines in their age-standardised rates (-19.3% [95% UI -21.3 to -16.8], -11.6% [-13.9 to -9.4], and -6.5% [-10.5 to -2.5]; figure 2). In addition, the speed of mortality decline in these three leading causes and many other causes has levelled off since 2005 for both men and women (average annual percentage change in age-standardised death rates between 1990 and 2005 was -2.6% for cerebrovascular diseases, -2.6% ischaemic heart diseases, and -1.2% for lower respiratory infection; after 2005, -1.9%, -1.2%, and -0.7%). Alzheimer's disease and other dementias were the only causes out of the ten leading causes that

showed a significant increase in age-standardised death rates since 2005 (3.7% [95% UI 2.3-5.0]). The leading causes of YLLs are shown in the appendix (p 1).

Age-standardised death rates for GBD's most detailed causes between Japan and the 47 prefectures in 2015 are shown in figure 3. A subnational comparison of age-standardised rates for YLLs are shown in figure appendix 2 (p 2). Many of the leading causes of mortality and YLLs showed striking variation by prefecture (figure 3). For example, due to cerebrovascular disease (combined mortality of ischaemic stroke, haemorrhagic stroke, and other types of stroke), Shiga's age-standardised death rates (37.9 per 100 000 people)—the lowest in Japan in 2015—was 1.6 times lower than Iwate's, which was the highest (62.0 per 100 000 people). For ischaemic heart disease, the age-standardised death rate was 1.5 times lower in Kumamoto (lowest; 35.9 per 100 000 people) and Saitama (highest; 55.0 per 100 000 people). Some causes had distinct patterns largely determined by geography (higher rates in the north, and lower in the central and south), and others did not.

Cerebrovascular disease and ischaemic heart diseases are now at similar levels nationally in Japan (figure 4). As with mortality, the pace of reduction in DALYs in these causes largely levelled off since 2005. The average yearly percentage change in age-standardised DALY rates was -2.6% for both ischaemic heart diseases and cerebrovascular disease from 1990 to 2005, which reduced to

| Leading causes 1990 | Leading causes 2005 | Change in number of DALYs 1990-2005 (%) | Change in all-age DALYs rate 1990-2005 (%) | Change in age-standardised DALYs rate 1990-2005 (%) | Leading causes 2015 | Change in number of DALYs 2005-15 (%) | Change in all-age DALYs rate 2005-15 (%) | Change in age-standardised DALYs rate 2005-15 (%) |
|----------------------------------|----------------------------------|---|--|---|----------------------------------|---------------------------------------|--|---|
| 1 Cerebrovascular disease | 1 Cerebrovascular disease | -6.7 (-7.9 to -5.4) | -9.3 (-10.5 to -8.1) | -38.2 (-39.1 to -37.3) | 1 Ischaemic heart disease | 7.6 (5.1 to 10.0) | 8.0 (5.5 to 10.4) | -14.5 (-16.4 to -12.5) |
| 2 Ischaemic heart disease | 2 Low back & neck pain | 15.7 (13.4 to 18.0) | 12.4 (10.2 to 14.7) | 0.3 (-1.5 to 2.1) | 2 Low back & neck pain | 6.7 (4.6 to 8.8) | 7.2 (5.0 to 9.2) | -0.1 (-1.9 to 1.7) |
| 3 Low back & neck pain | 3 Ischaemic heart disease | -0.6 (-2.2 to 0.9) | -3.4 (-5.0 to -2.0) | -33.8 (-34.8 to -32.8) | 3 Sense organ diseases | 22.7 (20.6 to 25.3) | 23.2 (21.1 to 25.7) | 0.8 (-0.3 to 2.0) |
| 4 Sense organ diseases | 4 Sense organ diseases | 42.0 (39.1 to 45.7) | 38.0 (35.2 to 41.5) | 1.3 (0.0 to 2.7) | 4 Cerebrovascular disease | -0.7 (-3.3 to 2.0) | -0.3 (-2.9 to 2.4) | -21.4 (-23.4 to -19.4) |
| 5 Stomach cancer | 5 Self-harm | 37.9 (33.8 to 41.5) | 34.0 (30.0 to 37.5) | 34.0 (30.2 to 37.3) | 5 Alzheimer's disease | 49.6 (47.1 to 51.8) | 50.2 (47.7 to 52.4) | 3.3 (2.2 to 4.5) |
| 6 Lower respiratory infections | 6 Lower respiratory infections | 27.2 (24.1 to 30.2) | 23.6 (20.6 to 26.5) | -23.8 (-25.5 to -22.1) | 6 Lower respiratory infections | 22.4 (17.0 to 28.1) | 22.8 (17.4 to 28.6) | -10.8 (-14.8 to -6.6) |
| 7 Self-harm | 7 Lung cancer | 45.0 (42.3 to 47.7) | 40.9 (38.3 to 43.5) | -1.0 (-2.8 to 0.7) | 7 Lung cancer | 8.1 (4.7 to 11.7) | 8.5 (5.1 to 12.2) | -11.1 (-13.7 to -8.2) |
| 8 Skin diseases | 8 Alzheimer's disease | 87.0 (84.0 to 89.8) | 81.7 (78.8 to 84.4) | -2.2 (-3.6 to -1.0) | 8 Self-harm | -8.8 (-11.8 to -5.7) | -8.5 (-11.4 to -5.4) | -5.3 (-8.1 to -2.5) |
| 9 Depressive disorders | 9 Stomach cancer | -12.2 (-13.4 to -11.0) | -14.7 (-15.9 to -13.5) | -38.0 (-38.9 to -37.1) | 9 Stomach cancer | -4.5 (-7.6 to -1.7) | -4.1 (-7.2 to -1.4) | -20.6 (-23.3 to -18.3) |
| 10 Road injuries | 10 Skin diseases | 1.3 (0.2 to 2.7) | -1.5 (-2.6 to -0.2) | 0.6 (-0.2 to 1.3) | 10 Colorectal cancer | 11.4 (8.2 to 14.8) | 11.8 (8.6 to 15.2) | -6.4 (-9.1 to -3.7) |
| 11 Lung cancer | 11 Depressive disorders | 4.6 (2.1 to 7.1) | 1.7 (-0.7 to 4.0) | -1.9 (-2.7 to -1.0) | 11 Depressive disorders | 2.9 (0.9 to 5.0) | 3.3 (1.2 to 5.4) | 0.7 (-0.8 to 2.1) |
| 12 Diabetes | 12 Colorectal cancer | 39.8 (37.2 to 42.6) | 35.8 (33.3 to 38.6) | -0.9 (-2.7 to 0.9) | 12 Skin diseases | 1.8 (0.7 to 3.0) | 2.2 (1.1 to 3.4) | 0.1 (-1.0 to 1.4) |
| 13 Migraine | 13 Diabetes | -5.6 (-9.5 to -2.2) | -8.2 (-12.1 to -5.0) | -29.0 (-32.1 to -26.4) | 13 Chronic kidney disease | 16.9 (14.3 to 19.6) | 17.4 (14.7 to 20.1) | -4.8 (-7.0 to -2.8) |
| 14 Colorectal cancer | 14 Liver cancer | 11.8 (9.2 to 14.2) | 8.6 (6.1 to 10.9) | -21.2 (-23.0 to -19.6) | 14 Diabetes | 4.8 (1.5 to 8.0) | 5.2 (1.9 to 8.4) | -9.0 (-11.7 to -6.2) |
| 15 Liver cancer | 15 Falls | 17.4 (12.9 to 21.9) | 14.1 (9.7 to 18.5) | -6.0 (-9.3 to -2.8) | 15 Liver cancer | -2.2 (-6.9 to 2.1) | -1.8 (-6.5 to 2.5) | -18.1 (-22.1 to -14.6) |
| 16 Chronic kidney disease | 16 Chronic kidney disease | 16.5 (14.3 to 18.7) | 13.2 (11.0 to 15.3) | -19.5 (-21.7 to -17.7) | 16 Oral disorders | 12.8 (11.3 to 14.3) | 13.3 (11.7 to 14.7) | -0.3 (-0.8 to 0.3) |
| 17 Alzheimer's disease | 17 Migraine | -1.5 (-6.2 to 3.1) | -4.3 (-8.8 to 0.2) | -0.8 (-4.7 to 3.2) | 17 Falls | -3.9 (-9.0 to 1.1) | -3.5 (-8.6 to 1.5) | -19.0 (-23.4 to -14.6) |
| 18 Falls | 18 Oral disorders | 30.4 (27.0 to 33.8) | 26.7 (23.5 to 30.0) | 1.2 (0.7 to 1.8) | 18 Other musculoskeletal disease | 14.0 (8.3 to 19.4) | 14.4 (8.7 to 19.9) | 1.9 (-2.5 to 6.5) |
| 19 Asthma | 19 Other musculoskeletal disease | 1.4 (-2.5 to 5.7) | -1.4 (-5.3 to 2.7) | -14.3 (-16.8 to -11.5) | 19 Migraine | -1.9 (-5.9 to 2.6) | -1.5 (-5.6 to 3.0) | 1.0 (-2.9 to 5.1) |
| 20 Other musculoskeletal disease | 20 COPD | 8.9 (4.7 to 15.4) | 5.8 (1.7 to 12.1) | -29.0 (-31.8 to -25.1) | 20 COPD | 13.1 (9.2 to 17.1) | 13.5 (9.6 to 17.5) | -11.4 (-14.2 to -8.2) |
| 23 COPD | 22 Road injuries | | | | 29 Road injuries | | | |
| 24 Oral disorders | 28 Asthma | | | | 31 Asthma | | | |

Figure 4: GBD level 3 causes of DALYs in Japan in 1990, 2005, and 2015 for both sexes combined, with all-age and age-standardised DALY rate change
 Ranking is based on the number of DALYs from each cause. Percentage change in number of DALYs and in all-age and age-standardised DALY rates are shown with 95% UI in parentheses. Alzheimer's disease=Alzheimer's disease and other dementias. COPD=chronic obstructive pulmonary disease. DALYs=disability-adjusted life-years. GBD=Global Burden of Diseases, Injuries, and Risk Factors.

the lowest and highest DALY rates in 2015, was 1.7 times for ischaemic heart disease and 1.8 times for cerebrovascular disease (combined DALY rates of ischaemic stroke, and haemorrhagic and other stroke). Many disabling conditions that predominantly lead to DALYs but do not cause substantial death, such as low back and neck pain, major depression, anxiety disorders, and schizophrenia, were homogeneous across the prefectures, revealing no distinct patterns.

Overall for Japan in 2015, 47.1% (95% UI 44.9–49.3) of total deaths were attributable to identified risk factors: behavioural risk factors accounted for 33.7% (30.9–36.8) of total deaths, metabolic risks for 24.5% (22.6–26.4), and environmental and occupational risks for 6.7% (5.4–8.2; data not shown). Similarly, all identified risk factors jointly explained 34.5% (95% UI 32.4–36.9) of DALYs, with the remaining 65.6% DALYs as yet unexplained by the risk factors analysed. Nationally, behavioural risk factors made a greater contribution to DALYs in 2015 (25.2% of total DALYs [22.9–27.7]) than metabolic risks (16.4% [15.2–17.6]) or environmental and occupational risks (4.4% [3.9–4.1]).

Dietary risks—combined risks of diets high in sodium, and diets low in whole grains, fruits, vegetables, and nuts and seeds—were the leading risk for DALYs both in men (13.8% [95% UI 11.7–16.3]) and women (9.3% [7.8–11.5]) in 2015. Among the dietary risks, high sodium consumption was the dominant risk for DALYs in both men and women (men 4.4% [2.2–7.3]; women 3.0% [1.4–5.2]). Tobacco smoking was the second leading risk factor for men (12.5% [11.0–14.0]). A number of metabolic risks, such as high blood pressure and high fasting plasma

glucose, were among the five leading risk factors for DALYs in both men and women. The contributions of these risk factors to DALYs did not vary much across the prefectures in 2015 (appendix pp 3–5). For example, dietary risks accounted for 10.4% (8.7–12.4) of total DALYs in Fukuoka (lowest) and 13.5% (11.3–15.6) in Aomori (highest). High sodium—the dominant downstream risk of dietary risks—explained 3.2% (1.5–5.4) of total DALYs in Okinawa (lowest) and 4.5% (2.2–7.4) in Akita (highest). For mortality, smoking was the leading risk factor for men (18.9% [95% UI 17.4–20.4]), while dietary risks were the major contributors to the total deaths for both men (18.8% [15.7–21.8], second rank) and women (18.0% [15.0–21.4], first rank). The contributions of these risk factors to mortality also did not vary much across the prefectures in 2015 (appendix pp 6–8).

We observed a distinct north–south gradient—with higher values in the south and lower in the north for the health system inputs analysed (appendix p 38). The prefectural mean of per capita health expenditure was US\$2246 (SD 311). In 2015, the average number of health workforce per 100 000 people across prefectures in 2014 was 237 (39) physicians, 957 (178) registered nurses, and 47 (12) public health nurses. The associations between the age-standardised death rates in 2015 and prefecture's per capita health expenditure (in 2015), number of physicians, registered nurses, and public health nurses per 100 000 people (in 2014) are shown in figure 6. Their Pearson's correlation coefficients were all very small (0.12, 0.10, 0.02, and -0.05, respectively), indicating very weak correlations, and there were no statistically significant relationship between them with small

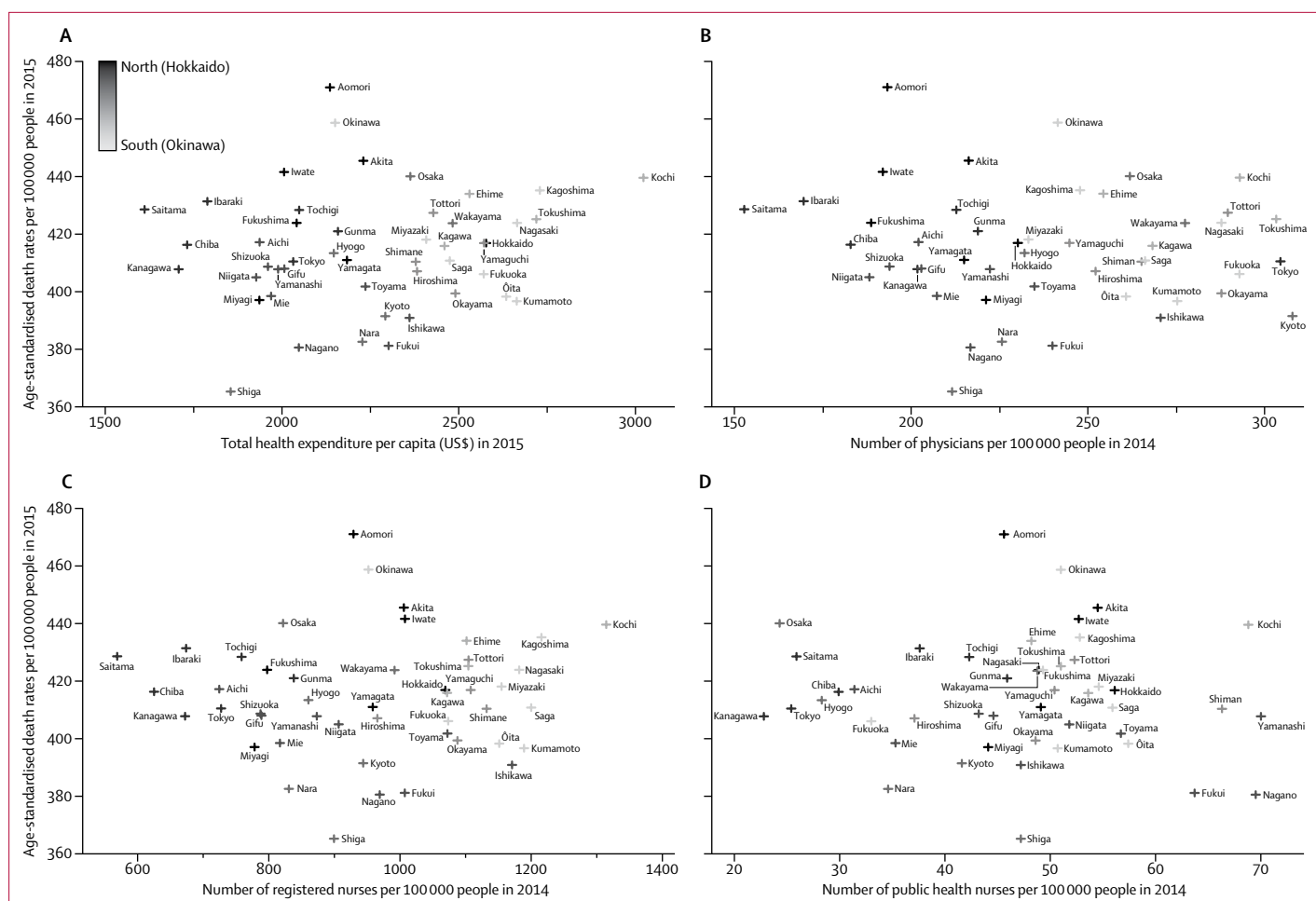


Figure 6: Association between age-standardised death rates and (A) total health expenditure per capita, (B) number of physicians, (C) registered nurses, and (D) public health nurses per 100 000 people

A gradation of symbols refers to the dark to light (black to white) from north (Hokkaido) to south (Okinawa). We defined the total health expenditure as the sum of inpatient and outpatient expenditures (not including those on dental care). In presenting results, we used the exchange rate of 112 Japanese yen per US\$ as of Feb 3, 2017.

and other dementia has substantially increased in both number of people dying and age-standardised death rates since 2005, indicating that improvements in overall mortality in Japan might have levelled off mainly due to these causes. Similar to mortality, the pace of reduction in DALYs in these leading causes also largely slowed down since 2005. All-cause age-standardised YLLs decreased by 33.4% between 1990 and 2015; however, the reduction in the rate of age-standardised YLDs was only 3.5% (appendix pp 32–37). These findings indicate an increase in the proportion of the population with morbidity, particularly age-related disorders.

One important implication of our results is that, coupled with the slowed-down progress in population health, Japan is experiencing a morbidity expansion due to its health transition. This expansion will require a shift in the health system framework in Japan. Yasuhisa Shiozaki, the Minister of Health, Labour, and Welfare, commissioned the “Health Care 2035 Advisory Panel” in 2015 that brought together young Japanese health policy

leaders to develop a long-term strategy for Japan’s future health policy for the next 20 years. Their report—Japan Vision: Health Care 2035^{30,31}—proposes integrating health care into social and community system frameworks around the country. The report also proposes that Japan’s new health system should continue to value equality and solidarity, while recognising individual patient priorities and values and incorporating global health perspectives. The report further suggests a shift in focus from inputs to outcomes. The system should redirect attention from the quantity of services provided to the quality of care, from cure to health maintenance and wellbeing, from central regulation to professional self-regulation, and from specialisation of services to integrated approaches across medical and social service sectors.³⁰

Gaps in life expectancy and HALE between prefectures have widened from 2.5 to 3.1 years in 1990 and from 2.3 to 2.7 years in 2015 (appendix pp 26–31). Consistent with other analyses,¹⁴ a broad tendency of higher mortality was observed in the north. Age-standardised mortality

reduction between 1990 and 2015 varied across the prefectures. These results could indicate an unequal health transition in the past 2 decades across Japan, and regional variations in national and local public health policy and strategy should therefore be addressed.

Many disabling conditions that predominantly lead to DALYs but do not cause substantial death, such as low back and neck pain, and depressive disorders, had no distinct patterns across the prefectures. This low regional variation might be an artifact of our limited coverage of subnational data sources for Japan. Nevertheless, many of the leading causes of mortality and YLLs, including cerebrovascular disease, ischaemic heart diseases, and self-harm showed remarkable variations by prefecture (appendix p 2). In view of the prominence of the different variation patterns in causes across regions, cause-specific and region-specific health interventions might need to be addressed in the most at-risk prefectures to deal with regional variations.

Several plausible mechanisms exist as to why some prefectures are achieving better health outcomes than others. First, according to the National Health and Nutrition Survey 2012, a nationwide survey conducted by the Ministry of Health, Labour and Welfare, statistically significant, slight variations by prefectures were observed in major lifestyle-associated behavioural factors (eg, salt intake and smoking) among adults aged 20 years and older.³² These variations are consistent with the patterns by geography we found in our study (higher death or DALY rates in the north, lower in the central and south). Therefore, regional variations in lifestyles might explain the regional health variations. However, importantly, our estimates showed that the contributions of such behavioural risk factors (ie, dietary risks, smoking, alcohol consumption) to DALYs as well as mortality did not vary much across the prefectures (appendix pp 3–8). This implies that regional variations in health might be driven by other unobserved factors, such as health system performance, which varies across the country.⁵ However, as mentioned previously, the low regional variation in risk factor contributions could be due to our poor data coverage of limited subnational data sources.

Second, a north–south gradient (lower–higher) was suggested in major proxy indicators of health system inputs, such as per capita health expenditures, and health workforce in numbers (appendix p 38), which might differentiate health outcomes across the country. However, prefecture-level associations between these health system inputs and mortality and DALYs were weak and not significant, suggesting other social determinants of health might suitably capture the regional variations in health (ie, socioeconomic and political contexts, including income and education levels²³). Health-care spending is strongly linked with health conditions and varies across Japan.^{8,33} In future rounds of subnational analysis for the GBD study in Japan, we plan to quantify the effect of personal

health-care spending and public health spending as well as other social determinants of health on the outputs from GBD, to identify prefecture-level characteristics potentially associated with improved health outcomes.

As observed elsewhere in the world,³⁴ the overall proportion of disease burden decreased in Japan between 1990 and 2015 largely due to a substantial decline in the incidence of preventable diseases (eg, cerebrovascular diseases, ischaemic heart diseases, lower respiratory infection, and some types of cancer), resulting in increased life expectancy. However, these diseases remained top causes of death and DALYs in 2015, which underlines the need to scale up effective coverage of preventive and public health measures nationally, such as screening and risk factor reduction to tackle the continuing burden of preventable diseases. Simultaneously, the scale-up of preventive measures should raise debates on investment in comparative cost-effectiveness assessment of policies and programmes to aid decision making.

In Japan, in 2015, behavioural risk factors made a greater contribution to both DALYs (25·2%) and mortality (33·7%) than did metabolic risks (DALYs 16·4%; mortality 24·5%) or environmental and occupational risks (DALYs 4·4%; mortality 6·7%). Unhealthy diets (particularly diets high in salt) and tobacco smoking were the two most important behavioural risk factors for many health conditions.

Smoking also increases the probability of many of serious clinical conditions.^{35–37} In 2017, Japan is expected to pass its strictest-ever smoking laws that would ban smoking on the premises of public facilities, such as restaurants, pubs, hospitals, and municipal offices. However, opposition is mounting from members of parliament. A group of parliamentarians has suggested that Japan should instead focus on smoke segregation policies that divide smoking and non-smoking areas in public places (ie, designated smoking rooms), which is not in line with the 2010 agreement adopted by WHO and the International Olympic Committee. Japan is responsible for hosting a smoke-free Olympics Games in 2020.³⁸

In view of our findings, addressing of these modifiable risk factors throughout an individual's life (namely risk factor approach) within national and local public health policies and strategies could enable the whole population to age better than in the past and maximise their health and longevity. More importantly, the contributions of these modifiable behavioural risk factors to DALYs and mortality did not vary much across the prefectures (appendix pp 3–8), implying that national systematic action could make a significant difference.

To our knowledge, this study is the first to provide a comprehensive picture of disease burden and patterns in Japan and prefectures—the country with the fastest ageing population in the world. Our subnational estimates of disease burden are the first and crucial step toward a greater understanding of prefecture-specific health priorities aligned to national and local health policy and programme implementations. Our study,

therefore, can help not only guide policy agendas and programme implementation, and facilitate intervention prioritisation, nationally and locally, to further improve the population health in Japan but also identify particular regions in the county where more targeted policy attention might be required.

Our analyses are, however, subject to the same limitations described for GBD 2015,^{15–18,39} as well as specific limitations associated with data availability for Japan. First, we had limited data access to up-to-date vital data, especially cause of death. Registration of death that occurred in Japan is a legal requirement. Therefore, we assumed mortality data were complete. However, a time lag between data registration and becoming available in databases exists. Second, sources of subnational data are not available at the prefecture level for the estimates of prevalence and incidence for several diseases as well as their risk factors. Our subnational estimates depend on the GBD Bayesian models, which allow for borrowing strength from other studies while using available covariates as predictors for imputing the missing data. Addressing of the sparse availability of individual-level morbidity data, such as patient records (ie, hospital inpatient and outpatient data) by prefecture will substantially improve future analytic efforts. Finally, as with other GBD studies reported elsewhere, the relative ranking across causes and risk factors are dependent on the level of their aggregation. Online data visualisations provide access to results based on different levels of the GBD 2015 hierarchy of causes and risk factors, including a complete set of age-specific, gender-specific, cause-specific, and prefecture-specific estimates of GBD outputs from 1990 until 2015.

Our study showed that health in Japan has been improving and life expectancy is rising because of the successful reduction in mortality and disability from most preventable diseases, such as cerebrovascular diseases, ischaemic heart diseases, lower respiratory infection, and some cancers that were previously severe and often fatal. However, the progress in population health has slowed down and variation in health is growing between prefectures for many leading causes. National and local health policies should therefore address region-specific health interventions to deal with these variations. The subnational health system inputs were not obviously associated with health outcomes, suggesting they are weakly associated with regional health variations. Therefore, the potential sources of the regional health variations, including subnational health system performance, need assessment.

Contributors

All authors contributed to the draft, and have seen and approved the final version of the report.

Declaration of interests

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Japan Health System Review



Asia Pacific Observatory
on Health Systems and Policies

Japan Health System Review

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Preface

The Health Systems in Transition (HiT) profiles are country-based reports that provide a detailed description of a health system, and of reform and policy initiatives in progress or under development in a specific country. Each profile is produced by country experts in collaboration with international editors. To facilitate comparisons between countries, the profiles are based on a template, which is revised periodically. The template provides detailed guidelines and specific questions, definitions and examples needed to compile a profile.

A HiT profile seeks to provide relevant information to support policymakers and analysis in the development of health systems. This can be used:

- to learn in detail about different approaches to the organization, financing and delivery of health services, and the role of the main actors in health systems;
- to describe the institutional framework, process, content and implementation of health-care reform programmes;
- to highlight challenges and areas that require more in-depth analysis;
- to provide a tool for the dissemination of information on health systems and the exchange of experiences between policy-makers and analysts in different countries implementing reform strategies; and
- to assist other researchers in more in-depth comparative health policy analysis.

Compiling the profiles poses a number of methodological issues. In many countries, there is relatively little information available on the health system and the impact of reforms. Due to the lack of a uniform data source, quantitative data on health services is based on a number of different sources, including the World Health Organization (WHO), national statistical offices, the Organisation for Economic Co-operation and Development (OECD) health data, the International Monetary Fund (IMF), the World Bank, and any other sources considered useful by the

authors. Data collection methods and definitions sometimes vary, but typically are consistent within each separate series.

The HiT profiles can be used to inform policy-makers about the experiences in other countries that may be relevant to their own national situation. They can also be used to inform comparative analyses of health systems. This series is an ongoing initiative, and the material will be updated at regular intervals.

Comments and suggestions for further development and improvement of the HiT series are most welcome and can be sent to the apobservatory@who.int. HiT profiles and HiT summaries for countries in Asia Pacific are available on the Observatory's website at www.healthobservatory.asia or http://www.searo.who.int/asia_pacific_observatory/en/.

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List of abbreviations

| | |
|---------|---|
| AMR | antimicrobial resistance |
| BCG | Bacillus Calmette–Guerin |
| CAM | complementary and alternative medicine |
| CHI | Community Health Insurance |
| CPR | cardiopulmonary resuscitation |
| CT | computerized tomography |
| DALY | disability-adjusted life year |
| DMAT | disaster medical assistance team |
| DPC | diagnosis–procedure combination |
| DPT-IPV | diphtheria–pertussis–tetanus and inactivated polio vaccine |
| DRG | diagnostic-related group |
| EHS | Elderly Health Systems |
| ELST | emergency life-saving technician |
| EMS | emergency medical service |
| FCSU | food (F), clothing (C), shelter (S) and utility (U) (approach) |
| FRSYO | Financial Redistribution System for the Young-Old |
| FY | financial year |
| GDP | gross domestic product |
| GPSP | General Principles for Suicide Prevention |
| HI | horizontal inequality |
| Hib | Haemophilus influenzae type b |
| HiT | Health Systems in Transition |
| HPV | human papillomavirus |
| HTA | health-care technology assessment |
| ICCS | Integrated Community Care System |
| ICD-10 | International Statistical Classification of Diseases, 10th Revision |
| ICT | information and communication technology |
| IDF | International Diabetes Federation |
| IDSC | Infectious Disease Surveillance Center |
| IT | information technology |

| | |
|--------|--|
| JCQHC | Japan Council for Quality Health Care |
| JHIA | Japan Health Insurance Association |
| JMA | Japan Medical Association |
| JNA | Japanese Nursing Association |
| JSTAR | Japanese Study of Ageing and Retirement |
| LDP | Liberal Democratic Party |
| LTC | long-term care |
| LTCI | long-term care insurance |
| MAFF | Ministry of Agriculture, Forestry and Fisheries |
| MAS | Mutual Aid Association |
| METI | Ministry of Economy, Trade and Industry |
| MEXT | Ministry of Education, Culture, Sports, Science and Technology |
| MHLW | Ministry of Health, Labour and Welfare |
| MHW | Ministry of Health and Welfare |
| MIC | Ministry of Internal Affairs and Communications |
| MMR | measles–mumps–rubella |
| MR | measles–rubella |
| MRI | magnetic resonance imaging |
| NCD | noncommunicable disease |
| NHCE | national health-care expenditure |
| NHI | National Health Insurance |
| OECD | Organisation for Economic Co-operation and Development |
| OHCA | out-of-hospital cardiac arrest |
| OOP | out-of-pocket |
| PPP | purchasing power parity |
| RBO | regional branch office (of the MHLW) |
| SCCE | Special Committee on Cost-Effectiveness |
| SHARE | Study of Health and Retirement in Europe |
| SHCSHG | specific health check-ups and specific health guidance |
| SMHI | Society-Managed Health Insurance |
| THE | total health-care expenditure |
| UHC | universal health coverage |
| VHI | voluntary health insurance |
| WAM | Welfare and Medical Service Agency |
| WHO | World Health Organization |

Abstract

Since the 1960s, the universal health insurance system in Japan has provided comprehensive coverage to all Japanese citizens. Associating with economic growth, Japan has achieved numerous successes in health such as control and eradication of common infectious diseases, substantial decrease of transport accident death, and most famously, achieving the world's highest life expectancy.

However, negative population growth with low fertility rate coupled with an ageing population, shrinking economy and increasing unemployment pose critical structural challenges to Japanese health. In addition, tight control of health-care cost and a laissez-faire approach to service delivery has resulted in a mismatch between need and supply of health-care resources and reduction in accountability for care quality. Japan's economic slowdown, high life-expectancy and growing use of expensive technologies have led to an ever-increasing rate of health-care expenditure. Consequently, good quality of care with comparably low price is no longer available.

To counteract this, the government has adopted several reforms in the past two decades in service delivery and financing: *Long-term care insurance system (2000)*; *Integrated Community Care System (2006)*; *The Comprehensive Reform of Society Security and Tax (2010)*; and *Regional Healthcare Vision (2014)*.

Moreover, young Japanese health-care leaders have already proposed *Japan Vision: Health Care 2035*, which encourages a paradigm shift to the new system, with a goal to build a sustainable health-care system that delivers better health outcomes through care that is responsive and equitable to each member of the society and that contributes to prosperity in Japan and the world.

Executive summary

Japan, the world's third-largest economy, with a corresponding high standard of living, level of development, safety and stability, has made a large number of noticeable successes in health since its universal health insurance system was founded in 1961. This includes the full implementation of universal insurance coverage, achieving the world's highest life expectancy and control and eradication of common infectious diseases. In addition, transport accident deaths has decreased substantially in the past 50 years.

Despite these achievements, the country faces many challenges including a negative population growth with low fertility rate, an ageing population, shrinking economy and increasing unemployment rate. Increasing NCD-related disease burden and degenerative diseases especially in recent decades along with population ageing places a strain on the national health system in many aspects especially in terms of service delivery and financing.

Japan's health system is characterized by universal insurance scheme, where participants are free to choose health care facilities and good quality of care with comparably low price. However, Japan's policy of tight control of health-care cost and a laissez-faire approach to service delivery, with inadequate governance of provider organisations, created a mismatch between need and supply of health-care resources and impeded accountability for care quality. Japan's economic slowdown, high life expectancy, and growing use of expensive technologies have led to an ever-increasing rate of health-care expenditure (THE of % GDP: 6.3% in 1995 to 10.9% in 2015, by OECD). This demographic dilemma requires a drastic reform in health-care and long-term care systems.

Building on the robust implementation of universal health insurance system, several reforms have been adopted in the past two decades in order to meet the challenges posed by demographic changes.

Long-term care insurance system (2000): social insurance scheme for elderly aged 65 years and above who require long-term care or social

services. This is reviewed and revised every three years to maintain sustainability.

Integrated Community Care system (2006): a comprehensive system at the community level that integrates prevention, medical services, and long-term care and also provides living arrangements and social care.

The Comprehensive Reform of Social Security and tax (2010): a joint reform for the social security system and taxation system that should improve fiscal sustainability for the Japanese social security system in Japan. In seven years since its start, several related laws have successfully been enacted or amended under this reform plan and this plays the central policy for healthcare and long-term care. Priority areas are: measures for the support of children and child-raising, employment of young people, reform of medical and long-term care services, pension reform, measures against poverty and income inequality and measures for low-income earners as a cross-system issue.

Regional Healthcare Vision (2014): The Ministry of Health, Labour and Welfare has asked each prefectural government to create a region-specific vision, specifically requesting that prefectures estimate the future supply and demand for healthcare and create region-specific healthcare systems by 2025. Together with ICCS, this vision aims to provide seamless support for the elderly (from disease prevention to long-term care) in their respective communities.

Japan needs a paradigm shift to the new system as proposed in *Japan Vision: Health Care 2035*, a report for the Health Minister by young Japanese health leaders in June 2015 under the former Health Minister, Yasuhisa Shiozaki's leadership. The goal of *Japan Vision: Health Care 2035* is to build a sustainable health-care system that delivers better health outcomes through care that is responsive and equitable to each member of the society and that contributes to prosperity in Japan and the world. This report proposes that Japan's health system move from inputs to outcomes, from quantity to quality and efficiency, from cure to care, and from specialization to integrated approaches across all sectors.

1 Introduction

Chapter summary

Japan is the world's third-largest economy, with a correspondingly high standard of living, level of development, safety and stability. Japan is a constitutional monarchy with a parliamentary system of government. The country is divided into 47 prefectures that span a number of small archipelagos as well as the four main islands. Japan is a highly urbanized country and is host to one of the largest metropolises in the world, Tokyo. The country's 127 million population is ageing rapidly and shrinking due to low birth rates, increased life expectancy and its immigration policy. This has led to what some claim is an imminent demographic crisis (Tamiya N et al., 2011).

Since Japan's health system was founded in 1961, it has provided comprehensive coverage to all Japanese citizens. This can be largely attributed to the universal health insurance system. Thanks to the overall effectiveness of the health system, socio-economic development and advances in technology (Tamiya N et al., 2011), Japan has enjoyed increased life expectancy for many years. However, in recent decades, the incidence of noncommunicable and degenerative diseases has increased significantly. This increase, along with population ageing, has placed a strain on the national health system. Coupled with over two decades of economic slowdown, Japan must now find policies that balance universal insurance coverage, service quality and financial sustainability.

1.1 Geography and sociodemography

Japan is an archipelago set between the Sea of Japan to the west and the Pacific Ocean to the east. Japan shares no contiguous land borders with any other nation, but due to the large number of islands within its territory, it has an extensive maritime boundary. While Japan comprises over 6000 islands, a large majority of its population inhabits the four main islands: Honshu, Kyushu, Hokkaido and Shikoku (in descending order of population). Due to mountainous terrain, the land available for urban development is limited, resulting in high population density in

conurbations. Japan's geographic proximity to the Pacific rim makes the country particularly prone to seismic activity (i.e., earthquakes and tsunamis) and typhoons from the Pacific Ocean. Fig. 1.1 shows a map of the main islands of Japan.

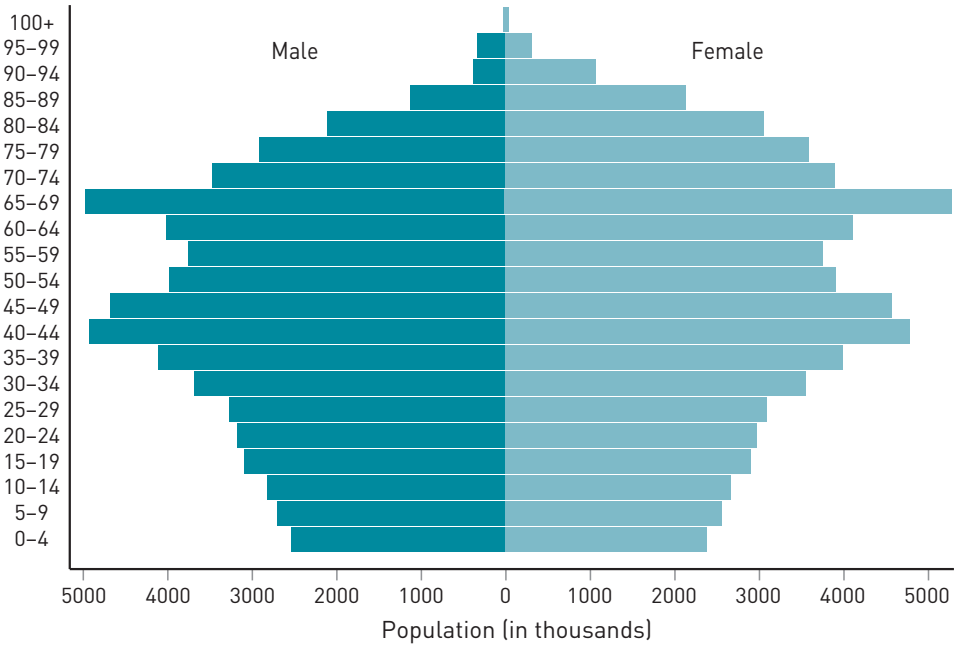
Fig. 1.1 Map of Japan



Source: United Nations Geospatial Information Section, 2014

Japan has passed through the epidemiological transition and is now ageing rapidly. Because of a sharp decline in Japan's fertility rate, the shape of the population pyramid no longer resembles the form of a classic population pyramid (Fig. 1.2). Two consecutive baby booms are represented by the two corresponding bulges, with the first one occurring shortly after the Second World War (1947–1949) and the second one in the early 1970s. It is evident that Japan has a large elderly population and will face an unprecedented ageing crisis when the first baby boomers reach the age of 75 years and older in 2025.

Fig. 1.2 Japan population pyramid in 2016



Source: Statistics Bureau, Ministry of Internal Affairs and Communications, 2017

The population in Japan increased steadily from 117 million in 1980 to 128 million in 2004. Although 2005 was the first year that the total population was below that of the previous year, it reached its peak in 2008. Since then, it fluctuated for a few years before beginning a steady decline from 2011 onwards (Table 1.1).

The proportion of the population aged 65 years and over overtook the proportion of those aged 0–14 in 1997, and was more than double said proportion by 2016; increasing from 9.1% in 1980 to 27.3% in 2016, while the proportion of the 0–14 year olds fell from 23.5% to 12.4% over the same time period. The number of those aged 65 years and above now stands at 34 million and peak in 2042 at 38.8 million; subsequently, it is estimated that the total number of the elderly will start to decline (Cabinet Office, Government of Japan, 2016). From 1980 onwards, total fertility rate was below the replacement level (2.0 children per woman). The crude birth rate has decreased steadily over time (from 13.6 per 1000 population in 1980 to 7.8 in 2016), while over the same period, there has been a consistent increase in life expectancy (Tamiya N et al., 2011). Among countries belonging to the Organisation for Economic Co-operation and Development (OECD), Japan has the lowest fertility rate with the highest mean maternal

age at first birth (Sleeboos J, 2003). The main reasons for the population decline in Japan are multifactorial, including an increase in irregular employment and corresponding lower wages, delayed marriage, an increasingly large unmarried population, changes in the home environment and social customs, an increasing number of women participating in the workforce, insufficient maternity and childcare leave for irregular workers, the rising costs of childbirth and child-rearing, and immigration policy (Jones GW, 2007; Morgan SP et al., 2006; Sleeboos J, 2003).

Table 1.1 Trends in demographic indicators, selected years

| Indicators | 1980 | 1990 | 2000 | 2010 | 2016 |
|---|---------|---------|---------|---------|--------------------|
| Population (in thousands) ^a | 117 060 | 123 611 | 126 926 | 128 057 | 126 940 |
| Female (% of total) ^a | 50.8 | 50.9 | 51.1 | 51.3 | 51.4 |
| Population (% of total) ^{a,b} | | | | | |
| 0–14 years | 23.5 | 18.2 | 14.6 | 13.1 | 12.4 |
| 65 years and older | 9.1 | 12.1 | 17.3 | 22.8 | 27.3 |
| 80 years and older | 1.4 | 2.4 | 3.8 | 6.4 | 8.2 |
| Annual population growth rate (%) ^a | 0.90 | 0.42 | 0.21 | 0.05 | -0.17** |
| Population density (per sq. km) ^a | 314 | 332 | 340 | 343 | 341 |
| Mean age at first child ^a | 26.4 | 27.0 | 28.0 | 29.9 | 30.7 |
| Mean age at first marriage ^a | | | | | |
| Male | 27.8 | 28.4 | 28.8 | 30.5 | 31.1 |
| Female | 25.2 | 25.9 | 27.0 | 28.8 | 29.4 |
| Total fertility rate (per woman) ^a | 1.75 | 1.54 | 1.36 | 1.39 | 1.44 |
| Crude birth rate (per 1000 population) ^a | 13.6 | 10.0 | 9.5 | 8.5 | 7.8 |
| Crude death rate (per 1000 population) ^a | 6.2 | 6.7 | 7.7 | 9.5 | 10.5 |
| Age-dependency ratio [*] | 48.4 | 43.5 | 47.0 | 56.8 | 65.8 ⁺ |
| Urban population (%) ^c | 76.2 | 77.3 | 78.6 | 90.5 | 93.5 ⁺⁺ |

Notes: *Age-dependency ratio is the ratio of population (age 0–14 and 65+)/[age 15–64], ** 2013, + 2014, ++ 2015

Sources: ^a Statistics Bureau Ministry of Internal Affairs and Communication, 2017, ^b World Bank, 2017, ^c United Nations Department of Economic and Social Affairs Population Division, 2017

The age-dependency ratio, the number of people who are less than 15 years old and above 65 years old divided by the working-age population (between 15 and 64 years), increased from 48.4 in 1980 to 65.8 in 2016. According to the World Urbanizations Prospects by the United Nations, urbanization is also taking place in Japan. In 1980, 76.2% of the population was categorized as urban, and by 2015, this number had increased to 93.5%. It is expected that the urban population will further increase to 97.7% by 2050, resulting in the disappearance of a large number of rural communities (United Nations, Department of Economic

and Social Affairs Population Division, 2017). Urbanization and population ageing have a substantial impact on the future of social and health systems in rural and underpopulated areas in Japan.

1.2 Economic context

Japan is the world's third-largest economy by gross domestic product (GDP) and is a member of the Group of Seven (G7). Although Japan's GDP increased rapidly in the immediate post-War period, the economic crisis of the 1990s caused several decades of stagnation and recession (Table 1.2). Industrial structure also changed significantly in the past decades. "Value added by services" was 70.0% of the GDP in 2015, representing a 4.2% rise from 2000 levels. However, the "value added by industry" fell by 3.8% of the GDP in the same period, as did agriculture, by 0.5% of GDP. This change in industrial structure is now affecting the sustainability of the Japanese universal insurance system (see more details in Chapter 3) (Ikegami N et al., 2011).

Historically, Japan has had low levels of unemployment. The unemployment rate had increased since 1990, peaking at 5.4% in 2002, and then resumed its decline to reach 3.4% in 2015 although the proportion of part-time and contingent workers has continued to grow in recent years. The majority of this increase can be attributed to the growth in the number of older people and women after childrearing, who had left the workforce and later returned to work (Reich MR et al., 2015). Increasingly, the inequality in working conditions and low wages for part-time and contingent workers have been seen as serious labour issues with social implications.

Equity has been a central tenet in Japan, and the government has promoted equity both in depth and breadth of public services. Gini coefficients quantifying income inequality have declined consistently from 1962 to 1981 (indicating that income was distributed more equally over this period) (Ministry of Health, Labour and Welfare, 2017t). However, in the decades after the 1980s, Japan's Gini coefficient increased (indicating higher levels of income disparity). In 2012, the Gini coefficient reached 0.33, which is higher than the OECD average (0.318) and is partially attributable to the increasing number of elderly persons (OECD, 2017b). Although Japan provides universal health insurance regardless of economic status with comparably lower premiums, an increasing number of children live below the poverty line, having reached 13.9% in 2015; these children's parents may not be able to afford even the lowest

premiums (Cabinet Office, Government of Japan, 2015a). Concerns regarding the impact of increasing inequality among children in access to and quality of health care due to poverty are ever present. In 2011, Ikegami et al. estimated that there were about 1.6 million people who were not covered by national health insurance. This was largely due to an increase in the proportion of those with irregular employment at lower wages (from 18% in 1988 to 34% in 2010) and is now of great political concern (Ikegami N et al., 2011).

At the centre of Japan's approach to healthcare has been the constitutionally enshrined objective of equity and universality, translated into practice by universal health-care access (Murray CJL, 2011). An extended economic recession has had an impact on the fiscal space allocated to the health-care system in Japan (Wada K et al., 2016). As social inequalities increase, the social determinants of health will likely become more entrenched, leading to overall poorer health of the population (World Health Organization, 2010). Ensuring long-term sustainability of the universal health coverage system in Japan is presently challenged by expanding inequity and the demographic transition.

Table 1.2 Macroeconomic indicators, selected years

| Total population | 1980 | 1990 | 2000 | 2010 | 2015 |
|--|-----------------|---------|-----------------|-----------------|-----------------|
| GDP (Billion Yen) ^a | 249 345 | 454 645 | 526 706 | 500 354 | 530 545 |
| GDP (US\$) ^a | 1100 | 3140 | 4888 | 5700 | 4383 |
| GDP per capita (1000 ¥) ^a | 2135 | 3680 | 4152 | 3907 | 4173 |
| GDP per capita, PPP (US\$) ^a | - | 19 454 | 26 795 | 34 996 | 40 686 |
| GDP average annual growth rate (%) ^a | 2.8 | 5.6 | 2.8 | 4.2 | 1.2 |
| Health expenditure, total (% of GDP) ^a | - | - | 7.5 | 9.6 | 10.2** |
| Value added in industry (% of GDP) ^a | 38.3 | 37.4 | 32.7 | 28.5 | 28.9 |
| Value added in agriculture (% of GDP) ^a | 3.0 | 2.1 | 1.5 | 1.1 | 1.1 |
| Value added in services (% of GDP) ^a | 58.6 | 60.6 | 65.8 | 70.4 | 70.0 |
| Labour force (total) ^b ('000) | 56 500 | 63 840 | 67 660 | 66 320 | 66 250 |
| Unemployment, total (% of labour force) ^b | 2.0 | 2.1 | 4.7 | 5.1 | 3.4 |
| Real interest rate (%) ^a | 2.8 | 4.5 | 3.5 | 3.6 | -0.9 |
| Gini coefficient ^c | 0.318 (1981) | 0.364 | 0.381 (1999) | 0.379 (2011) | 0.376 (2014) |

Notes: The Gini coefficient is a measure of income inequality; higher figures indicate greater inequality among the population (Survey of the Redistribution of Income is conducted once every three years). **2014, ¥: yen; ¥B: billion ¥; PPP: purchasing power parity

Sources: ^a World Bank, 2017, ^b Statistics Bureau, Ministry of Internal Affairs and Communications, 2017, ^c Ministry of Health, Labour and Welfare, 2017t

1.3 Political context

Japan's journey towards the universal insurance system has been marked by eras of foundation, expansion and managed growth in a post-War nation. But seemingly, the path to universal insurance was illuminated by strong egalitarian principles. Comparatively, with reference to other countries at the same level of industrialization and wealth, it is not surprising that the universal insurance system could be achieved in Japan; however, what remains unusual is the breadth and depth of the health system that has been achieved.

Unique to the Japanese health system is the existence of both: Employees' Health Insurance plans and Community Health Insurance (CHI) plans, which are now classified as National Health Insurance. Employee's Health Insurance system has its origin in the Bismarckian system of social health insurance in Germany. Although Employees' Health Insurance and CHI have different origins, together they extended coverage to the entire population over time. CHI - which later became National Health Insurance (NHI), mainly covered self-employed and temporary workers.

The history of national insurance systems after the Second World War was marked by a movement towards attaining a higher level of care, in terms of health-care and welfare similar to that of Western nations. Even now, tensions among contending political parties, interest groups and public opinion on health care and health insurance have continued to influence political debate, especially during national elections.

1.3.1 *Foundation of the health insurance system*

The foundation of the Japanese health insurance system arose from an effort towards industrialization, in favour of progress. The most significant event in the history of the Employee's Health Insurance system was the enactment of the Health Insurance Act of 1922, which was promoted both by the government and industrial sectors to provide health insurance, in order to maintain the health of workers and prevent them from being attracted to socialism.

1.3.2 *Expansion*

By the middle of the 1930s, the majority of employees had access to health insurance, thanks to the Employees' Health Insurance system, while a very limited number of the unemployed had access to health care.

In 1938, the Central Government decided to create an insurance system that targeted the unemployed population so as to provide 100% insurance coverage to all Japanese residents. Responding to the threat of socialism from the Union of Soviet Socialist Republics, the government acted to extend coverage to both employed and unemployed populations nationally. Later, as the political agenda became more influenced by the military, the Ministry of Health and Welfare further expanded coverage with the main purpose of recruiting healthy soldiers during the early 1930s. However, CHI was offered on a voluntary basis and there were still many people who were not covered either by Employees' Health Insurance or CHI.

1.3.3 Growth and equity

When the Second World War ended in 1945, many social services, including health care, were destroyed, and the then-government was urged by GHQ (General Headquarters) operated in the USA to create social infrastructure. Subsequently, political conflict between the major parties resulted in the expansion of coverage to more vulnerable groups, as the Liberal Democratic Party (LDP) attempted to weaken the socialist and communist party agendas. Nobusuke Kishi, the LDP prime minister at that time, strongly believed that attaining equitable health care and a welfare system could be the driving force in making his cabinet sustainable. He expressed his intention to pursue universal insurance coverage in his speech at the Diet in 1957 and enacted the National Health Insurance Act (New) in 1958, which forced all municipalities to transform voluntary-basis Community Health Insurance to mandatory National Health Insurance. This law was enforced in 1959, and Japan officially achieved universal health insurance coverage in 1961.

During a period of almost 15 years of economic growth that started in the early 1960s with an unprecedented 10% growth rate (known as the economic miracle), the then LDP prime ministers Hayato Ikeda and Kakuei Tanaka expanded the breadth and depth of universal insurance coverage (initial co-payment rate started at 50% and was then reduced to 30% by the 1980s). At the same time, there was increasing pressure from the Socialist Party that urged a faster expansion of the coverage to the elderly, who were not receiving the full benefits of economic growth. Advocates highlighted the fact that because the elderly had lower income but more likely to experience illness, if their co-payment for accessing health system was kept the same, even if they access the system at the same rate, they would spend proportionally higher rate of their income on health care costs. The ruling LDP thus decided to provide free health care for the

elderly who were above the age of 70 years. This populist policy would later impose a heavy financial burden on the Japanese health system.

The recession of the 1973 oil crisis marked the end of the “economic miracle” and resulted in much slower economic growth. In a period of decreasing fiscal space and increasing health expenditures, tensions between the LDP and the Socialist Party were higher than ever. Although the Cabinet was sensitive to the increasing burden of health-care costs (mainly due to free health care for the elderly) and the need to reduce health-care expenditure, actions to contain health spending did not come until the late 1970s.

When the LDP won the national elections in the early 1980s, prime minister Yasuhiro Nakasone started an austere fiscal policy, also known as “small government.” At a time when global leaders like Margaret Thatcher from the United Kingdom and Ronald Reagan from the USA were promoting austere fiscal policy, the Japanese government started to reduce the health care budget primarily by abolishing free health care for the elderly and introducing a fee-control schedule (detailed explanation of healthcare for the elderly and the fee-schedule are explained in Chapter 3).

After a long period of austere fiscal policy for health, government actions were required to address inequities inherent to a system with a complex governance structure and with fragmented insurance plans with varying premium levels. In 2001, Junichiro Koizumi was elected as prime minister with a promise of a more progressive approach to health. However, poor macroeconomic performance and strong opposition from the Japan Medical Association (JMA) (mainly directed at strong austere fiscal policy on healthcare and the increase in both OOP and insurance premiums) limited such changes. The JMA's opposition, however, was weakened after Koizumi's overwhelming victory in the general election in 2005 (JMA made a significant blunder in the general election by taking an anti-Koizumi stance, although health care was not at stake). With the overwhelming majority, the Koizumi administration launched a fiscal policy in social security, in which the natural increase of the social security budget would be suppressed by 1.1 trillion yen in 5 years. Such an austere fiscal policy (the fee schedule for providers was decreased by 2.6% in 2006, the largest-ever price cut in its history) inevitably strained the health care setting and created “health care crisis”. Since then, the balance between

cost and quality of health care remains a central debate in Japan (more recent health-care reforms are explained in Chapters 6 and 7).

More recent laws and policies have aimed to consolidate insurance plans, promote community-level integration of health care, provide long-term care, encourage use of health data including ICT use in health care and settle controversies on highly priced drugs. In 2015, an advisory panel commissioned by the former health minister Yasuhisa Shiozaki presented its vision for health care in 2035. In this proposal, a reformed system will still promote egalitarian principles and at the same time underscore individual patient values; it clearly states that its goal is to provide a “sustainable health-care system that is responsive and equitable to each member of society.”

1.4 Health status

1.4.1 Life expectancy and mortality

Table 1.3 presents trends in life expectancy at birth as well as mortality rates from 1990 to 2015 in Japan. Life expectancy at birth increased between 1990 and 2015 by 4.0 years for men and 4.5 years for women, reaching 80.5 years and 86.8 years, respectively (Nomura S et al., 2017). However, regional disparities have widened during the same period. The gap between the highest and lowest life expectancy among prefectures increased from 2.5 years in 1990 to 3.1 years in 2015.

Table 1.3 Life expectancy at birth and health indicators by gender in 1990 and 2015

| Indicators | 1990 | 2015 |
|------------------------------------|-------|-------|
| Life expectancy (in years) | | |
| Male | 75.9 | 79.9 |
| Female | 81.8 | 86.3 |
| Healthy life expectancy (in years) | | |
| Male | 68.2 | 71.5 |
| Female | 72.4 | 76.3 |
| Age-standardized mortality rate* | | |
| Male | 759.3 | 539.0 |
| Female | 455.5 | 315.0 |

Notes: Death rates presented as per 100 000 population

*Age standardized death rates were derived from world population standards developed for the Global Burden of Disease Study (Wang H et al., 2016)

Source: Nomura S et al., 2017

Healthy life expectancy at birth, the average number of years that a newborn can expect to live in full health, rose from 70.4 years in 1990 to 73.9 years for both sexes in 2015. In 2015, healthy life expectancy was 71.5 years for men and 76.3 years for women. The gap between life expectancy at birth and healthy life expectancy at birth observed in 1990 has been static until 2015. All-cause age-standardized mortality rates for both sexes decreased by 29.0% between 1990 and 2015, falling from 584.1 deaths per 100 000 people in 1990 to 414.8 deaths per 100 000 people in 2015. Prefecture-level reductions in age-standardized mortality rates varied from 22.0% in Okinawa to 32.4% in Shiga between 1990 and 2015.

Table 1.4 Life expectancy (years), selected OECD countries, selected years

| Life expectancy (years) | Year | | | | |
|--------------------------|------|------|------|------|-------|
| | 1980 | 1990 | 2000 | 2010 | 2015 |
| Canada | 75.3 | 77.2 | 79.0 | 81.1 | 81.7* |
| Finland | 73.6 | 75.0 | 77.7 | 80.2 | 81.6 |
| France | 74.3 | 77.0 | 79.2 | 81.8 | 82.4 |
| Germany | 72.9 | 75.3 | 78.2 | 80.5 | 80.7 |
| Greece | 75.3 | 77.1 | 78.6 | 80.7 | 81.1 |
| Italy | 74.0 | 77.1 | 79.9 | 82.1 | 82.6 |
| Japan | 76.1 | 78.9 | 81.2 | 82.9 | 83.9 |
| Republic of Korea | 66.2 | 71.7 | 76.0 | 80.2 | 82.1 |
| Mexico | 67.2 | 70.5 | 73.3 | 74.1 | 75.0 |
| Switzerland | 75.7 | 77.5 | 79.9 | 82.6 | 83.0 |
| United Kingdom | 73.2 | 75.7 | 77.9 | 80.6 | 81.0 |
| United States of America | 73.7 | 75.3 | 76.7 | 78.6 | 78.8 |

Note: *2013

Source: OECD, 2016

There have been significant improvements in life expectancy over the past 35 years in all OECD countries, as shown in Table 1.4. According to OECD data, of the 12 high-income OECD countries, Japan has the highest life expectancy at 83.7 years in 2015. This longevity compared to other OECD countries has been sustained over time. Among other OECD countries, Italy (82.7 years) has the second longest life expectancy followed by France (82.4 years) and Korea (82.3 years). The lowest life expectancy among OECD countries was observed in Mexico (76.7 years). The contributing factors to the relatively long life expectancy in Japan may be attributable to a healthy lifestyle, diets and other risk factor profiles,

sanitation and hygiene, universal and equitable health coverage and social determinants (Horiuchi S, 2011; Ikeda N et al., 2011).

1.4.2 Burden of diseases

Like many other high-income countries, non-communicable diseases (NCDs) are now the leading cause of mortality and morbidity in Japan, while the burden of communicable diseases has decreased substantially over the past five decades. TB was the top leading cause of death by the middle of the 20th century in Japan, although it drastically fell in the rankings over the same period (the number of deaths decreased from over 100 000 in 1950 to 1892 in 2016). Pneumonia was also one of the top causes of death in early the 1900s but has gradually decreased over the decades. However, mainly due to an ageing society, the number of deaths attributable to pneumonia resumed an increase in the 1990s and is now the third leading cause of death in Japan.

Table 1.5 shows the leading causes of death in Japan. Rankings are based on the number of deaths from each cause. The top three leading causes of death in 1990 were cerebrovascular disease, ischaemic heart disease, and lower respiratory infection, which remained at the top in 2015 despite substantial declines in their age-standardized rates (–19.3%, –11.6% and –6.5% between 2005 and 2015, respectively). The pace of decline in mortality from these three leading causes and many other causes has levelled off since 2005 for both men and women with the average annual percentage change in age-standardized death rates between 1990 and 2005 being –2.6%, –2.6%, and –1.2% for the top three causes, but declining to –1.9%, –1.2%, and –0.7%, respectively after 2005.

Table 1.5 Causes of death in Japan in 1990, 2005 and 2015 for both sexes

| Leading causes in 1990 | Leading causes in 2005 | Change in age-standardized death rate from 1990 (%) | Leading causes in 2015 | Change in age-standardized death rate from 2005 (%) |
|-------------------------------|---------------------------------|---|---------------------------------|---|
| 1 Cerebrovascular disease | 1 Cerebrovascular disease | -39.6 | 1 Cerebrovascular disease | -19.3 |
| 2 Ischaemic heart disease | 2 Ischaemic heart disease | -38.4 | 2 Ischaemic heart disease | -11.6 |
| 3 Lower respiratory infection | 3 Lower respiratory infection | -17.5 | 3 Lower respiratory infection | -6.5 |
| 4 Stomach cancer | 4 Alzheimer's disease | 3.7 | 4 Alzheimer's disease | 3.7 |
| 5 Alzheimer's disease | 5 Lung cancer | 2.8 | 5 Lung cancer | -8.7 |
| 6 Lung cancer | 6 Stomach cancer | -33.9 | 6 Stomach cancer | -5.9 |
| 7 Colorectal cancer | 7 Colorectal cancer | 3.0 | 7 Colorectal cancer | -6.4 |
| 8 Liver cancer | 8 Liver cancer | -9.5 | 8 Chronic kidney disease | -11.2 |
| 9 Self-harm | 9 Self-harm | 21.7 | 9 Liver cancer | 4.1 |
| 10 COPD | 10 Chronic kidney disease | -23.3 | 10 COPD | -16.0 |
| 11 Chronic kidney disease | 11 COPD | -36.0 | 11 Pancreatic cancer | 6.5 |
| 12 Road injuries | 12 Pancreatic cancer | 6.8 | 12 Self-harm | -2.3 |
| 13 Pancreatic cancer | 13 Gallbladder cancer | -19.1 | 13 Gallbladder cancer | 5.1 |
| 14 Gallbladder cancer | 14 Aortic aneurysm | 18.5 | 14 Aortic aneurysm | 2.1 |
| 15 Hypertensive heart disease | 15 Oesophageal cancer | -1.2 | 15 Other cardiovascular disease | -8.7 |
| 16 Cirrhosis/hepatitis C | 16 Breast cancer | 25.9 | 16 Interstitial lung disease | 0.7 |
| 17 Diabetes | 17 Other cardiovascular disease | 5.2 | 17 Breast cancer | 0.0 |
| 18 Oesophageal cancer | 18 Cirrhosis hepatitis C | -31.8 | 18 Oesophageal cancer | -14.4 |
| 19 Other neoplasms | 19 Road injuries | -45.0 | 19 Lymphoma | -6.6 |
| 20 Leukaemia | 20 Interstitial lung disease | 55.5 | 20 Other neoplasms | -18.8 |

Notes: The ranking is based on the number of deaths from each cause.

COPD: chronic obstructive pulmonary disease

Source: Nomura S et al., 2017

Many of the leading causes of death showed considerable variation by prefecture (Nomura S et al., 2017). For example, amongst the 47 prefectures, the lowest and highest age-standardized death rates due to cerebrovascular disease were 37.9 and 62.0 per 100 000 population, respectively. For ischaemic heart disease, there was a 1.5-fold difference between the prefectures with the lowest and highest age-standardized death rates (35.9 and 55.0 per 100 000 population, respectively). Cerebrovascular disease has a 1.6-fold difference between the prefectures with the lowest and highest age-standardized death rates (37.9 and 62.0 per 100 000 population respectively). Some causes have distinct patterns determined largely by geography (higher in the rates in the north, lower in the central and south) while others do not.

Between 1990 and 2015, the rate of age-standardized disability-adjusted life years (DALYs) decreased by 19.8% overall. Table 1.6 provides the trends in cause-specific DALYs from 1990 to 2015. Cerebrovascular disease and ischaemic heart disease are now at similar levels in Japan. As with mortality, the pace of reduction in DALYs due to these causes largely levelled off since 2005. The average yearly percentage change in age-standardized DALY rates was -2.6% for both ischaemic heart disease and cerebrovascular disease from 1990 to 2005, which decreased to -1.5% and -2.1% after 2005, respectively. With no significant change in age-standardized DALY rates since 2005, low back and neck pain, sense organ diseases, and depressive disorders have been important leading causes of DALYs in 2015. Although they do not cause substantial death, they result in major disabilities.

Like many causes of death, causes of DALYs showed substantial variation between prefectures, which largely followed patterns determined by geography. In terms of disparity, between the prefectures with the lowest and highest DALY rates in 2015, there was a 1.7-fold and 1.8-fold difference for ischaemic heart disease and cerebrovascular disease, respectively. Many disabling conditions that predominantly lead to DALYs but do not cause a substantial number of deaths, such as low back and neck pain, and sense organ diseases, revealed no distinct geographical pattern.

Table 1.6 Causes of DALYs in Japan in 1990, 2005 and 2015 for both sexes combined

| Leading causes in 1990 | Leading causes in 2005 | Change in age-standardized DALYs rate 1990–2005 (%) | Leading causes in 2015 | Change in age-standardized DALYs rate 2005–2015 (%) |
|----------------------------------|----------------------------------|---|----------------------------------|---|
| 1 Cerebrovascular disease | 1 Cerebrovascular disease | -38.2 | 1 Ischaemic heart disease | -14.5 |
| 2 Ischaemic heart disease | 2 Low back & neck pain | 0.3 | 2 Low back & neck pain | -0.1 |
| 3 Low back & neck pain | 3 Ischaemic heart disease | -33.8 | 3 Sense organ diseases | 0.8 |
| 4 Sense organ diseases | 4 Sense organ diseases | 1.3 | 4 Cerebrovascular disease | -21.4 |
| 5 Stomach cancer | 5 Self-harm | 34.0 | 5 Alzheimer's disease | 3.3 |
| 6 Lower respiratory infections | 6 Lower respiratory infections | -23.8 | 6 Lower respiratory infections | -10.8 |
| 7 Self-harm | 7 Lung cancer | -1.0 | 7 Lung cancer | -11.1 |
| 8 Skin diseases | 8 Alzheimer's disease | -2.2 | 8 Self-harm | -5.3 |
| 9 Depressive disorders | 9 Stomach cancer | -38.0 | 9 Stomach cancer | -20.6 |
| 10 Road injuries | 10 Skin diseases | 0.6 | 10 Colorectal cancer | -6.4 |
| 11 Lung cancer | 11 Depressive disorders | -1.9 | 11 Depressive disorders | 0.7 |
| 12 Diabetes | 12 Colorectal cancer | -0.9 | 12 Skin diseases | 0.1 |
| 13 Migraine | 13 Diabetes | -29.0 | 13 Chronic kidney disease | -4.8 |
| 14 Colorectal cancer | 14 Liver cancer | -21.2 | 14 Diabetes | -9.0 |
| 15 Liver cancer | 15 Falls | -6.0 | 15 Liver cancer | -18.1 |
| 16 Chronic kidney disease | 16 Chronic kidney disease | -19.5 | 16 Oral disorders | -0.3 |
| 17 Alzheimer's disease | 17 Migraine | -0.8 | 17 Falls | -19.0 |
| 18 Falls | 18 Oral disorders | 1.2 | 18 Other musculoskeletal disease | 1.9 |
| 19 Asthma | 19 Other musculoskeletal disease | -14.3 | 19 Migraine | 1.0 |
| 20 Other musculoskeletal disease | 20 COPD | -29.0 | 20 COPD | -11.4 |

Notes: The ranking is based on the number of DALYs from each cause.

COPD: chronic obstructive pulmonary disease; DALY: disability-adjusted life year

Source: Nomura S et al., 2017

According to Nomura et al. (2017), 47.1% of total deaths in 2015 were attributable to identified risk factors: behavioural risk factors accounted for 33.7% of total deaths, metabolic risks factors for 24.5%, and environmental and occupational risks factors for 6.7% (Nomura S et al., 2017). Similarly, all identified risk factors jointly explained 34.5% of DALYs, with the remaining 65.6% DALYs as yet unexplained. Behavioural risk factors contributed to more DALYs in 2015 (25.2%) than metabolic (16.4%) or environmental and occupational risks factors (4.4%).

In 2015, smoking was the leading risk factor for mortality among men (18.9%), while dietary risk factors were the major contributors to the total deaths for both men (18.8%, second rank) and women (18.0%, first rank). Dietary risks factors were the leading cause of DALYs both in men (13.8%) and women (9.3%) in 2015, of which high sodium consumption was at the top for both men and women (men 4.4%, women 3.0%). Tobacco smoking was the second leading risk factor for men (12.5%). A number of metabolic risk factors, such as high blood pressure and high fasting plasma glucose, were among the five leading risk factors for DALYs in both men and women. The contributions of these risk factors to death and DALYs did not vary much across prefectures in 2015.

1.4.3 Health behaviour

Diabetes and hypertension

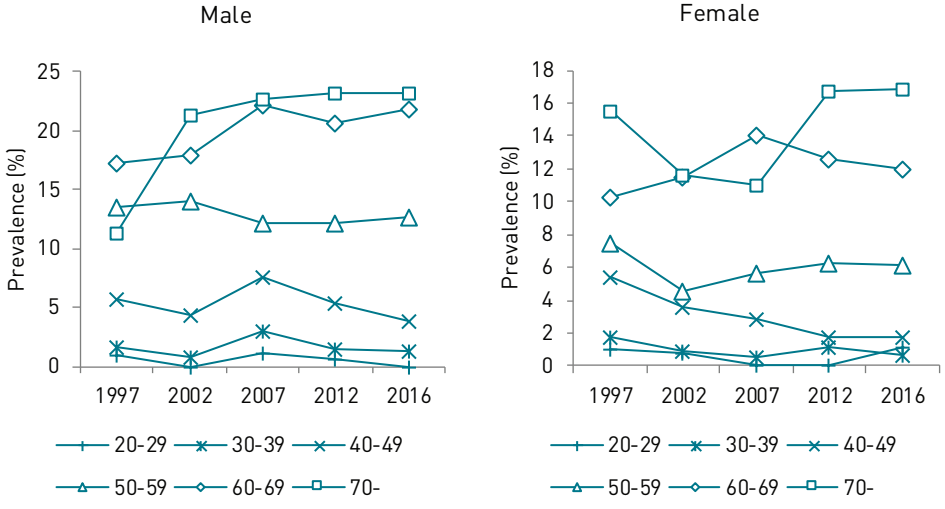
Diabetes and hypertension are the two major chronic diseases in Japan, although they have become a major public health concern among all OECD countries. The age-standardized prevalence of diabetes¹ was 12.1% (16.3% for men and 9.3% for women in 2016) (Ministry of Health, Labour and Welfare, 2016o).

Hypertension (defined as systolic blood pressure \geq 140mmHg) is another major chronic disease, acknowledged as one of the established risk factors for stroke and cardiovascular diseases in Japan. The prevalence of hypertension in Japan is among the highest in OECD countries, at 34.6% for men and 24.8% for women in 2016 (Table 1.7) (Ministry of Health, Labour and Welfare, 2016o). Salt intake has been identified as a major risk factor for hypertension in Japan, and as such, lowering sodium intake is strongly recommended to address this health trend. Public health programmes to promote salt reduction and primary care management

1 Definition: Hb1Ac is over 6.5% (NGSP) or currently under treatment

of high blood pressure with anti-hypertensives have been credited with significant reductions in hypertension in Japan (Ikeda N et al., 2011).

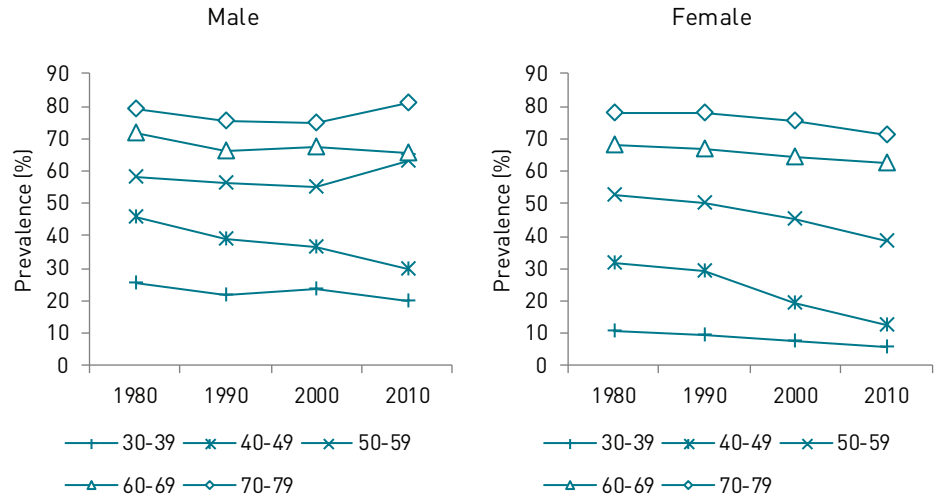
Fig. 1.3 Age- and sex-specific prevalence of diabetes in Japan, 1997-2016



Notes: Definition of diabetes is Hb1Ac is over 6.1% (JDS: Japan Diabetes Society) or currently under treatment for the data between 1997 and 2012, and Hb1Ac is over 6.5% (NGSP: National Glycohemoglobin Standardization Program) or currently under treatment for the data in 2016.

Source: Ministry of Health, Labour and Welfare, 2002, 2017k

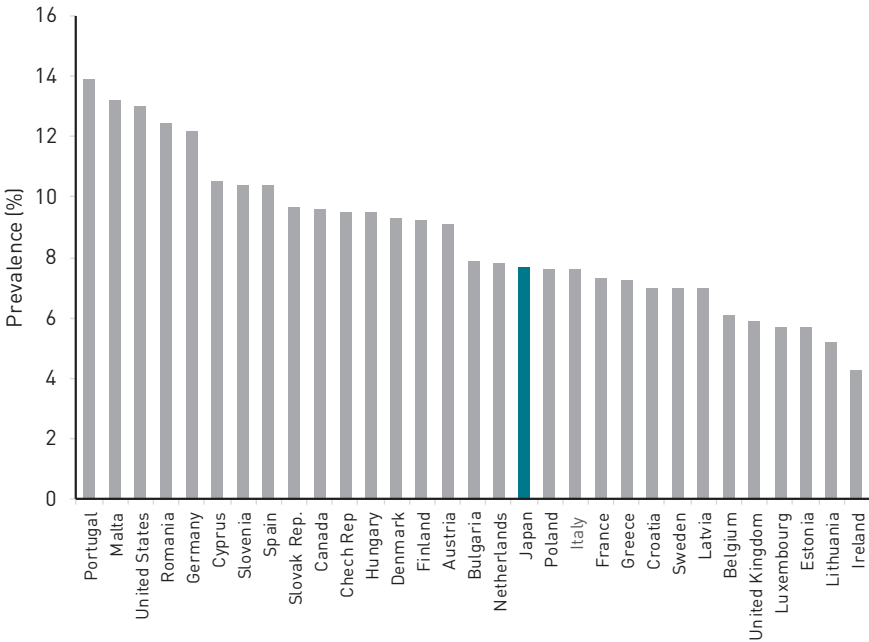
Fig. 1.4 Age- and sex-specific prevalence of hypertension in Japan, 1980-2010



Source: Miura K et al., 2013

Fig. 1.3 and 1.4 show the time trends in age- and sex-specific prevalence of diabetes and hypertension, respectively. The prevalence of diabetes appears to remain stable over the years in all age categories, except for the 70–79 age group in both sexes and for 60–69 age group in men. Among this group, an increasing trend in diabetes prevalence can be observed. The age-specific prevalence of hypertension appears to remain unchanged or shows a decreasing trend over time, the exception being in men aged between 50–59 and 70–79 years old from 2000 onwards. Due to this increasing prevalence, further monitoring is needed for men aged 50 years and older.

Fig. 1.5 Estimated prevalence of diabetes, adults aged 20–79 years in 2015



Source: International Diabetes Federation, 2017

According to a recent report from the International Diabetes Federation (IDF), Japan has an intermediate rate of diabetes (5.7%) prevalence when compared to other countries (although this figure is different than the value of 12.1% reported by the National Health and Nutrition Survey, probably due to IDF’s data quality or differing methodologies). Fig. 1.5 shows the prevalence of diabetes among OECD countries. The highest prevalence of diabetes, 13.9% was in Portugal while the lowest prevalence, 4.3% was in Ireland

Body mass index

In 2013, the prevalence of obesity, measured as a body mass index of 30 kg/m² or more was only 4.5% for men and 3.3% for women in Japan. The prevalence of obesity was relatively constant for women over time. For men, an increase was observed from 1.5% to 4.5% between 1980 and 2013, which is probably due to low physical inactivity and changes in dietary habits (Yoshiike N, 2003).

Table 1.7 summarizes the trends in the prevalence of people with a body mass index of 25 kg/m² or more. In 2016, this prevalence stood at 31.1% for men and 19.0% for women. While the proportion of obese women remains largely constant over time, it increased rapidly in men from 11.0% to 31.1% between 1980 and 2016 although the prevalence is still much lower than in other developed countries.

Table 1.7 Body mass index (≥ 25 kg/m²) in adults aged 20 years and older, Japan, 1980–2016

| Age-standardized obesity | Percentage (%) | | | | | |
|--------------------------|----------------|------|------|------|------|------|
| | 1980 | 1990 | 2000 | 2010 | 2013 | 2016 |
| Male | 11.0 | 13.7 | 26.8 | 29.9 | 28.4 | 31.1 |
| Female | 22.8 | 17.7 | 21.3 | 19.5 | 18.8 | 19.0 |

Notes: Cut-off point for obesity ≥ 25 kg/m² (subcutaneous fat ≥ 40 mm for men, ≥ 50 mm for women in 1990)²

*Age 50–59 for 1980

Source: Ministry of Health, Labour and Welfare, 2016o; National Institute of Health and Nutrition, 2018

Tobacco consumption

Compared to other OECD countries, Japan has made limited progress in reducing tobacco consumption over the past few decades, and it remains a leading cause of premature death. Looking ahead to the 2020 Olympic and Paralympic games in Tokyo, the MHLW attempted to pass legislation on second-hand smoking in 2017 (prohibition of indoor smoking in restaurants and bars (larger than 30 m²)); however, this bill faced fierce opposition from pro-tobacco lawmakers (mainly members of the Tobacco Caucus of the Liberal Democratic Party), the restaurant industry, and Japan Tobacco (JT), the world's third largest tobacco company.

2 WHO defines obesity as BMI ≥ 30 kg/m² and overweight as ≥ 25 kg/m² (<http://www.who.int/mediacentre/factsheets/fs311/en/>). However, because of low prevalence of obesity and overweight in Japan, the MHLW set cut off point for obesity as BMI ≥ 25 kg/m².

Although Japan is ranked very low in terms of tobacco control by the World Health Organization (WHO), there has been no new movement to enact the second-hand smoking law. Currently, the Tokyo Metropolitan government, the host city of the 2020 Tokyo Olympic and Paralympic games, is proposing regulations which, by 2019, would prohibit indoor smoking at all restaurants in Tokyo. The trend in tobacco use in Japan is shown in Table 1.8.

Table 1.8 Proportion of Japanese adults who are daily smokers, 1980–2015

| Smoking (ages ≥ 15 years who are daily smokers) | Percentage (%) | | | |
|---|----------------|------|------|------|
| | 1990 | 2000 | 2010 | 2015 |
| Male | 53.1 | 47.4 | 32.2 | 31.4 |
| Female | 9.4 | 11.5 | 8.4 | 8.3 |

Note: Age not adjusted for the data 1990 and 2000, and age adjusted for 2010 and 2015.

Source: Ministry of Health, Labour and Welfare, 2017k

The prevalence of smoking in Japan has dropped by more than 50% since 1980. Around 30% of male adults in Japan now smoke daily, down from over 70% in 1980. Japanese men smoke almost 3.8 times as much daily compared to women. Effective policies for tobacco control are needed in Japan in light of tobacco control ordinances consistent with the Framework Convention on Tobacco Control (Shibuya K et al., 2003). Japan is on the verge of choosing one of two paths: (1) improving the population health through a strict smoke-free policy that has already become the gold standard in many other countries and (2) keeping JT and tobacco industries appeased through less-restrictive policies at the price of lives lost from passive smoking (Tsugawa Y et al., 2017).

1.4.4 Maternal and child health indicators

There were approximately 1 000 000 births in Japan in 2015. In 2014, 9.6% of newborns were considered to be of low birth weight, a trend that has been increasing over recent decades. Since the 1970s, Japan has enjoyed very low mortality rates for both mothers and their children. Infant mortality reached a record low in 2015, with 2.0 deaths per 1000 live births. This decrease was mirrored in all measures, including neonatal, perinatal and under-five mortality rates. Likewise, the maternal mortality ratio (risk associated with each pregnancy) was reduced by more than half between 1990 and 2015.

Table 1.9 Maternal, child and adolescent health indicators, selected years

| Selected health indicator | 1980 | 1990 | 2000 | 2010 | 2015 |
|--|------|------|------|------|------|
| Adolescent fertility rate | 4.0 | 4.0 | 5.2 | 4.8 | 4.0 |
| Neonatal mortality rate | 4.9 | 2.5 | 1.8 | 1.1 | 0.9 |
| Infant mortality rate | 7.4 | 4.6 | 3.3 | 2.4 | 2.0 |
| Under-five mortality rate | 9.9 | 6.3 | 4.5 | 3.2 | 3.0 |
| Maternal mortality ratio | - | 14.0 | 10.0 | 6.0 | 5.0 |
| Measles immunization | 69.0 | 73.0 | 96.0 | 94.0 | 96.0 |
| Low-birth-weight babies (% of live births) | - | - | 8.0 | - | 9.6* |

Notes: Adolescent fertility rate: birth per 1000 women ages 15–19 years; mortality represents deaths per 1000 live births for infants and 100 000 live births for mothers; measles immunization for % of children aged 12–23 months

* 2012

Source: World Bank, 2018

Table 1.9 summarizes the maternal, child and adolescent health indicators in Japan. Adolescent fertility rates rose slowly for the period up until 2000, and decreased to 4.0 per 1000 in 2015. Immunization rates in Japan are high and comprehensive coverage has been achieved for some years now, with the exception of measles, for which coverage fell to 73% in the 1990s due to fears surrounding the measles–mumps–rubella (MMR) vaccine. This drop proved to be temporary: as of 2015, 96% of children aged 12–23 months have been immunized.

1.5 Natural and human-induced disasters

Disasters are a major threat to population health, both in the acute response and the long-term recovery phases. The devastating magnitude 9.0 Great East Japan Earthquake struck north-eastern Japan on 11 March 2011 and killed more than 16 000 people. Coupled with the subsequent tsunami and Fukushima Daiichi Nuclear Power Plant Accident, this triple-disaster caused massive destruction of local health-care facilities. However, despite the damage to infrastructure, health-care administrative information was well maintained under the universal health insurance system, which, along with temporary co-payment exemptions, allowed for continuity in health-care access for people in many affected areas (Tanihara S et al., 2013). While there is growing evidence that major disasters contribute to the development of cardiovascular disease (CVD), several studies from the areas most

seriously affected by the triple-disaster in Japan demonstrated only slight or no obvious increase in CVD risk post-disaster (Gilmour S et al., 2015; Toda H et al., 2017). These experiences demonstrate that a strong universal health-care system supports robustness and resilience during public health emergencies in Japan.

1.6 Conclusion

In the past five decades, Japan has achieved a large number of health successes. These include the full implementation of universal insurance coverage, cultivating the world's highest healthy life expectancy, and the control and even eradication of common infectious diseases. In addition, alcohol consumption and transport accident deaths have decreased substantially over the past 50 years. Despite these achievements, the country faces many structural challenges, including negative population growth, an ageing population, low fertility, a shrinking economy, increasing unemployment, and an increasing NCD-related disease burden. In addition, although the overall life expectancy and healthy life expectancy have been increasing in Japan, there are increasing disparities among prefectures, demonstrating a need for region-specific health policies.

Japan has successfully reduced the disease burden from NCDs during the past decades; however, the pace of reduction has stagnated since around 2005. Although many NCDs are preventable and are linked to lifestyle and dietary patterns, challenges still remain, especially for tobacco control. Additionally, there are no effective preventive or curative measures for Alzheimer's disease so far, and the number of cases is only expected to increase; further efforts (i.e., effective policies to support patients in the community and R&D directed at new medicines for Alzheimer's disease) are required. There is an urgent need to scale up effective coverage of preventive and public health interventions so as to further reduce the disease burden from NCDs.

2 Organization and governance

Chapter summary

The Ministry of Health, Labour and Welfare (MHLW) is the central leading organization in the Japanese health care system. Japan's health care system is characterized by excellent health outcomes at a relatively low cost; the system emphasizes equity, facilitated by universal insurance coverage through social insurance premiums and tax subsidies, with virtually free access to health-care facilities. The country's population is rapidly ageing and Japan needs to transform its health care system into one that prioritize patient value, quality and efficiency of care, and integrated approaches across sectors.

The MHLW as Japan's leading organization, actively collaborates and cooperates with various other bodies such as the Cabinet, several other ministries and professional organizations. Traditionally, the Ministry of Finance (MOF), the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and the Ministry of Agriculture, Forestry and Fisheries (MAFF) are involved in financing (in particular, the fee schedule and drug pricing), medical professional education, food security and one health, among others. Recently, the Cabinet Office and the Ministry of Economy, Trade and Industry (METI) have become more involved in health care and the medical industry. In 2013, the Central Government published the Japan Revitalization Strategy, in which health care was determined to be one of the top driving forces for revitalizing the Japanese economy (Prime Minister of Japan and His Cabinet, 2013). Under this strategy, Medical Excellence Japan (MEJ) was established under the support of the MEXT in order to promote and expand Japanese health-care services. Additionally, at the G7 Ise-shima summit in 2016, health – with a strong focus on health security – was one of the main agenda items on which the Cabinet Office, MHLW, MOF and Ministry of Foreign Affairs (MOFA) worked together closely.

The government regulates and controls nearly all aspects of the health system at three levels: national, prefectural, and municipal, where service delivery and implementation are mainly handled by prefectural

and municipal governments. Several professional organizations such as the JMA and the Japanese Nursing Association (JNA) are also actively involved in health policy processes. The manner in which the MHLW interacts with these professional organizations, including the private sector, care providers and patients, is notably complex.

2.1 Overview of the health system

Japan's health system is distinctly characterized by universal health insurance, which provides excellent health outcomes at a relatively low cost with equity (Ikegami N et al., 2011; Murray CJL, 2011). By law, all residents of Japan (including foreign nationals with a residence card) must be enrolled in a health insurance programme.

There are two main types of health insurance in Japan – the Employees' Health Insurance System and National Health Insurance (NHI) (previously called Community Health Insurance). The Employees' Health Insurance System is provided to employed workers (company employees) and their dependents, while NHI is designed for self and unemployed people (hence those not eligible to be members of Employees' Health Insurance) and is run by municipal governments (i.e., cities, towns and villages).

Patients' co-payments for medical expenses must be paid at every visit to clinics and hospitals. The nationally uniform fee schedule (i.e., amount of reimbursement, including the patients' co-payment) covers most health-care procedures and products, including drugs. The health insurance pays 70–90% of the cost while the remainder is paid by the insured as co-payment. The co-payment rate as of March 2017 is as follows: pre-elementary school³ = 20%; elementary school up to age 69 years = 30%; age 70–75 years = 20%; and age 75 years or above = 10% (see more details in Chapter 3) (Ishii M, 2012).

2.2 Historical background

The two health insurance schemes in Japan – Employees' Health Insurance system and NHI have different histories. As summarized in Chapter 1.3, the Employees' Health Insurance System started in 1922 for employed workers, while the CHI system, which was later renamed "NHI," was designed and enacted in 1938 for self-employed workers (such as farmers, fishermen, and informal employees) (Hatanaka T et al., 2015).

3 Pre-school in Japan starts at 1 year of age and ends at 6 years of age.

Participation in these two insurance schemes was voluntary, so a substantial number of individuals were not covered under either Employees' Health Insurance or NHI.

In the aftermath of the Second World War, the growth of democratic movements and a commitment to social solidarity gave rise to the impetus to achieve universal insurance. After a transition from voluntary to mandatory enrolment in the NHI system, together with the expansion of coverage of the Employees' Health Insurance System, a universal health insurance system was established in 1961 (although the service coverage was limited and out-of-pocket (OOP) was still high at 50%) (Ikegami N et al., 2011).

Thanks to the economic boom after the Second World War, the government successfully expanded its service coverage and reduced the OOP payment rate from 50% to 30%. Moreover, the government introduced a monthly and an annual cap on the OOP payment for individuals and households (see more details in Section 3.4.1) as well as free medical services for the elderly in 1973. Although the latter ended in 1982 due to economic stagnation, this framework has remained the foundation for the health-care system for the elderly (see more details in Chapter 3).

2.3 Organization

2.3.1 Central Government

The MHLW plays a central role in the health-care system of Japan. Originally, it was composed of two different ministries – the Ministry of Health and Welfare, and the Ministry of Labour. These ministries merged in 2001 as part of an administrative government reform plan. Fig. 2.1 shows the administrative structure of the MHLW. The main bureaus involved in population health and health care are Health Policy, Health Service, Pharmaceutical Safety and Environmental Health, Labour Standards, Social Welfare and War Victims' Relief, Health and Welfare for the Elderly, Health Insurance and Pension.

Fig. 2.1 Organization chart of the Japanese Ministry of Health, Labour and Welfare



Source: Ministry of Health, Labour and Welfare, 2017]

The Health Policy Bureau is responsible for the administrative and strategic management of the health care system, including health economy, research and development, and information. The Health Services Bureau plans and supervises the prevention of lifestyle-related diseases, cancer and infectious diseases, coordinates organ transplantation and regulates the promotion of environmental health. The Pharmaceutical Safety and Environmental Health Bureau directs the safety of pharmaceutical products, foods, chemical substances and medical devices, promotes the provision of safe blood products and orchestrates anti-drug abuse campaigns.

The Labour Standards Bureau is responsible for the safety and sanitation of factories and providing compensation for labour-related injuries. The Social Welfare and War Victims' Relief Bureau is in charge of welfare services for indigent people, community welfare, welfare for disabled persons and war victims' relief. The Health and Welfare for the Elderly Bureau regulates and supervises insurance for long-term care, elderly dementia and the health of the elderly. The Health Insurance Bureau also regulates and supervises health-care insurance and provides plans to improve the insurance system. The Pension Bureau is responsible for national and industrial pensions.

2.3.2 Consumer and professional groups

Consumer groups (mainly patient organizations) play a predominant role in client and patient advocacy. It is estimated that there are more than 3000 patient organizations in Japan, and they can participate as committee members during policy meetings conducted by the MHLW (Patient Groups in Japan, 2017). However, these patient organizations are relatively small and fragmented compared with those in the USA and EU, which means that only a few patient organization have significant clout over the policy making process.

Besides these consumer groups, professional organizations also play an important role in advocacy. The JMA is the national voice of Japanese physicians, although it is not authorized to discipline or sanction doctors because such authority lies with the government. Founded as a compulsory organization in 1916 and then re-established in its current voluntary form in 1947, the JMA's mission is to provide leadership for physicians and to promote the highest standards of medical ethics and education to protect the health of all Japanese citizens (Japan Medical Association, 2017). On behalf of its members, the JMA performs a wide

variety of functions, such as advocating health promotion and patient safety policies and strategies, advocating access to quality healthcare in local communities, providing leadership and guidance to physicians to help them influence, manage and adapt to changes in health-care delivery, and authorizing obstetricians to perform legal abortions. The JMA's membership is 165 000 or 60% of all licensed physicians in Japan; about 50% of the members are general practitioners who are working at small clinics (Japan Medical Association, 2017).

The JNA was established in 1946 for nursing professionals including licensed public health nurses, midwives and assistant nurses. Its aims and missions are to preserve people's dignity as human beings, to meet people's universal needs to stay in good health, and to contribute to people's achieving healthy lives. In addition, it aims to improve nursing quality based on nursing expertise rooted in education and self-learning, promote an environment in which nurses are able to continue working peacefully throughout their lives, and develop and expand nursing fields to meet people's needs (Japanese Nursing Association, 2017).

2.4 Decentralization and centralization

The government regulates and controls nearly all aspects of the health system, including the health insurance system. Across the 47 prefectures, there are a total of 1718 municipalities. There are three types of municipalities in Japan: cities, towns and villages. The Central and local (prefectural/municipal) governments are responsible by law for ensuring a system that efficiently provides quality health-care services. The Central Government sets the nationally uniform fee schedule for insurance reimbursement and subsidizes and supervises local governments, insurers and health-care providers. It also establishes and enforces detailed regulations for insurers and health-care providers at the prefecture levels.

Based on regional context, each prefecture is required by the *Health Care Structural Reform Act* passed in June 2006 to create detailed descriptions called "Medical Care Plans (MCP)". By promoting collaboration and differentiation of medical institutions, these MCP aims to secure medical services for local residents, where necessary healthcare will be provided seamlessly from the acute phase to the long-term phase, including in-home care. Initially, the MCP was introduced in 1986 to control the escalating number of hospital beds. However, the 2006 Act strengthened the MCP by adding "disease-specific integrated clinical pathways" and

stipulating effective liaisons among providers (clinics and hospitals) on a disease-specific basis. One should be cautioned that “integrated clinical pathway” is different from “in-hospital clinical pathway,” which aims to streamline the hospitalization. MCP may include evaluations of quality of care on a regional basis, and some prefectures also included clinical indicators. However, most indicators are limited to structural and process measures, and outcome indicators are not included.

Each prefectural government is responsible for developing this “MCP” for effective and high-quality health-care delivery. Prefectural governments are also in charge of annual reviews and inspections of hospitals to ensure maintenance of compliance with regulatory standards. If a hospital admits too many patients per nurse – an indication of a poor quality of hospital care – the reimbursement rate for the hospital is reduced.

MCPs must be revised every five years. The next revision is scheduled for April 2018 and the focus should be on:

- disease- and service- specific integrated clinical pathways, including goal-oriented and collaborative methods among health-care facilities: in particular, five diseases (cancer, stroke, acute myocardial infraction, diabetes and mental disorders) and six services (emergency care, disaster management, care for remote areas, perinatal care and paediatric care) are prioritized;
- measures to secure an adequate number of health-care professionals;
- measures to secure patient safety;
- zoning secondary and tertiary health-care regions within a prefecture; and
- calculation of the necessary number of beds for every secondary region.

All of the health care provided in Japan is in accordance with the MCP. Although prefectural governors are authorized to develop MCP, it is commonly discussed in committees composed of representatives from local medical and dental associations, hospital associations and stakeholders.

Under the regulatory oversight of MHLW and using the MCP framework generated by the prefectural government, municipal governments provide health promotion activities for their residents as follows:

- Health guidance and check-ups for children at various stages of growth; each municipality gives guidance and consultation on childcare, prevention of diseases, etc. by sending public health nurses to individual homes. These visits are free of charge and provided either by request of the mother or through referral by the doctor.
- Health check-ups for 3–4, 8–10, and 18-month-old infants at health care facilities. In addition, 3-year-old children are checked for their growth, nutritional status, physical and dental health, mental development, behaviour and speech development, and sight and hearing.
- Vaccination of children; municipal governments provide most vaccines free-of-charge to children at all public health centres as well as municipal health centres (MHCs) for protection against twelve preventable diseases: tuberculosis, tetanus, diphtheria, pertussis, hepatitis B, *Haemophilus influenzae* type B (Hib), measles, rubella, polio, *Streptococcus pneumoniae* bacteria, chicken pox and Japanese encephalitis.
- Health consultations for residents aged above 40 years at risk for life-style-related diseases, and cancer screening, of which most are free-of-charge. In general, persons eligible for cancer screening include women aged ≥ 20 years for cervical cancer, women aged ≥ 40 years for breast cancer, and both men and women aged ≥ 40 years for colon, lung and gastric cancer (≥ 50 years for gastric cancer). Screening strategies (e.g. screening according to cancer type, and screening cost, eligibility, and invitation methods) differ slightly by municipality.

2.5 Policy and planning

2.5.1 Policy formulation

Policy formulation, planning and its evaluation are mainly conducted by the MHLW. Policies and strategies that require the creation of or change in a law or call for new budgetary allocation are sent to the Cabinet and discussed at the Diet.

2.5.2 Current planning

Presently, with the increasing longevity and declining fertility of the population, rising medical expenses threaten the sustainability of the

health-care system (Ikegami N et al., 2011). From the viewpoint of financing, Japan's health care and social welfare had been separate before the creation of long-term care insurance in 2000: the former financed by the universal health insurance system while the latter was financed by tax revenue. Whether the system relies on insurance premiums or general taxes makes a crucial difference: in insurance, the premium revenue is set first and the premium rate is set accordingly while in taxation, the tax rate must first be set by law (Article 84 of the Constitution), and the tax revenue is set accordingly. Under taxation, the expenditure is always limited by budget restrictions while under an insurance system, expenditure is not subject to budgeting.

Consequently, the increasing demand for long-term care had to be accommodated by health care facilities and not by welfare facilities. nursing homes, which are financed by taxation, were almost always in short supply. Because admissions to nursing homes were determined by the welfare offices of municipal governments, priority was given to low-income residents. The working population with average income found it hard to receive welfare services. The increasing demand for long-term care was met with geriatric hospitals because anybody could be admitted by doctors' orders without any bureaucratic red tape. As a result, Japan became a country characterized by excessive hospital beds and a chronic shortage of welfare facilities.

To increase Japan's long-term care services, switching the financial source of long-term care from taxation to social insurance was the logical answer. Long-Term Care Insurance (LTCI), a new social insurance scheme, was introduced in 2000 benefiting those requiring long-term care or social services (including nursing care, day service, leasing of welfare devices at home and long-term care at social welfare and medical facilities) (Kikuchi K et al., 2006). As most care-givers are household members, the government tried to shift the burden of care-giving from individual household members to society as a whole. Moreover, the ageing society and increasing demand for health care placed severe pressure on the health insurance system, especially for NHI managed by local governments. There was an urgent need for creating a new financial scheme that would be independent from the health insurance scheme and geared for the long-term; this was the logic behind the LTCI's development (see more details in Chapter 5.8).

Using LTCI and the Act for Securing Comprehensive Medical and Long-Term Care in the Community of 2014, the MHLW asked each prefectural government to create “Regional Healthcare Visions,” requesting each prefecture to estimate the supply and demand of future healthcare needs in each region and to create region-specific health-care systems by 2025 (see details in Chapter 6). Additionally, the MHLW proposed to implement the Integrated Community Care System (ICCS) by 2025. ICCS is a comprehensive system at the community level that integrates prevention, medical services, and long-term care while also providing living arrangements and social care (see more details in Chapter 6) (Ministry of Health, Labour and Welfare, 2017h). By introducing ICCS, the government is trying to shift towards disease prevention and control rather than cure and/or treatment, and moving towards patient-centred integrated services at the community level and home-based care, rather than hospital-centred services.

However, these changes may not be enough to address the profound fiscal and demographic changes facing the nation. The new system will further require a paradigm shift in Japan’s health system, as proposed in *Japan Vision: Health Care 2035*, a report for the Health Minister written by young Japanese health leaders in June 2015 under the leadership of former health minister Yasuhisa Shiozaki (Miyata H et al., 2015; Reich MR et al., 2015). This report proposes that Japan’s health system move from inputs to outcomes, from quantity to quality and efficiency, from cure to care, and from specialization to integrated approaches across all sectors. *Japan Vision: Health Care 2035* proposes three visions to promote the overall goal of “a sustainable health-care system that delivers unmatched health outcomes through care that is responsive and equitable to each member of society and that contributes to prosperity in Japan and around the world”, namely lean health care (implement value-based healthcare), life design (empower society and support personal choice) and global health leadership (lead and contribute to global health). With these three pillars, the report proposes five essential infrastructures as foundations of this vision; innovation, information, sustainable funding, health care professionals, and a world-class MHLW. This is expected to be a benchmark report for the creation of a new health-care system over the next 20 years; it will target people of all lifestyles – from children to older people, from patients to providers – so that individuals feel secure and supported to make the life and work choices that are right for them (Health Care 2035 Advisory Panel, 2015).

2.5.3 Role of development partners in policy and planning

Development partners are usually not involved in domestic policy planning in Japan; however, as a member state of WHO, ILO and OECD, Japan actively participates in the decision-making processes of these organizations and refers to reports and recommendations made by these three organizations on domestic decision-making processes. As to official development assistance (ODA), health care has been one of the main areas of cooperation, and the Japan International Cooperation Agency (JICA) has been conducting several health-care related projects in low- and middle-income countries for more than six decades. Recently, by responding to increasing momentum for UHC, JICA, together with the MHLW and other relevant stakeholders, conducted projects focusing on human resource development and health care financing in several low- and middle- income countries, which all could contribute to attain UHC in project operating countries.

2.6 Intersectorality

Various other ministries are involved in other sectoral issues, such as policies on financing, marketing and sales regulation of tobacco, alcohol and food, education of medical professionals, food and nutrition security, climate change; emergency planning, and engagement with non-governmental organizations and civil society. These ministries include the Ministry of Finance, MEXT, MAFF, and the Ministry of Justice.

One example of an intersectoral approach can be seen in the field of food and nutrition education, which encompasses the education sector (MEXT) for school education, agriculture (MAFF) for food production, as well as health (MHLW) for surveillance and dietary guidance (Nakamura T, 2011). In 2005, the MHLW and MAFF collaboratively developed the *Japanese Food Guide: A Spinning Top*, which is a user-friendly tool pictured as a spinning top to guide people to improve eating habits, and promote dietary education (Yoshiike N et al., 2007). Simultaneously, MEXT started a programme to train people to become “diet and nutrition teachers” in primary schools.

Other recent examples include pandemic preparedness for events like the Ebola virus outbreak in 2013 in West Africa. Pandemics are not only a health sector issue; they are connected with national security, foreign diplomacy, trade and economy, so several organizations like the Cabinet Office, MHLW, MOFA and MOF would be involved. As the president of the

G7 summit in 2016, Japan put health security at the top of the agenda and successfully raised awareness for strengthening the response to public health emergencies as well as attaining Universal Health Coverage (UHC) with strong health systems and better preparedness for public health emergencies. Since health emergencies directly affect the health status of Japanese citizens, the MHLW has a vested interest in building up response capabilities. MOFA emphasized the relevance of UHC in the context of ensuring human security, which is at the core of their foreign policy, and implementing the SDGs as part of its foreign policy framework. Meanwhile, MOF focused on promoting the World Bank Group's funding scheme initiatives (i.e., Pandemic Emergency Facility (PEF) and International Development Association (IDA)) in order to respond to and prepare for health security needs and crises. Since health security is strongly related to national, global and human security, under Prime Minister Abe's leadership, the Cabinet Secretariat and these three ministries aligned successfully around health security. The three ministries and the Cabinet Secretariat constantly had joint meetings at director-general level participation in order to share information and discuss how to consolidate Japan's commitment under a unified government.

2.7 Health information management

2.7.1 Information systems

Although some core statistics related to health care are collected by the Ministry of Internal Affairs and Communication (i.e., population census), most health-related statistics are collected, compiled and analysed by the MHLW. The Statistics Act was originally introduced in 1947, which restricted the use of governmental statistics to administrative use (Government of Japan, 2007). In 2007, the Act was fully revised. Governmental statistical data are now considered to be part of society's information infrastructure, and the revised act of 2007 allow broader use to enable the production and provision of tailor-made tabulation and anonymized data.

The Director-General for Statistics and Information Policy of the MHLW circulates key statistical surveys on vital events and health characteristics of the population. The Director-General for Statistics and Information Policy has a central role in the policy-making process and statistical service management of the MHLW. This includes configuration and online reporting/publishing of seven fundamental statistics: Vital Statistics, Life

Tables, Comprehensive Survey of Living Conditions, Survey of Medical Institutions, Patient Survey, Monthly Labour Survey, Basic Survey on Wage Structure and a total of 23 general statistics for public use (approximately 100 statistical surveys in total have been conducted by the MHLW as a whole, not limited to surveys conducted by the Director-General for Statistics and Information Policy). These statistics can facilitate action for planning and implementing policies, programs, and services to improve the social and economic conditions that affect health.

The Director-General for Statistics and Information Policy has comprehensive mechanisms for the collection of quality data on demographics, healthcare, social welfare, employment and wages, etc. The details of the main services are summarized in Chapter 5.

Japan has another important mechanism for the collection of health data on cancer, which is also administrated by the Director-General for Statistics and Information Policy of the MHLW. Cancer registration in Japan has a long history spanning over 60 years; the first population-based cancer registry was established and administered by the prefectural government of Miyagi (situated in the north-western part of Japan, facing the Pacific Ocean) in 1951.

After the Law on Health and Medical Services for the Aged was enacted in 1983, population-based cancer registries were initiated promptly in many prefectures. However, deficiencies remained in the local government-administered cancer registries, e.g. the reporting of cancer cases to the population-based cancer registries was voluntary task for medical institutions and as of 2007, there were population-based cancer registries in 35 of Japan's 47 prefectures (Okamoto N, 2008). In 2013, in response to the looming elderly population with potentially 2–3 million cancer patients, the Act on Promotion of Cancer Registries was finally enacted in Japan. The Act stipulated that hospital managers must report information on any primary cancer that was first diagnosed in their institutions from 1 January 2016 onwards to the prefectural government (Matsuda T et al., 2015).

2.7.2 Information management system for emergencies

Based on the Act on the Prevention of Infectious Diseases and Medical Care for Patients with Infectious Diseases, the MHLW selects infectious diseases that potentially have a severe and huge burden on the Japanese public and classifies them into five categories. Depending on the category,

health-care facilities and local health centres are obliged to report the occurrence of infection to the Central Government (see more details in Chapter 5).

2.8 Regulation

Regulation of the health-care system has two dimensions: human and capital resources are regulated by the Medical Care Act, and financing is regulated by the Health Insurance Act of 1922. Regulatory bodies consist of a three-tier system, in which the Central Government, prefecture governments and major city governments share different levels of authority. Financing (reimbursement by health insurance) is regulated almost solely by the Central Government. Human and capital resources are regulated through inspection by the government at the prefecture and major city levels through public health centres.

2.8.1 Regulation and governance of third-party payers

All insurers are regulated by the MHLW and consequently have limited discretionary power. There are more than 3000 insurers in Japanese insurance system that are classified on the basis of occupation, place of residence and age. Regulation and governance of third-party payers are explained in Chapter 3. For-profit insurance companies sell voluntary health insurance (VHI), but holding VHI will not exempt an individual from mandatory enrolment in the social health insurance scheme. The role of VHI is supplementary in nature, complementing social health insurance benefit packages.

2.8.2 Regulation and governance of providers

The government enacts health laws, which regulate all aspects of the health-care system. The laws delegate regulatory authority over the health workforce and facilities such as hospitals, clinics and pharmacies to prefectures and major city governments, which conduct inspections pursuant to the Medical Care Act. Professional organizations such as the JMA, although they have no regulatory authority because they are voluntary organizations, have strong political power to influence the drafting of new regulations.

2.8.3 Registration and planning of human resources

The number of health-care professionals such as physicians, nurses, dentists and pharmacists is strongly controlled by the Central

Government. Training for health-care professionals is provided by both public and private educational facilities (see more details in Chapter 4).

2.8.4 Regulation and governance of pharmaceuticals, medical devices and aids

Pharmaceutical products, cosmetics and medical devices are subject to regulation by the Law on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices of 1960. The Act was amended in April 1993 to allow public subsidies for research and development of orphan drugs as well as accelerated review of new drugs. New drug applications are subject to preliminary review by a special agency, the Pharmaceuticals and Medical Devices Agency (PMDA), and then final review by the Pharmaceutical and Food Affairs Council. The final decision is left to the discretion of the Minister of Health, Labour and Welfare. Regulations on clinical trials were tightened by the amendment of the *Pharmaceutical Affairs Law* in June 1996.

This tightened regulation coupled with the low interest of physicians in clinical research discouraged doctors from conducting clinical trials. Deregulation to accept foreign research data added to this trend: multinational pharmaceutical companies prefer to conduct clinical trials outside Japan and obtain a new drug approval later by “importing” data to Japan. As a result, a considerable number of new drugs remain unavailable to Japanese patients even after they are approved elsewhere in the world (Pharmaceuticals and Medical Devices Agency, 2017). Furthermore, allowing foreign research data may not always be appropriate because the same drug may have different effects in different ethnic groups. One example is omeprazole (a proton pump inhibitor): a higher prevalence of *CYP 2C19* carriers (i.e., poor metabolizers) in the Japanese population makes the drug more effective at a lower dosage (Kubota T et al., 2001).

To revitalize clinical trials, the Pharmaceuticals and Medical Devices Act was revised to initiate “investigator initiated clinical trials,” which enabled physicians to initiate clinical trials and took effect in July 2003. Until then, only pharmaceutical companies could apply to run clinical trials. Even if physicians wanted certain indications added to existing drugs, they were not authorized to conduct clinical trials by themselves (Off-label prescribing of drugs to patients for indications that have not been approved is prohibited), and pharmaceutical companies would not

be interested in conducting expensive clinical trials without considerable commercial promise.

Another measure taken by the government was to develop a large-scale network of clinical trials to enable participating hospitals and doctors to share resources such as data centres and institutional review boards. A supporting organization, the Japan Clinical Research Assist Centre, was established together with its Data Management Centre in 2001. The Japan Clinical Research Assist Centre is currently assisting seven clinical trials through data management, data analysis, provision of an institutional review board and training of clinical research coordinators.

In April 2003, the Ministry published a “3-year plan for vitalizing clinical trials” to facilitate clinical trials in medical school-affiliated hospitals and, in August 2003, reached an agreement with the JMA for promoting investigator initiated clinical trials in community hospitals. Meanwhile, practices related to research misconduct have been reported in recent years. The fabrication and the falsification of data in five valsartan studies (Jikei Heart Study, Kyoto Heart Study, Valsartan Amlodipine Randomized Trial (VART), Shiga Microalbuminuria Reduction Trial (SMART), and Nagoya Heart Study) have been identified by the board of investigators from each of the universities where these trials were conducted (Mochizuki S et al., 2007; Muramatsu T et al., 2012; Narumi H et al., 2011; Sawada T et al., 2009; The Shiga Microalbuminuria Reduction Trial (SMART) Group, 2014). These were long-term, post-marketing clinical trials with a prospective, randomized, open, blinded-endpoint design. They were not performed under any government regulations and were funded by pharmaceutical companies. This misconduct might have caused disadvantages to patients and has led to unnecessary defrayment and increased cost of health insurance. However, there is no clear punishment against such corrupted actions in the Japanese legal system.

As to regenerative medicine, the Act on Securement of Safety of Regenerative Medicine was enacted in 2013. It aims to promote the safe and effective use of regenerative medicine, while establishing systems for regulating and monitoring the regenerative medicine plan and for inspecting cell culturing and processing facilities. In 2017, retinal cells were successfully produced by iPS cells (induced pluripotent stem cells) harvested from third-party individuals in Japan at the first time in the world: further research is now being conducting to use iPS cells in instances of Parkinson’s disease, cardiac failure and spinal cord injury.

2.8.5 Health technology assessment

Under the national health insurance system, all the prices of health care, medical devices and pharmaceuticals are determined by the MHLW and are scheduled to be revised once every two years (see more details in Chapter 3). The MHLW has a division dedicated for development and revision of the fee schedule and drug price list (Medical Economics division) staffed by medical and dental officers as well as medical economists. The prices of clinical procedures are usually resource-based set but some of them are set based on policy: the prices of clinical procedures to be encouraged may be set intentionally low while those to be discouraged may be set intentionally high. Such price manipulation functions are an important policy tool. Drug prices are set based on market surveys: The Medical Economics division surveys wholesale prices from wholesalers. Prices of new drugs are essentially set resource-based to cover the investment made by pharmaceutical manufacturers.

In response to the rising demand for healthcare in the face of public financing constraints, there has been a rapid growth of health-care technology assessment (HTA) activities (that address the clinical, economic, organizational, social, legal and ethical impacts of a health technology and consider its specific health-care context as well as available alternatives) among health service researchers, physicians and other health professionals in Japan since the mid-1980s. In 1996, the MHLW organized an Advisory Committee for the Application of HTA. Officially, it was known as the first commitment to HTA by the MHLW (Hisashige A, 2009). The main aim of this committee was the application of HTA in health policy decision-making in order to improve the quality and effectiveness of health care. Since then, progress towards implementing HTA in Japan has stagnated, partly because of the opposition from JMA.

In 2012, the first Special Committee on Cost-Effectiveness (SCCE) was set up under the Central Social Insurance Medical Council, an advisory panel under the MHLW, which was tasked with making decisions about the pricing and re-pricing of new drugs reimbursed through the universal health insurance system. The government started to discuss whether to introduce cost-effectiveness assessment into HTA, particularly pricing/reimbursement decisions on health-care technologies (including drugs, devices, surgical techniques and medical procedures). In 2015, a Cabinet decision was made to introduce cost-effectiveness methods for HTA, and

the SCCE decided to implement a new HTA programme, beginning with an HTA pilot program conducted by the Council starting in 2016.

In this new HTA programme, seven drugs have been subjected to the appraisal process, including Sofosbuvir and Nivolumab. It has now been expanded to seven drugs and six medical devices, with a plan to carry out re-pricing by 2018 based on the first HTA appraisal results. It is anticipated that analysis of data from manufacturers will be conducted by a new independent public organization for proof-of-concept appraisals (Central Social Insurance Medical Council, 2012).

2.8.6 Regulation of capital investment

There is no official regulation on capital investment.

2.9 Patient empowerment

2.9.1 Patient information

Most of the health- and welfare- related information is available on the website of the MHLW. Public comments are also popular in Japan: people are encouraged to propose ideas and recommendations related to health-care policies and strategies formulated by the MHLW.

2.9.2 Patient choice

One of the features of the health-care system in Japan is described as “free access to health-care facilities,” in which patients are totally free to choose any health-care facility, regardless of their insurance status or severity of illness (though patients are required to pay some additional fee for tertiary-care facilities if they do not have a referral letter from a primary or secondary health-care facility). The choice of insurers is limited, since patients have designated insurers based on their occupational status.

2.9.3 Patient rights

Article 25 of the Japanese Constitution fundamentally supports patient rights in Japan, by stating that “all people shall have the right to maintain the minimum standards of wholesome and cultured living. In all spheres of life, the State shall use its endeavours for the promotion and extension of social welfare and security, and of public health.” Although there is no basic law determining patients’ right in Japan, Article 25 of the Constitution is the basis of every type of health-care policy in Japan.

2.9.4 Procedure for complaints (mediation, claims)

Medical safety measures in Japan started in 2001 when the Medical Safety Promotion Office was established in the MHLW. Review meetings of medical safety measures have been held regularly since its founding. In 2002, comprehensive medical safety promotion measures were formulated, which mandated hospitals and clinics with beds to establish a medical safety management system within each organization (which was later expanded in 2007 to clinics without beds and birth centres). Recognizing the increasing incidence of medical accidents, in 2003, the MHLW further mandated advanced treatment hospitals to place medical safety managers, medical safety management departments, and patient consultation counters in each respective facility. In 2015, a Medical Accidents Investigation System was introduced, which required medical institutions to provide an explanation to the bereaved family, report to the third-party organization (support center for investigating medical accidents) that conducts necessary investigations, provide an explanation of the investigation results to the bereaved family and report them to the Medical Accident Investigation and Support Centre. Patients or their families who are suspicious about a medical procedure can use this Medical Accidents Investigation System to clarify what was happening at the time of the operation/treatment procedure.

2.9.5 Public participation

Most of the health-care policies created by the MHLW are open to a consultation process with the public through the MHLW website. Expert meetings are also open to the public and the media. However, information provided by the MHLW is not always comprehensive and easy to understand for the general public. Additionally, although the MHLW host an open-consultation period, how the MHLW incorporates these public comments into the actual decision-making process remains unclear, and the general public does not know where and how policies are decided. Patients organizations can sometimes join expert meetings as a member that can lend its voice to the policy-making process, but the selection process for which organization can join remains unclear.

2.9.6 Patients and cross-border health care

It is not common for Japanese people to seek health care outside Japan. However, Japan is now accepting patients coming from abroad to receive high-quality health care services. In 2013, the Central Government published the Japan Revitalization Strategy, in which health care was

determined to be one of the top driving forces for revitalizing Japanese economy (Prime Minister of Japan and His Cabinet, 2013). Under this strategy, Medical Excellence Japan (MEJ) was established under the support of the MEXT in 2013 in order to promote Japanese health-care services overseas and to provide opportunities for foreigners to receive high-quality health care in Japan. According to the report by the Development Bank of Japan, by 2020, the number of foreign patients seeking health care in Japan will increase to 430 000 patients and its market size would expand US\$ 5.5 billion (Development Bank of Japan, 2010). MEJ has started to accredit Japanese health-care facilities, determining whether or not they have the capacity to treat foreign patients.

3 Financing

Chapter summary

Japan's health-care system is based on a social insurance system with tax subsidies and some amount of out-of-pocket (OOP) payment. According to OECD data, total health expenditure increased substantially and accounted for 10.9% of the GDP in Japan in 2015 (ranked 3 among 34 countries), about two percentage points above the OECD average of 9%. Healthcare in Japan is predominantly financed by publicly sourced funding. In 2015, 85% of health spending came from public sources, well above the average of 76% in OECD countries. Direct OOP payments contributed only 11.7% of total health financing. The health insurance coverage rate was nearly 100% while the share of household consumption spent on OOP payments was only 2.2%, 0.6% less than the OECD average of 2.8%. Despite the relatively low OOP payments, the key challenges in Japan are population ageing, rapid increases in chronic illness, escalating medical expenditure, contracting fiscal space, and pressures on the health-care workforce. Reforms of the financing system and greater efficiencies in health systems will be necessary to sustain good health at low cost with equity in the future.

The health insurance covers more than 5000 medical procedures, dental care and drugs. Once every two years, the MHLW reviews the scope of coverage by the national insurance scheme and the billing reimbursement conditions for each procedure, drug, and medical device. There are two major types of insurance schemes in Japan; Employees' Health Insurance and NHI. Employees' health insurance covers those who are public servants or work in companies, while NHI covers the self-employed and unemployed. Employees' Health Insurance is further divided into four major categories: Japan Health Insurance Association (JHIA), Society Managed Health Insurance (SMHI), Mutual Aid Association, and Seamen's Insurance. Japan does not have a single insurance fund; insurers are divided into approximately 3000 organizations. Moreover, the premium rate largely differs from one insurance scheme to the next; this fragmentation is a source of inefficiency in the system and

inequity in premiums. Although there are several cross-subsidy systems among insurance schemes, mainly for the financially weak NHI, financial sustainability and equity among insurance schemes remain major challenges for the Japanese health financing system, especially when one takes into account the rapidly ageing society.

3.1 Health expenditure

Health-care expenditure in Japan has been increasing, as can be seen in Table 3.1.

Table 3.1 Trends in health-care expenditure in Japan, 1995–2014

| Expenditure | 1995 | 2000 | 2005 | 2010 | 2014 |
|---|------|------|------|------|------|
| Total health expenditure (% GDP) | 7 | 8 | 8 | 10 | 10 |
| Public expenditure on health (% of THE) | 82 | 81 | 82 | 82 | 84 |
| Private expenditure on health (% of THE) | 18 | 19 | 19 | 18 | 16 |
| Government expenditure on health (% of GTE) | 15 | 15 | 18 | 19 | 20 |
| OOP payments (% of PHE) | 79 | 81 | 83 | 81 | 85 |
| OOP payments (% of THE) | 14 | 16 | 16 | 14 | 14 |

Notes: GDP: gross domestic product; THE: total health-care expenditure; GTE: government total expenditure; PHE: private health expenditure; OOP: out-of-pocket

Source: World Health Organization, 2017

According to the WHO Global Health Expenditure Database, total health expenditure as a proportion of GDP increased from 7% in 1995 to 10% in 2014. In 2014, around 84% of expenditure was from public sources and 16% from private sources. Public and private expenditure on health as a proportion of total health expenditure has remained almost constant since 1995. Government health expenditure as a proportion of total expenditure increased from 15% in 1995 to 20% in 2014. In Japan, the share of out-of-pocket (OOP) payments in total health expenditure is relatively low, and has declined from 16% in 2000 to 14% in 2014.

According to the OECD database, the total health expenditure as a percentage of the GDP was 10.9% in 2015. The median health-care expenditure in selected OECD countries as a percentage of GDP was 9% in 2015. Trends in the proportion of GDP committed to health expenditure for all OECD countries are shown in Table 3.2.

Table 3.2 Health expenditure as a percentage of GDP, OECD countries, selected years

| Countries | 1995 | 2000 | 2005 | 2010 | 2015 |
|--------------------------|------|------|------|------|------|
| Australia | 6.9 | 7.6 | 8.0 | 8.5 | 9.4 |
| Austria | 8.9 | 9.2 | 9.6 | 10.1 | 10.3 |
| Belgium | 7.5 | 7.9 | 9.0 | 9.9 | 10.5 |
| Canada | 8.6 | 8.3 | 9.1 | 10.6 | 10.3 |
| Chile | - | 6.3 | 6.6 | 6.7 | 8.1 |
| Czech Republic | 5.8 | 5.7 | 6.4 | 6.9 | 7.2 |
| Denmark | 7.8 | 8.1 | 9.1 | 10.4 | 10.3 |
| Estonia | - | 5.2 | 5.0 | 6.3 | 6.5 |
| Finland | 7.4 | 6.8 | 8.0 | 8.9 | 9.4 |
| France | 9.8 | 9.5 | 10.2 | 10.7 | 11.1 |
| Germany | 9.5 | 9.8 | 10.3 | 11.0 | 11.2 |
| Greece | 8.0 | 7.2 | 9.0 | 9.6 | 8.4 |
| Hungary | 6.7 | 6.8 | 8.0 | 7.6 | 7.2 |
| Iceland | 7.8 | 9.0 | 9.2 | 8.8 | 8.6 |
| Ireland | 6.1 | 5.9 | 7.6 | 10.5 | 7.8 |
| Israel | 6.9 | 6.8 | 7.1 | 7.0 | 7.4 |
| Italy | 6.9 | 7.6 | 8.4 | 9.0 | 9.0 |
| Japan | 6.3 | 7.2 | 7.8 | 9.2 | 10.9 |
| Luxembourg | 5.3 | 5.9 | 7.2 | 7.0 | 6.0 |
| Mexico | - | 4.9 | 5.9 | 6.0 | 5.9 |
| Netherlands | 7.4 | 7.1 | 9.3 | 10.4 | 10.7 |
| New Zealand | 6.9 | 7.5 | 8.3 | 9.7 | 9.3 |
| Norway | 7.3 | 7.7 | 8.3 | 8.9 | 10.0 |
| Poland | 4.9 | 5.3 | 5.8 | 6.4 | 6.3 |
| Portugal | 7.2 | 8.4 | 9.4 | 9.8 | 9.0 |
| Republic of Korea | 3.4 | 4.0 | 5.0 | 6.4 | 7.2 |
| Slovakia | - | 5.3 | 6.6 | 7.8 | 6.9 |
| Slovenia | - | 7.8 | 8.0 | 8.6 | 8.5 |
| Spain | 7.0 | 6.8 | 7.7 | 9.0 | 9.2 |
| Sweden | 7.3 | 7.4 | 8.3 | 8.5 | 11.0 |
| Switzerland | 8.8 | 9.3 | 10.3 | 10.7 | 12.1 |
| Turkey | 2.4 | 4.7 | 4.9 | 5.1 | 4.1 |
| United Kingdom | 5.7 | 6.0 | 7.2 | 8.5 | 9.9 |
| United States of America | - | 12.5 | 14.5 | 16.4 | 16.9 |
| OECD median | 7.1 | 6.9 | 8.0 | 8.8 | 8.9 |

Source: OECD, 2018a

Based on OECD health data, total health-care expenditure as a share of the GDP has increased in all countries since 1995 and, in 2015, health-care expenditure in most European countries accounted for 9–11% of the GDP. A steady increase in health-care expenditure was also noticeable in Japan, from 6.3% of the GDP in 1995 to 10.9% in 2015. Historically Japan has been referred to as achieving a high quality of care with low health-care expenditure compared to other OECD nations. Using the OECD system of health accounts (SHA), which includes more broad data and internationally comparable total health expenditure (THE), Japan's share of the GDP devoted to health rises to be the third highest among OECD nations. However, the official statistics on National Health Care Expenditure (NHCE) published by the MHLW are misleading because they include expenditures covered by health insurance only (excluding LTCl).

Table 3.3 shows the trend in per capita health expenditure in all OECD countries between 1995 and 2015. Per capita health expenditure in Japan has increased from US\$ 1469.5 in 1995 to US\$ 4149.8 in 2015.

Given a rapidly ageing population, the burden of health-care expenditure will continue to grow quickly in Japan. Per capita health expenditure was lower than the median OECD per capita expenditure until 2010, but they officially reached US\$ 4435.6 in 2015, which is higher than the OECD median. All OECD countries have experienced an increase in per capita health expenditure. In particular, the USA, Switzerland, Norway and Luxembourg all saw an increase in per capita health expenditure to values of more than US\$ 6000.

Table 3.3 National health expenditure per capita (US\$ PPP, current price), OECD countries, selected years

| Countries | 1995 | 2000 | 2005 | 2010 | 2015 |
|-------------------|--------|--------|--------|--------|--------|
| Australia | 1554.7 | 2156.9 | 2842.1 | 3607.5 | 4492.6 |
| Austria | 2110.0 | 2702.0 | 3340.9 | 4237.7 | 5100.0 |
| Belgium | 1684.0 | 2221.1 | 3007.7 | 3980.0 | 4778.5 |
| Canada | 2002.4 | 2421.9 | 3282.5 | 4227.8 | 4532.8 |
| Chile | - | 600.7 | 837.8 | 1219.7 | 1877.3 |
| Czech Republic | 788.4 | 925.0 | 1401.0 | 1920.5 | 2434.1 |
| Denmark | 1759.7 | 2321.1 | 3104.4 | 4470.1 | 5057.9 |
| Estonia | - | 486.2 | 818.5 | 1369.6 | 1885.2 |
| Finland | 1437.4 | 1827.6 | 2558.8 | 3442.1 | 3993.2 |
| France | 2053.4 | 2505.3 | 3124.2 | 3872.0 | 4529.6 |
| Germany | 2251.4 | 2708.9 | 3330.6 | 4413.2 | 5352.6 |
| Greece | 1227.9 | 1412.7 | 2301.1 | 2696.2 | 2210.1 |
| Hungary | 616.8 | 820.9 | 1366.0 | 1622.5 | 1913.0 |
| Iceland | 1878.9 | 2657.3 | 3405.8 | 3383.4 | 4105.7 |
| Ireland | 1154.4 | 1708.7 | 3092.6 | 4555.9 | 5275.8 |
| Israel | 1366.3 | 1695.8 | 1769.0 | 2033.6 | 2713.0 |
| Italy | 1530.3 | 2047.2 | 2512.7 | 3140.5 | 3351.6 |
| Japan | 1469.5 | 1914.9 | 2463.7 | 3204.9 | 4435.6 |
| Korea | 457.5 | 723.1 | 1229.8 | 1976.0 | 2534.9 |
| Luxembourg | 2224.6 | 3405.3 | 5125.5 | 6386.5 | 6817.9 |
| Mexico | - | 484.4 | 730.8 | 911.4 | 1054.5 |
| Netherlands | 1700.8 | 2227.9 | 3454.7 | 4638.2 | 5296.7 |
| New Zealand | 1244.2 | 1606.8 | 2214.4 | 3019.8 | 3544.6 |
| Norway | 1767.7 | 2846.8 | 3980.8 | 5167.6 | 6190.1 |
| Poland | 377.1 | 564.0 | 807.0 | 1353.7 | 1703.6 |
| Portugal | 1035.0 | 1580.5 | 2145.1 | 2686.7 | 2663.7 |
| Republic of Korea | 457.9 | 724.1 | 1220.1 | 1951.3 | 2487.9 |
| Slovakia | - | 602.9 | 1096.3 | 1951.1 | 2059.4 |
| Slovenia | - | 1403.9 | 1907.3 | 2379.5 | 2730.8 |
| Spain | 1142.3 | 1466.6 | 2126.6 | 2885.7 | 3180.0 |
| Sweden | 1660.7 | 2168.7 | 2811.6 | 3536.1 | 5266.3 |
| Switzerland | 2637.6 | 3331.5 | 4149.2 | 5686.3 | 7535.6 |
| Turkey | 238.8 | 425.3 | 582.9 | 872.5 | 996.6 |
| United Kingdom | 1143.0 | 1565.0 | 2336.5 | 3040.7 | 4125.3 |
| USA | - | 4559.0 | 6444.6 | 7931.7 | 9507.2 |
| OECD median | 1469.5 | 1816.4 | 2463.7 | 3204.9 | 4003.0 |

Note: PPP: purchasing power parity

Source: OECD, 2018a

Table 3.4 shows government spending (not only direct government spending but also compulsory contributory health-care financing schemes) on health as a percentage of total national health expenditure across OECD countries since 1995.

Table 3.4 Government health expenditure as a percentage of total national health expenditure, OECD countries, selected years

| Countries | 1995 | 2000 | 2005 | 2010 | 2015 |
|--------------------------|------|------|------|------|------|
| Australia | 66.4 | 68.4 | 68.4 | 68.6 | 67.3 |
| Austria | 75.3 | 75.5 | 75.1 | 76.1 | 75.6 |
| Belgium | 76.8 | 74.6 | 76.5 | 77.4 | 77.5 |
| Canada | 70.9 | 70.0 | 69.9 | 69.8 | 70.2 |
| Chile | - | 51.3 | 36.8 | 45.5 | 60.8 |
| Czech Republic | 89.7 | 89.8 | 86.8 | 83.3 | 83.5 |
| Denmark | 82.0 | 83.1 | 83.7 | 84.6 | 84.1 |
| Estonia | - | 77.0 | 76.6 | 76.4 | 75.7 |
| Finland | 71.2 | 71.2 | 75.5 | 74.3 | 74.4 |
| France | 79.1 | 78.9 | 78.7 | 78.4 | 78.9 |
| Germany | 81.7 | 79.4 | 76.3 | 83.5 | 84.5 |
| Greece | 52.9 | 61.6 | 61.7 | 69.1 | 59.1 |
| Hungary | 82.9 | 69.6 | 70.7 | 67.1 | 66.7 |
| Iceland | 83.5 | 80.6 | 81.4 | 80.4 | 81.5 |
| Ireland | 74.1 | 77.5 | 78.9 | 76.2 | 70.0 |
| Israel | 68.2 | 63.1 | 59.9 | 62.9 | 60.7 |
| Italy | 71.3 | 72.6 | 77.5 | 78.5 | 74.9 |
| Japan | 81.8 | 80.4 | 81.2 | 81.9 | 84.0 |
| Luxembourg | 92.4 | 82.0 | 83.2 | 84.9 | 82.0 |
| Mexico | - | 45.2 | 42.2 | 48.6 | 52.2 |
| Netherlands | 75.4 | 66.4 | 67.3 | 82.6 | 80.7 |
| New Zealand | 77.2 | 78.0 | 79.7 | 80.6 | 80.3 |
| Norway | 83.9 | 81.7 | 83.1 | 84.7 | 85.4 |
| Poland | 73.5 | 68.9 | 68.7 | 71.7 | 70.0 |
| Portugal | 61.5 | 70.5 | 71.3 | 69.8 | 66.2 |
| Republic of Korea | 42.1 | 53.9 | 56.2 | 57.9 | 56.4 |
| Slovakia | - | 89.2 | 75.3 | 71.9 | 79.7 |
| Slovenia | - | 72.9 | 73.5 | 73.3 | 71.7 |
| Spain | 72.0 | 71.4 | 71.9 | 74.8 | 71.0 |
| Sweden | 86.6 | 85.5 | 81.8 | 81.9 | 83.7 |
| Switzerland | 53.6 | 55.4 | 59.5 | 62.5 | 64.0 |
| Turkey | 70.3 | 61.7 | 67.7 | 78.0 | 78.1 |
| United Kingdom | 84.1 | 79.3 | 81.3 | 83.1 | 79.7 |
| United States of America | - | 44.2 | 45.4 | 48.4 | 49.4 |
| OECD median | 73.5 | 74.0 | 74.0 | 75.0 | 76.0 |

Source: OECD, 2018a

The proportion of health expenditure paid by the public sector in Japan in 2015 was higher than that of many other high-income countries. Government expenditure as a percentage of total national expenditure ranged from 49.4% (USA) to 85.4% (Norway) in 2015. The OECD average has been around 70–75%, while that of Japan has been around 80–85% consistently sits higher than the OECD average.

Japan's NHCE by type of sector from 1995 to 2014 is presented in Table 3.5. Almost all categories have slightly increased since 1995. Most significantly, pharmacy dispensing expenditure has rapidly increased. According to NHCE, pharmacy dispensing expenditure increased about six times from 1995 to 2014, reflecting an increased “out-sourcing” of dispensing to pharmacies (before 1995, it was common for general clinics to directly dispense drugs to patients). The share of pharmacy dispensing expenditure to total health expenditure was 9.4% in 2003 and gradually

Table 3.5 National health-care expenditure (NHCE) and percentage distribution by type of sector and year

| Type of medical care | US\$ billions (%) | | | |
|---|-------------------|--------------|--------------|--------------|
| | 1995 | 2000 | 2005 | 2014 |
| National health care expenditure (1+2+3+4+5+6) | 238.6 (100) | 266.7 (100) | 293.2 (100) | 361.1 (100) |
| 1. Medical expenditure | 193.5 (81.1) | 210.6 (78.9) | 221.0 (75.4) | 258.9 (71.7) |
| A. Medical expenditure by type of health-care facility | | | | |
| Hospitals | 131.5 (67.9) | 143.1 (67.9) | 148.6 (67.3) | 181.8 (70.2) |
| General clinics | 62.1 (32.1) | 67.5 (32.1) | 72.3 (32.7) | 77.1 (29.8) |
| B. Medical expenditure by inpatient/outpatient treatment | | | | |
| B.1 Inpatient expenditure | 87.8 (45.4) | 100.0 (47.5) | 107.2 (48.5) | 135.1 (52.2) |
| Hospitals | 83.7 | 96.1 | 103.2 | 131.4 |
| General clinics | 4.1 | 3.9 | 4.0 | 3.7 |
| B.2 Outpatient expenditure | 105.7 (54.6) | 110.5 (52.5) | 113.7 (51.5) | 123.8 (47.8) |
| Hospitals | 47.8 | 46.9 | 45.4 | 50.4 |
| General clinics | 57.9 | 63.6 | 68.3 | 73.4 |
| 2. Dental expenditure | 21.1 (8.8) | 22.6 (8.5) | 22.8 (7.8) | 24.7 (6.8) |
| 3. Pharmacy dispensing expenditure | 11.2 (4.7) | 24.4 (9.2) | 40.4 (13.8) | 64.5 (17.9) |
| 4. Hospital meals and living expenses | 9.6 (4.0) | 8.9 (3.3) | 8.8 (3.0) | 7.1 (2.0) |
| 5. Recuperative treatment expenditure ^a | 3.0 (1.3) | NA | NA | 4.9 (1.4) |
| 6. Expenditure for home-visit nursing care | 0.2 (0.1) | 0.2 (0.1) | 0.4 (0.1) | 1.1 (0.3) |

Notes: US\$ 1 = ¥113

^a Costs for treatment by judo therapists or acupuncturists, etc. as well as transport costs and prosthetic device expenditure that come under health insurance benefits.

Source: Ministry of Health, Labour and Welfare, 2014a

increased to 18.0% in 2013, and remains almost the same at around 18.0%. Recently, expenditure for home-visit nursing care has also been increasing substantially compared to the period between 1995–2005, reflecting a rapidly ageing society and the government’s strong emphasis on home care (note that the NHCE does not include home-visit health care and nursing expenditure financed from the LTCI).

Table 3.6 presents age-specific health-care expenditure by type of health service in 2014 (note that the data reflect the narrowly defined NHCE estimated by the MHLW, not the more broadly defined THE).

Table 3.6 Health care expenditure by age group in 2014

| | Health care expenditure, US\$ billion(%) | | |
|-------------------|--|---------------|---------------|
| | Total | Inpatient | Outpatient |
| All ages | 2258.9 (100.0) | 135.1 (100.0) | 123.8 (100.0) |
| 0–14 years | 15.4 (6.0) | 5.7 (4.2) | 9.7 (7.9) |
| 15–44 | 30.3 (11.7) | 12.5 (9.3) | 17.8 (14.4) |
| 45–64 | 56.7 (21.9) | 26.4 (19.6) | 30.3 (24.5) |
| 65 years and over | 156.4 (60.4) | 90.4 (67.0) | 66.0 (53.3) |

Note: US\$ 1 = ¥113

Source: Ministry of Health, Labour and Welfare, 2014a

Health care expenditure increases rapidly with age. The highest medical expenditure was observed in those aged 65 years and above (US\$ 156.4 billion, 60.4% of total) while the lowest costs were associated with those aged 14 years or less (US\$ 15.4 billion, 5.95%). This trend is the same for in- and out-patient medical expenditure, in which those aged 65 years and above account for 67.0% and 53.3% of medical expenditure, respectively, while they only make up 26.0% of the population.

Table 3.7 shows disease-specific health care expenditure by major types of health services. The three main categories of expenditure were for diseases of the circulatory system (US\$ 52.1 billion), neoplasms (US\$ 35.1 billion) and diseases of the respiratory system (US\$ 19.3 billion).

Table 3.7 Health care expenditure by inpatient, outpatient treatment and category of disease in 2014

| Category of disease (ICD-10) | Medical expenditure (\$ billion) | | |
|--|----------------------------------|-----------|------------|
| | Overall | Inpatient | Outpatient |
| Infectious and parasitic diseases | 5.7 | 2.2 | 2.3 |
| Neoplasms | 35.1 | 23.2 | 11.9 |
| Malignant neoplasms | 30.5 | 20.5 | 10.0 |
| Mental and behavioural disorders | 16.8 | 12.2 | 4.6 |
| Diseases of the nervous system | 11.6 | 7.9 | 3.7 |
| Alzheimer disease | 2.5 | 1.7 | 0.8 |
| Diseases of the circulatory system | 52.1 | 30.0 | 22.1 |
| Hypertensive diseases | 16.4 | 1.9 | 14.5 |
| Heart diseases ¹ | 16.1 | 12.0 | 4.1 |
| Ischaemic heart diseases | 6.6 | 4.7 | 1.9 |
| Cerebrovascular diseases | 15.8 | 13.2 | 2.6 |
| Diseases of the respiratory system | 19.3 | 8.3 | 11.0 |
| Pneumonia | 2.9 | 2.7 | 0.2 |
| Chronic obstructive pulmonary disease | 1.3 | 0.6 | 0.7 |
| Asthma | 3.0 | 0.5 | 2.5 |
| Diseases of the digestive system | 14.9 | 8.0 | 6.9 |
| Diseases of stomach and duodenum | 3.9 | 0.8 | 3.1 |
| Liver diseases | 1.5 | 0.7 | 0.8 |
| Complications of pregnancy, childbirth and postpartum | 2.0 | 1.8 | 0.2 |
| Perinatal conditions | 1.9 | 1.6 | 0.3 |
| Injury, poisoning and other extrinsic impacts | 19.1 | 14.0 | 5.1 |

Notes: US\$ 1 = ¥113

¹excluding hypertensive diseases

Source: Ministry of Health, Labour and Welfare, 2014a

3.2 Sources of revenue and financial flows

The Japanese health-care system is primarily funded through insurance premiums subsidized by taxes. Both the Central Government and the municipalities levy proportional income taxes and insurance premiums on their respective populations. According to National Health Care Expenditure (NHCE), insurance premiums contribute to 48.7% of financial contributions followed by public subsidies (38.8%) and patients' co-payments (11.7%) (Ministry of Health, Labour and Welfare, 2014a).

Table 3.8 shows the trends in NHCE by financing sources since 1985. The total proportion of NHCE drawn from taxation increased from 31.7% in 1995 to 38.8% in 2014. Although the share financed by the Central Government has been stable at around 25%, the absolute value largely increased from US\$ 39 billion in 1985 to US\$ 96.6 billion, which imposed a huge fiscal burden. However, insurance premium contributions declined rapidly during this period, from 56.4% in 1995 to 48.7% in 2014. The proportion of OOP payment fluctuated during this period and peaked at 14.4% in 2005. It has been gradually decreasing since, reaching 11.7% in 2014.

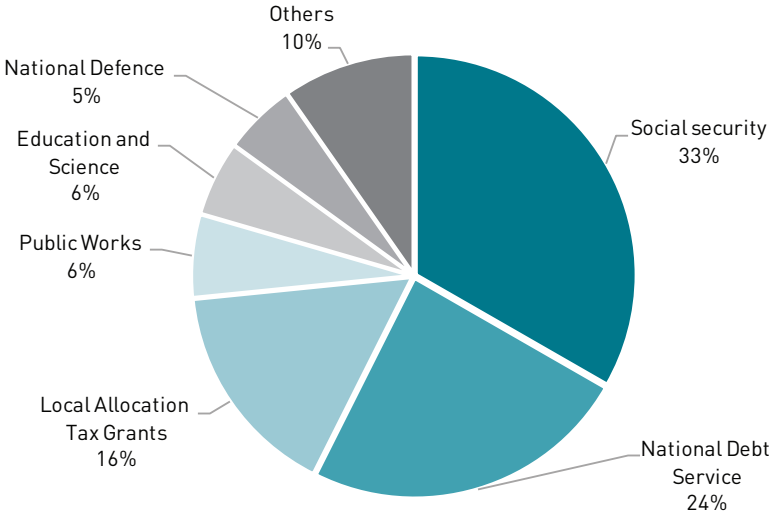
Table 3.8 National Health-Care Expenditure by financial sources (%)

| | 1985 | 1995 | 2000 | 2005 | 2011 | 2014 |
|--------------------------------|-------|-------|-------|-------|-------|-------|
| Total health expenditure | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Tax | | | | | | |
| Central Government | 26.6 | 24.2 | 24.7 | 25.2 | 25.9 | 25.8 |
| Local governments | 6.8 | 7.5 | 8.5 | 11.4 | 12.2 | 13.0 |
| Total | 33.4 | 31.7 | 33.2 | 36.6 | 38.1 | 38.8 |
| Insurance premiums | | | | | | |
| Employees' | 23.4 | 24.5 | 22.7 | 20.3 | 20.1 | 20.4 |
| NHI (self-employed and others) | 30.9 | 31.9 | 30.7 | 28.7 | 28.3 | 28.3 |
| Total | 54.3 | 56.4 | 53.4 | 49.0 | 48.5 | 48.7 |
| OOP payments | 12.0 | 11.8 | 13.4 | 14.4 | 12.7 | 11.7 |

Source: Ministry of Health, Labour and Welfare, 2016p

Fig. 3.1 shows the distribution of the annual budget across government activities in 2017. The Japanese government's budget in fiscal year (FY) 2017 was ¥96.7 trillion (US\$ 853 billion), of which social security (healthcare, pension, long-term care, welfare) accounts for approximately one-third (¥32.5 trillion equivalent to US\$ 287 billion).

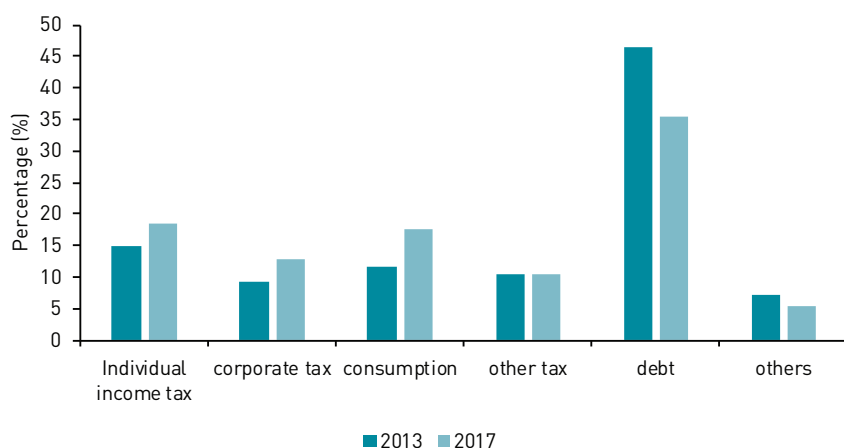
Fig. 3.1 Distribution of government budget, FY2017



Source: Ministry of Finance, 2017a

Fig. 3.2 shows the distribution of sources of Japanese government revenue. As much as 35.3% of the revenue is raised by debt (issuing Japanese Government Bonds, JGBs). Traditionally, Japan’s taxation system has relied on direct taxes rather than indirect taxes. But due to stagnation of the direct tax revenue stream, the consumption tax is increasingly viewed as the main funding source to support the growing social security budget. An increase in the consumption tax rate was part of the Comprehensive Reform of Social Security and Tax proposed in 2013, with the resulting increase in revenues ear-marked for social security (see more details in Chapter 6). As a result, the consumption tax rate was increased from 5% to 8% in FY2014, thus increasing consumption tax revenue from US\$ 93.8 billion (FY2013) to US\$ 152.2 billion (FY2017) (Ministry of Finance, 2013, 2017a). The consumption tax rate is scheduled to be further increased to 10% in FY2019.

Fig. 3.2 Sources of Japanese government revenue in 2013 and 2016



Source: Ministry of Finance, 2013, 2017a

Table 3.9 shows allocation of social security cost. Among the total of US\$ 278 billion social security costs, US\$ 10.3 billion was allocated to JHIA (3.7%), US\$ 30.3 billion was allocated to NHI (10.1% to municipal NHI and 0.8% to NHI societies) and US\$ 42.0 billion was allocated to the late-stage health care system for the elderly (15.1%). The largest share among social security costs was subsidies for pensions, which accounted for 34.9 % in 2016.

Table 3.9 Structure of social security budget, FY 2015

| | | US\$ billions | % |
|-------------------------------------|---|---------------|------------|
| Subsidy to health insurance | JHIA | 10.3 | 3.7 |
| | Municipal NHI | 28.0 | 10.1 |
| | NHI societies | 2.3 | 0.8 |
| | Late stage health care system for the elderly | 42.0 | 15.1 |
| Welfare benefit for the indigent | Health and LTCI | 12.4 | 4.5 |
| | Others | 13.1 | 4.7 |
| Subsidy to pension | | 97.1 | 34.9 |
| Subsidy to LTCI | | 23.2 | 8.3 |
| Other social welfare | Child allowance | 12.9 | 4.6 |
| | Disability assistance | 13.2 | 4.7 |
| | Others | 16.8 | 6.0 |
| Public health | | 4.2 | 1.5 |
| Labour | | 1.5 | 0.5 |
| Total social security budget | | 278 | 100 |

Source: Compiled by the authors based on the data from (Ministry of Finance Policy Research Institute, 2016)

3.3 Overview of the public financing schemes

3.3.1 Coverage

The health insurance coverage rate was 100% in Japan and covered more than 5000 medical procedures, dental care and drugs. Once in every two years, the MHLW reviews the scope of coverage by the national insurance scheme and the reimbursement billing conditions for procedures, drugs, medical devices. All hospitals and clinics are required to comply with the nationally uniform fee schedule set by the MHLW and cannot set their own prices for treatments under the NHI scheme.

There are two major types of insurance schemes in Japan: Employees' Health Insurance and NHI. Employees' health insurance covers those who are public servants or work in companies, while NHI covers the self-employed and unemployed. Employees' Health Insurance is further divided into four major categories as follows: JHIA, SMHI, MAS, and Seamen's insurance (Table 3.10).

Table 3.10 Major insurance schemes in Japan

| Name of Insurance Scheme | | Insurer | Target population | Number of insurers |
|--|--------------------|--|------------------------------------|---|
| National Health Insurance (NHI) | | Municipal governments, NHI societies | Self-employed, unemployed, elderly | 1716 municipal governments 164 NHI societies |
| Employees' Health Insurance | | | | |
| 1 | JHIA | JHIA | Small- and medium- size companies | 1 |
| 2 | SMHI | Corporate-based health insurance society | Large-size companies | 1409 |
| 3 | MAS | Mutual Aid Societies | Public servants | 85 |
| 4 | Seaman's insurance | JHIA | Seamen | 1 (Japan Pension Organization) |

Notes: JHIA: Japan Health Insurance Association managed health insurance; SMHI: Society-Managed Health Insurance; MAS: Mutual Aid Societies

Source: Ministry of Health, Labour and Welfare, 2016j

The proportion of people covered by the types of risk pooling mechanisms from 1980 to 2014 is presented in Table 3.11, and the corresponding tax and premium flows are presented in Fig 3.3.

Table 3.11 Number of persons covered by health care insurance by type of insurance system (unit: thousands person)

| System category | | 1980 | 1990 | 2000 | 2005 | 2010 | 2015 |
|--|--------|---------|---------|---------|---------|---------|---------|
| Population | | 117 060 | 124 533 | 126 926 | 127 768 | 127 708 | 126 939 |
| Number (thousands) | | | | | | | |
| Total insured population | | 117 037 | 124 260 | 126 351 | 127 176 | 126 907 | 126 207 |
| Employees' Health Insurance | | | | | | | |
| 1 | JHIA | 31 807 | 36 821 | 36 805 | 35 675 | 34 845 | 36 392 |
| 2 | SMHI | 27 502 | 32 009 | 31 677 | 30 119 | 29 609 | 29 131 |
| 3 | MAS | 12 520 | 11 952 | 10 017 | 9587 | 9189 | 8836 |
| 4 | Seamen | 672 | 409 | 228 | 168 | 136 | 125 |
| National Health Insurance | | 44 536 | 43 069 | 47 628 | 51 627 | 38 769 | 35 937 |
| Late-stage medical care system for the elderly (Started in 2008) | | - | - | - | - | 14 341 | 15 767 |
| Proportion (%) | | | | | | | |
| Total proportion | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100 |
| Employees' Health Insurance | | 61.9 | 65.2 | 62.0 | 59.1 | 57.79 | 58.69 |
| 1 | JHIA | 27.2 | 29.6 | 29.0 | 27.9 | 27.29 | 28.67 |
| 2 | SMHI | 23.5 | 25.7 | 25.0 | 23.6 | 23.18 | 22.95 |
| 3 | MAS | 10.7 | 9.6 | 7.9 | 7.5 | 7.20 | 6.96 |
| 4 | Seamen | 0.6 | 0.3 | 0.2 | 0.1 | 0.11 | 0.10 |
| National Health Insurance | | 38.0 | 34.6 | 37.5 | 40.4 | 30.36 | 28.31 |
| Late-stage medical care system for the elderly (Started in 2008) | | - | - | - | - | 11.23 | 12.42 |

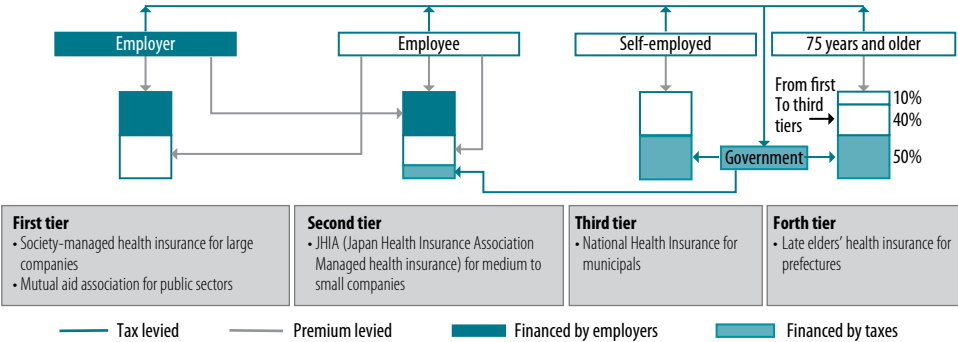
Notes: JHIA: Japan Health Insurance Association managed health insurance; SMHI: Society-managed Health Insurance; MAS: Mutual Aid Societies

Source: Health Labour and Welfare Statistics Association, 2016; Ministry of Health, Labour and Welfare, 2012g, 2016j

The majority (58.69%) of the population is covered by Employees' Health Insurance. Specifically, the JHIA covered the largest proportion (28.67%), followed by the SMHI (22.95%) and MAS (6.96%). The NHI covers 28.31% of the total population. There was a rapid increase in the proportion of the population covered by the NHI in recent decades due to an increase in the number of unemployed persons (mainly attributed to the elderly after retirement). This caused a significant financial burden on the NHI. In order to solve the financial inequity between the Employees' Health Insurance and NHI, the government introduced the late-stage medical

care system for the elderly (75 years old and above) in 2008 (see the details in Section 3.2.3 Pooling of funds).

Fig. 3.3 Financial flow based on insurance flows



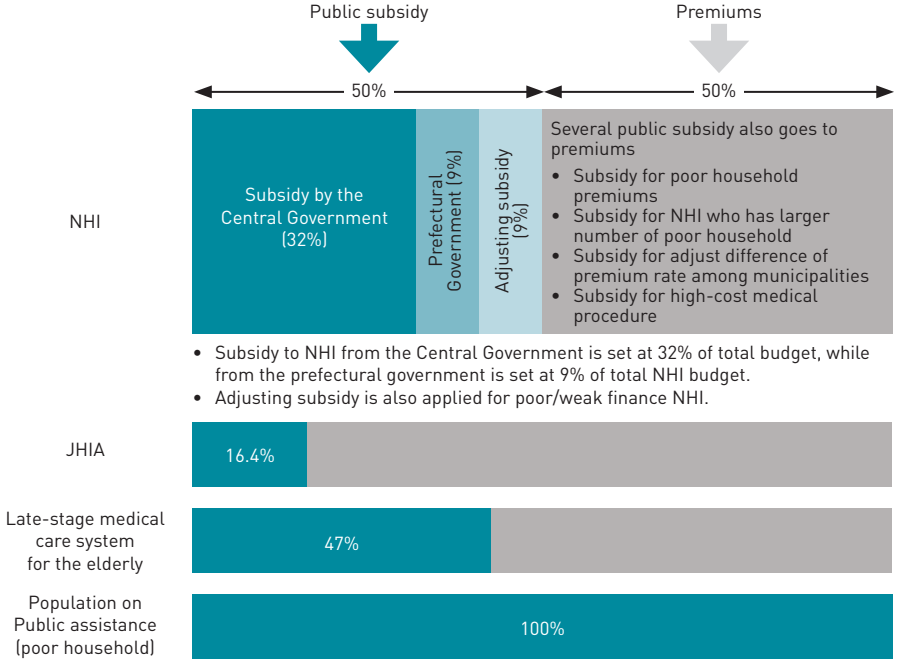
Source: Ikegami N et al., 2011

As shown in Table 3.10, Japan’s health financing system does not have a single payer for all insurance funds; insurers are divided into approximately 3000 organizations. As for the NHI, municipalities have the responsibility to collect premiums. Financial disparities between the NHI and Employees’ Health Insurance have been of major concern in recent decades. In particular, with urbanization and an ageing society, the size of risk pools in the NHI have changed significantly since 1961, and now many smaller municipalities face a declining funding base and increasing expenditure. Additionally, premium rates largely differ across municipalities, as do income levels. This fragmented insurer system remains a source of system inefficiency and premium inequities.

There are several cross-subsidy systems among insurance schemes. For NHI, public subsidies are set to 50% of the total NHI budget, in which 32% come from the Central Government and 9% come from the prefectural government. Besides these subsidies from the Central Government and prefectural governments, an adjusting subsidy is also applied for 9% of the total NHI budget, which aims to enhance financial capacity among municipal governments. The Central and prefectural governments also support premium revenues that flow into NHI by contributing: subsidies for poor household premiums, subsidies for NHI who have a larger number of poor household, subsidies for adjusting differences among premium rates across municipalities, and subsidies for high-cost medical procedures.

As for Employees' Health Insurance, compared with SMHI, JHIA is comprised of small- to middle-sized companies and is facing significant financial burden (though some of SMHI is closed because of economic stagnation). Currently, the Central Government also subsidizes the financially weak JHIA at a maximum rate of 16.4% (Fig. 3.4).

Fig. 3.4 Cross-subsidy mechanism



Source: Compiled by the authors

The health-care benefits for the population on public assistance (living below poverty line) is 100% financed by government subsidies. This segment of the population has been growing since 1995, from 882 229 (0.7% of total population) in 1995 to 2 165 895 (1.7%) in 2014. The amount of health expenditure paid on behalf of this population accounted for 4.2% of THE in 2014 (Ministry of Health, Labour and Welfare, 2016p). In order to limit a further increase in health-care spending for the population on public assistance, the MHLW is currently proposing four areas of priority for subsidizing the poor: promoting the use of generic medicines, reducing polypharmacy, dis-incentivizing frequent use of health-care facilities, and implementing appropriate control of NCDs (Ministry of Health, Labour and Welfare, 2017l).

3.3.2 Collection

The collection mechanism is slightly different between Employee's Health Insurance and National Health Insurance.

An Employees' Health Insurance premium is withheld directly from employee remuneration by employers. Employers are required to withhold premiums on behalf of the insurer. The health insurance premium contributions must be shared equally between employees and employers. The premium rate for health insurance varies considerably by insurer, reflecting their health-care expenditure and income level (insurers with higher health-care expenditure and lower income levels will have to levy higher premiums to raise sufficient revenue). For salaried workers, the average rate is around 10% of their income and is capped at 13%.

For the NHI, the local government has the responsibility of determining the premium rate, and premium structures vary considerably from municipality to municipality. These rates differ between local governments from a minimum of US\$ 2586 per year (7.3%) to a maximum of US\$ 5635 per year (15.9%) (premium rate as % of income). Efforts continue at both the national and local levels to enhance funding for health and social care and improve the sustainability of the system.

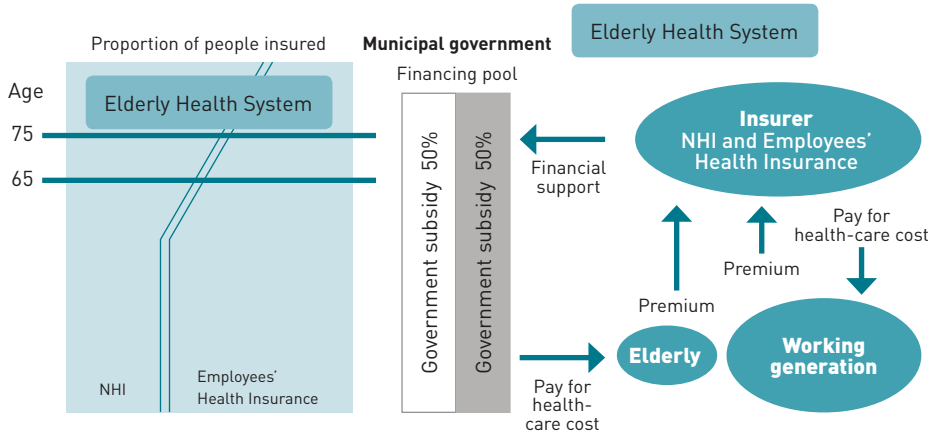
Late-stage medical care system for the elderly

As described in Section 1.3, health care services for the elderly aged over 70 were provided for free until the early 1980s. Due to population ageing and the accompanied increase in health care expenditure, the government decided to introduce the Elderly Health Systems (EHS) in 1982, which required the elderly to pay 10% out-of-pocket (as opposed to 30% in other age groups).

Before 2008, EHS served as a financial redistribution mechanism that adjusted for differences in the burden of elderly care between Employees' Health Insurance and NHI. Many workers (employed in large companies and government agencies) retire before the age of 65 years, and these retired employees join the municipal NHIs, which may not be able to manage the financial burden, especially in smaller rural areas with very large elderly populations. To ensure sustainability, the NHI is subsidized through the EHS with subsidies of up to 41% of benefit disbursement. The redistribution mechanism transfers funds from insurers with below-average enrolment of the elderly above 70 years of age to those

with above-average enrolment (Fig. 3.5). The eligibility age was raised gradually by one year starting in 2002 from 70 years to 75 years.

Fig. 3.5 Elderly Health System before 2008



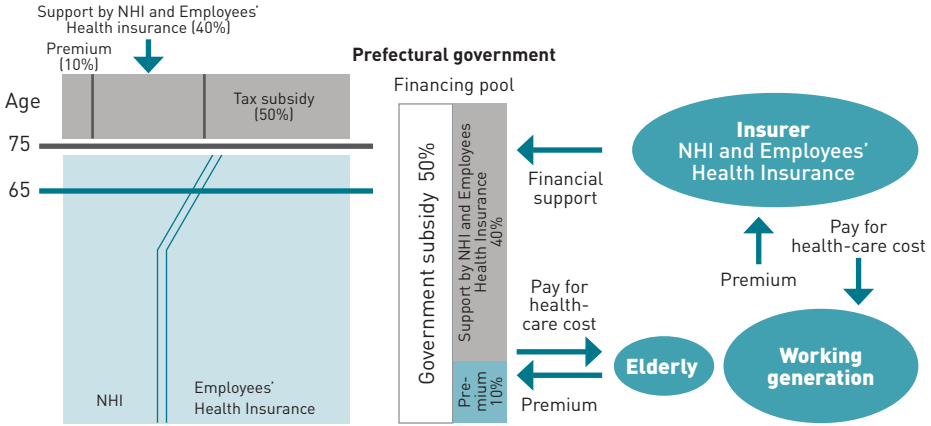
- Increasing proportion of the elderly, who are at high risk of diseases with no or less income
- Expense between the elderly and working generation was not clear
- For the elderly, organization pay for premium and organization pay for health-care cost was different
- Large inequality of premium rate among municipalities

Source: Compiled by the authors based on (Ministry of Health, Labour and Welfare, 2013c)

Despite these subsidies, the imbalance in distribution of the elderly population between the NHI and Employees' Health Insurance has been at the centre of Japan's health policy debate, further aggravated by the ageing population and resultant increase in health care costs. Total unification of multiple health insurance systems into a single payer system remains a policy option (as in the Republic of Korea and Taiwan, China) but has not proved to be politically feasible.

In order to further diminish disparities between the NHI and Employees' Health Insurance, the government introduced radical reforms in 2008 that separated the elderly aged 75 years and over from existing health insurance systems. Fig. 3.6 shows the restructuring of the elderly health-care system in 2008.

Fig. 3.6 Reform of pooling mechanisms in 2008



- Independence financing mechanisms for the elderly
- Expense between the elderly and working generation is clear
- For the elderly, organization pay for premium and organization pay for health-care cost is the same (prefectural government)
- Less inequality in terms of premium rate (set premium rate based on health-care status in each prefecture)

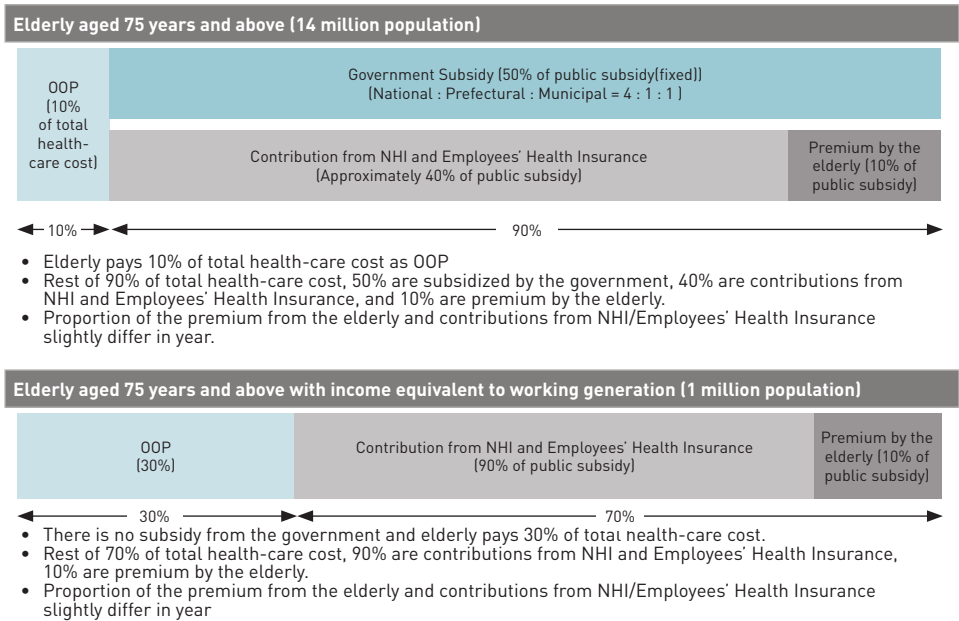
Source: Compiled by the authors based on (Ministry of Health, Labour and Welfare, 2013c)

This system has been modified so that health insurance and the distribution of premiums for those aged between 65 and 74 years are separated from those for the elderly over 75, who are insured by an independent health care system. This system was established under the Elderly Health Care Security Act in April 2008 to replace the EHS. Within this Act, two new financial pooling systems were established in order to reduce the number of elderly individuals covered under the new independent system: (1) late-stage medical care system for the elderly which covers those over 75 years old and (2) early-stage medical care for the elderly, aimed at 65–74 year old people.

The late-stage elderly contribute premiums of approximately 10% of total expenditure, which is deducted from their pensions. The remaining funds for the late-stage medical care system for the elderly is financed by government subsidies (50%) and contributions by the working population (40%). This financial sharing is dictated by law. The beneficiaries (15 million people in FY2013) are divided into two categories: high income (earning income equivalent to the working generation; approximately 1 million people) and others (approximately 14 million people). The

distribution of funds between these beneficiaries is shown in Fig. 3.7. The government subsidy is set at 50% of the benefit expenditure and is further shared among national, prefectural and municipal governments in the ratio of 4:1:1 for beneficiaries, excluding high-income beneficiaries. Furthermore, one quarter of the subsidy from the national government is ear-marked for financial redistribution among the 47 prefectures to balance out financial disparities. Overall, the government subsidy constitutes 47% of the total benefit of the late-stage medical care system for the elderly.

Fig. 3.7 Financial source of the late-stage medical care system for the elderly



Source: Ministry of Health, Labour and Welfare, 2013c

The number of the late-stage elderly population is expected to grow from the current 16 million to 20 million by 2020, while the working population will decline from 109 million to 100 million in the same period. Consequently, the contribution from the working population to the late-stage medical care system for the elderly is expected to grow from US\$ 54.7 billion (FY2014) to US\$ 91.1 billion by 2020. The contribution levied on the working population as their add-on premium is becoming an important health policy issue. So far, the contribution used to be levied on health insurers on a capitation basis (the amount of contribution is determined simply by multiplying the number of enrollees by a fixed

“price”). The per-capita contribution “price” has increased consistently – from US\$ 368 in FY2009 to US\$ 438 in FY2013 – because the share of premium revenue from the elderly has not kept pace with the increasing numbers of the elderly population. After 2017, the capitation was abolished and replaced with an income-based contribution. The rate was set at 3.73% of salary.

3.3.3 Purchasing and purchaser–provider relations

Japan’s purchaser–provider relationship is characterized by a complete dissociation between the two parties. The relationship between purchasers (health insurers) and providers (hospitals, clinics and pharmacies) in Japan is contractual in nature, and insurers are prohibited from making direct contract with purchasers.

According to the Health Insurance Law (Section 63), providers who wish to participate in health insurance practices must apply to the MHLW (criteria are described in Section 65 and Section 71 of this law). In practice, such procedures (as well as regulatory supervision) are delegated to the regional branch offices (RBOs) of the MHLW. There are eight RBOs in the country, each having sub-branches in every prefecture. These contracts between providers and the MHLW under Japan’s Health Insurance Law are considered to be *contracts based on public law*, as opposed to *contracts based on private law*. The distinction is profound: in contracts based on private law, contracting parties have the freedom to decide the contents of the contracts.

In the case of private law-based contracts, purchasers and providers can agree on the prices and scope of benefit, and it is possible for them to set differential pricing for doctors. Internationally, it is common practice that doctors with high performance or credentials can claim higher prices than doctors otherwise, and make contracts with purchasers accordingly. Under contracts based on public law, however, such freedom of contract is never possible. The contents of the contracts, such as prices and scope of coverage, are dictated by law. As a result, providers can choose only to accept them or not, leaving no room for negotiation.

The contents of contracts dictated by law are expressed in the form of the practice rules and the national uniform fee schedule as well as the price list of drugs and medical devices. This national uniform “fee schedule” has a dual function: (1) listing the definitions and scope of services covered by health insurance; and (2) setting prices and billing conditions assigned to

each service. The prices of both services and drugs are uniform throughout the country, and providers are strictly prohibited from balance billing.

Once a provider enters into a contract with the MHLW, the provider is required to obey the rules and regulations laid down by the MHLW. Providers submit monthly claims for reimbursement to the Claims Review and Reimbursement Organizations (CRROs) established in all 47 prefectures. All claims submitted by local providers are reviewed by expert committees, and the performance and observance of the rules by each provider is monitored. Despite this, there are huge inconsistencies in terms of claims and reimbursements for the same conditions by prefecture, and these remain a governance concern related to conflict of interest (COI) among CRROs expert committees, insurers and providers. In July 2017, the MHLW proposed the reform plans for CRROs, which encourage the CRRO's pursuit of efficiency and promote an automated system for reviewing claim data by fully utilizing ICT and artificial intelligence. By introducing uniform checklist criteria for reviewing claim data, automated reimbursement processes and avoidance of COI will be encouraged during the review process (Health Insurance Claims Review and Reimbursement Services, 2017).

Any deviation from the practice rules or the fee schedule may incur disciplinary action by RBOs of the MHLW. Disciplinary actions vary from mild (individual guidance) to punishable (on-site inspection and cancellation of contracts). Cancellation of provider contracts is perceived by many as de facto denial of practice because almost 100% of Japan's health care is under health insurance, and it would be difficult for ordinary physicians to continue to practice without contracts.

In FY2014, a total of 4466 cases of individual guidance were provided and 41 providers (hospitals, clinics or pharmacies) and 30 physicians, dentists or pharmacists had their contracts cancelled according to the MHLW.

By enabling the sanction of providers and the setting of standardized fees, this contract system allows the Central Government to exert great influence over the entire health-care system: controlling costs, distributing human resources more evenly across the country, and maintaining quality and quantity of health-care services with equity (patients have secured to access to good quality health-care services regardless of their income, place of residence and types of hospitals (publicly owned or privately owned)).

3.4 Out of pocket payments

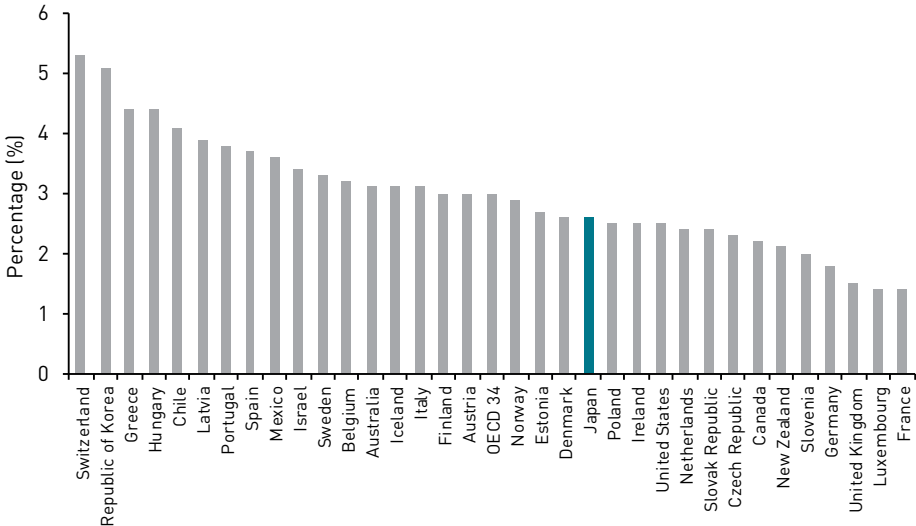
The proportion of total health expenditure paid from OOP expenses is an important marker of the extent of risk pooling and prevention of financial catastrophe in a health system. In countries where public funding for health services is inadequate and risk pooling mechanisms in health financing are limited or unavailable, unexpectedly high OOP payments and illness-related production or income loss can trigger asset depletion, indebtedness and reductions in the consumption of essentials, sometimes leading to financial catastrophe.

3.4.1 Cost sharing

Although the OOP rate is set at 30% for those under the age of 70, 20% for those aged 70–74 and 10% for those aged 75 and over, only 11.7% of health spending was paid directly by patients in Japan in 2014. The reasons include a lower OOP rate for children and the elderly, capped-payment for higher health expenditure (see more details in Section 3.4.2) and free health expenditure for certain conditions (see details in Section 5.14).

Fig. 3.8 presents the burden of OOP payments across OECD countries.

Fig. 3.8 Out-of-pocket medical spending as a share of final household consumption in 2015 (or nearest year)



Note: This indicator relates to current health spending excluding long-term care (health) expenditure.

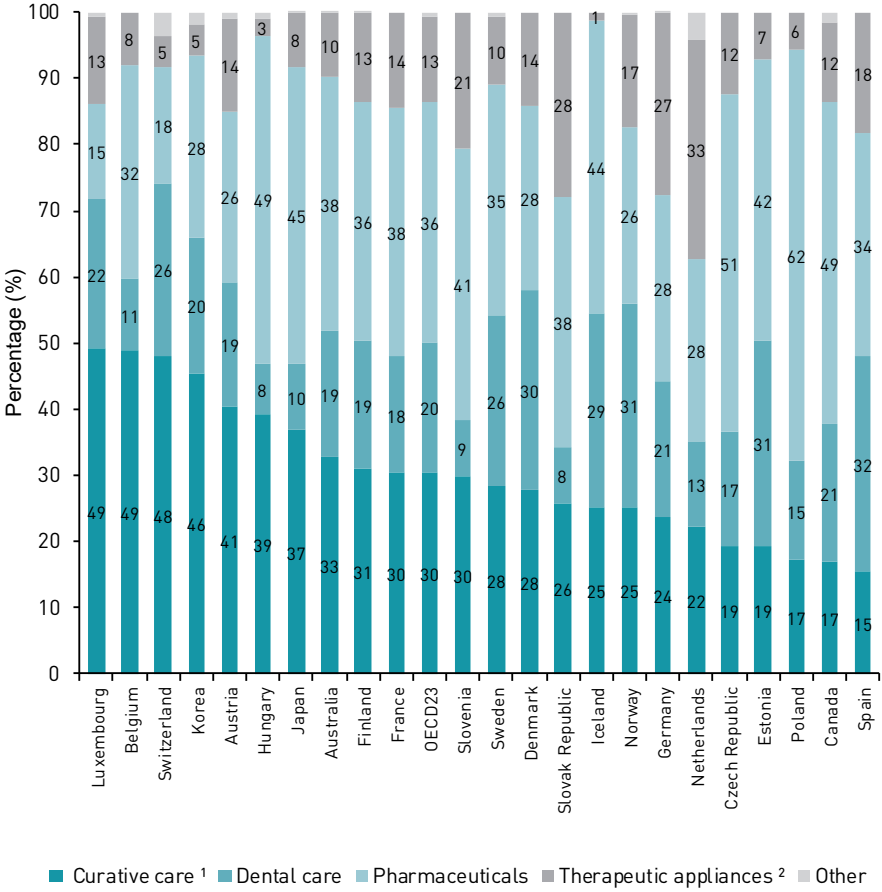
Source: OECD, 2017a

The burden of OOP health spending can be measured either as a share of total consumption expenditure or of total household income. On average in OECD countries, the OOP payment as a proportion of total household consumption, was around 2.8%. The average share varied substantially across OECD countries in 2013, from the lowest value in Turkey (1.2%) to the highest in the Republic of Korea (4.7%). In Japan, 2.2% of total household consumption was spent on OOP payment for health services, slightly lower than the OECD average. The low burden of OOP payments in Japan is due to low co-payments and caps on maximum OOP payment size, which is known as the high-cost medical expense benefit.

High-cost medical expense benefits started in 1973 in order to prevent patients from impoverishment because of health care expenditure. The MHLW sets the maximum co-payment per household based on household income on a monthly basis (see more details in Section 3.4.1).

The share of OOP spending on health-related goods and services across selected OECD countries is presented in Fig. 3.9. In most OECD countries, curative care and pharmaceutical goods or services are the two most important spending items for OOP payments, which account for more than 60% of total health care expenditure. In Japan, Hungary, Slovenia, Iceland, Poland, Estonia, Canada and the Czech Republic, more than 40% of OOP payments are for pharmaceuticals. However, in Luxembourg, Belgium, Switzerland, the Republic of Korea and Austria, household payments for curative care account for about 40% or more of total household medical expenditure. OOP payments for pharmaceutical goods or services are substantially higher than for curative care in Japan and many other OECD countries. Health expenditure related to dental care also contributes a larger share of household medical spending. On average, OECD countries spend around 20% of OOP payments on dental care. The highest OOP payments related to dental care in 2013 were in Spain (32%), and the lowest in Hungary and the Czech Republic (8%). Around 13% of OOP payments for therapeutic appliances was for therapy in OECD countries in 2013. In Japan, this figure was only 8%.

Fig. 3.9 Share of out-of-pocket medical spending by type of goods and services in 2013 (or nearest year)



Notes: This indicator relates to current health spending excluding long-term care (health) expenditure.

¹Including rehabilitative and ancillary services.

²Including eye care products, hearing aids, wheelchairs, etc.

Source: OECD, 2016

3.4.2 Cost-sharing (user charges)

Japan’s health insurance has no deductibles but has cost-sharing. Cost-sharing is a fixed proportion of the cost paid by the service user (the patient), with the insurers paying the remaining proportion. The proportion of cost-sharing is uniformly dictated by law. It is typically 30% for the population younger than 69 years, and 10% for the late-stage medical care system for the elderly, which covers those 75 years or older. Cost-sharing is fixed at 20% for beneficiaries aged between 70 and 74

years, as well as pre-school-age children (up to 6 years old). For the very poor receiving welfare payments under the Public Assistance Act, no cost-sharing is required.

The cost-sharing rate of 30% is relatively high by international standards, but there is a monthly and annual cap on the OOP payment for individuals and households. This cap is metered to the income of a beneficiary or a household. For example, for beneficiaries younger than 70 years, with no taxable income, the monthly cap is set at US\$ 312. Beneficiaries are required to pay 30% of costs up to the cap every calendar month, but only are required to pay the cap amount plus 1% of health expenditure if the cap is exceeded. This cap is further lowered starting from the fourth month in which the cap is reached during the most recent 12-month period. For example, if a beneficiary reached the cap in February, June and November of a given year, the beneficiary will qualify for a reduced cap starting in December.

Once the cap is reduced, it becomes easier for the beneficiaries to fulfil the requirement (of reaching the cap in at least three months during the most recent 12 month period), and they will be able to enjoy the reduced cap longer. This is advantageous for patients with chronic conditions in mitigating OOP payments. For certain chronic conditions, such as dialysis, the monthly cap is even further reduced. The policy of imposing relatively heavy cost-sharing (30%) for all beneficiaries at the point of visit while limiting the cost-sharing metered to one's income is an effective way of protecting households financially. However, as the patient needs to temporarily pay the total amount of health-care expenditure (the difference between actual health expenditure and the cap payment is reimbursed a few months later), this cap system favours the rich rather than poor, and heavy cost-sharing will prevent abuse of services.

Table 3.12 shows the structure of the cap according to the number of months of excessive payments and the income of the patient.

Table 3.12 Structure of the cap according to the number of months of excessive payments and the income of the payee in Japan in 2015

| Age 70 years and over | | |
|-------------------------------|--|--|
| Annual income (in US\$) | Outpatient cap by month (by individual) (in US\$) | Monthly cap (by household) (in US\$) |
| >32 600 | 390 | 707 + (HE-2356) *1% |
| | *If the cap limitation is exceeded more than three times within past 12months, then the household only pays US\$ 390 | |
| 13 700–32 600 | 106 | 390 |
| No taxable income | No taxable income | 217 |
| | No taxable income (below US\$ 700) | 132 |
| Age less than 70 years | | |
| Annual income | Monthly cap (by household) | Frequent user monthly cap by household |
| ≥102 300 | 2228+ (HE-7428) *1% | 1236 |
| 67 800–102 300 | 1477+ (HE-4923) *1% | 820 |
| 32 600–67 800 | 707+ (HE-2356) *1% | 390 |
| <32 600 | 508 | 390 |
| No taxable income | 312 | 217 |

Notes: 1 US\$=¥113

HE: health expenditure, Frequent user: those who reach the cap limitation more than three times within 12 months.

Source: Ministry of Health, Labour and Welfare, 2017f

3.4.3 Direct payment

Although most of the services are covered by national insurance, some services, especially for non-diseases, cosmetic and luxury purposes, are not covered by health insurance and patients have to pay the full amount. A typical example is normal vaginal delivery, as childbirth is not considered as a disease. Instead of providers (such as obstetric clinics or midwiferies) claiming reimbursement from health insurance, the government has introduced several types of one-time cash benefits for deliveries, which are likely to offset the cost. The primary benefit is ¥420 000 (approximately US\$ 3500). Although obstetric clinics and midwives can set the price of delivery freely because delivery is not covered under the uniform fee schedule set by the MHLW, in most cases, providers will set their prices somewhere within the limit of the cash benefit. Emergency and Caesarean section deliveries are treated as diseases covered by health insurance and providers will claim

reimbursement from health insurance in the same manner as any other treatment.

Other examples of direct payments include cosmetic surgery, orthodontics, abortions and infertility treatment. In Japan, infertility treatment (i.e. assisted reproductive treatment, ART) is proliferating due to advancing maternal age. Such infertility treatments are not covered by health insurance, and OOP payment for couples who wish to have children can be heavy. To alleviate the financial burden on couples suffering from infertility, subsidies commenced in 2004. Couples with a combined annual income of less than ¥7.3 million (approximately \$60 000) can receive a subsidy of ¥150 000 for a treatment cycle. However, the subsidy is far smaller than the actual charges of many clinics, which can be as high as ¥1 million and have no price control (infertility treatment is not covered by health insurance, which means that each hospital and clinic can set prices freely). Table 3.13 shows the growth in subsidies for infertility treatment, and the considerable demand for some services that are covered only by direct payments, which means patients are required to pay 100% of all health-care costs.

Table 3.13 Trend in subsidies for infertility treatment

| Year | 2004 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|----------------------------|--------|--------|--------|--------|---------|---------|---------|
| Number of subsidized cases | 17 657 | 72 029 | 84 395 | 96 458 | 112 642 | 134 943 | 148 659 |

Source: Ministry of Health, Labour and Welfare, 2017s

Japan’s health insurance system generally does not allow double billing (balance billing and extra billing) for services included in the national uniform fee schedule and the Drug Price List. Balance billing is payment over and above the amount reimbursed by insurance. Extra billing is billing for services or conditions that are not listed. This prohibits doctors from claiming services covered by health insurance while at the same time providing services not covered by health insurance. In other words, if a doctor provides services not covered by health insurance, providers cannot claim reimbursement from health insurance entirely, which means all aspects of the service are no longer covered by the insurance system.

3.5 Voluntary private health insurance

Voluntary private health insurance is fairly common in Japan; people participate in order to cover the expenses (e.g. transportation, food and

loss of income due to absence from work) that are not covered by NHI scheme. As described in the previous paragraph, all Japanese residents are covered by the NHI scheme and must pay 0–30% of health-care expenditure as OOP payments. These private health insurance plans are not strictly insurances per se, but rather pay out supplementary income equivalent to the amount that would have been earned had there been no illness, not for health-care expenditure already covered under the NHI.

As of 2015, the total market size of voluntary health insurance was about US\$ 400 billion, which was the second largest in the world after the USA. It is estimated that almost 90% of households in Japan participate in at least one voluntary private health insurance.

3.6 Other financing

Japanese health financing systems are primarily supported by the NHI system subsidized by taxation. People who would still like to be covered for OOP payments may also purchase private health insurance plans. There are no other sources of financing in Japan.

3.7 Payment mechanisms

Since the health-care system in Japan is largely controlled by the MHLW in terms of health-care financing and price-setting of health-care costs, payment mechanisms are also controlled mainly by the MHLW (though the majority of health-care facilities are privately owned). As described in previous paragraphs, the prices of all kinds of health care/medical procedures are set by the national fee schedule, and patients pay their health-care expenditure according to the price list.

4 Physical and human resources

Chapter summary

In Japan, there were 8442 hospitals, 101 529 clinics and 68 940 dental clinics in 2016. They are predominantly privately owned. Compared with other OECD countries, inpatient care in Japan is characterized by longer average hospital stays, with a larger number of inpatient beds per capita. Japanese hospitals are in general well equipped with high-technology devices such as computed tomography (CT) and magnetic resonance imaging (MRI) scanners.

Japan has a relatively small number of physicians (2.35 per thousand populations) but more nurses (9.06 per thousand populations) when compared with other OECD countries (OECD average density of physicians and nurses are 3.02 and 8.30, respectively). The number of women physicians was around 20.4% in 2016, although the proportion has been steadily increasing over time. Responding to the need for increased healthcare, the government decided to increase the number of physicians in 2008, and the quota for the number of students entering medical schools has increased by roughly 20% since then. In 2004, mandatory postgraduate clinical training was introduced for medical doctors and dentists, and a new board-certification system for medical doctors is scheduled to start in 2018. These changes are likely to influence career paths and staffing levels of relevant sectors of the health-care workforce in the future.

4.1 Physical resources

4.1.1 *Capital stock and investment*

Current capital stock

The Medical Care Act, 1948 defines hospitals and clinics as places where physicians or dentists conduct a medical or dental practice, serving either the general public or a particular group of people (Government of Japan, 1948b). Hospitals are defined to have facilities that can accommodate at least 20 patients, and clinics have fewer than 20 hospital beds, although many have none at all.

In 2016, there was a total of 178 911 active medical facilities, including 8442 hospitals, 101 529 general clinics and 68 940 dental clinics. Hospitals are further divided into 7380 general hospitals and 1062 psychiatric hospitals (Ministry of Health, Labour and Welfare, 2017r). Of the general clinics, 7629 (7.5%) had beds, and 93 900 (92.5%) did not. Among 7629 general clinics with beds, two thirds (70.7%, 5395) had 10–19 beds. Among 8442 hospitals, there were 3039 facilities with 20–99 beds (36.0%), 2754 with 100–199 (32.7%), 2231 (26.5%) with 200–499, and 418 with 500 beds or more (5.0%).

Health facilities are licensed by local governments. Prefectural governors, city mayors, or heads of special wards within a health-care centre can request reports from the founders or managers of hospitals, clinics, and birth centres, or send staff to inspect the facilities. According to the 2011 report of spot inspections of medical facilities, the observance rate for compliance with the requirements of the Medical Care Act, 1948 and related laws, including human resources and equipment, was 96.4% for medical workers, 98.0% for management, 98.3% for ledger sheets/ records, 98.9% for subcontracting, 98.2% in fire/disaster prevention systems and 99.7% for radiation management (Ministry of Health, Labour and Welfare, 2013b).

The Japan Council for Quality Health Care (JCQHC) was founded in 1995 and started an accreditation programme for hospitals in 1997. Accreditation is voluntary and hospitals wishing to achieve it must apply and pay the necessary fees. By March 2015, 2270 hospitals (approximately 26.7%) were accredited and met the required standards. The JCQHC emphasizes that accreditation is intended to help hospitals improve their quality on a voluntary basis, not to close them. Hospitals that fail to meet the standards are encouraged to make the necessary improvements and then reapply.

Investment funding

The main source of funding for private hospitals is borrowing from banks or the Welfare and Medical Service Agency (WAM). The WAM provides low-interest, long-term loans for construction, maintenance and operation of facilities to private social welfare institutions such as intensive care homes for older people and support facilities for disabled people, and to private medical institutions, including hospitals, clinics and long-term care facilities. At the end of 2013, WAM's balance of loan receivables was US\$ 14.3 billion (including construction funds, funds

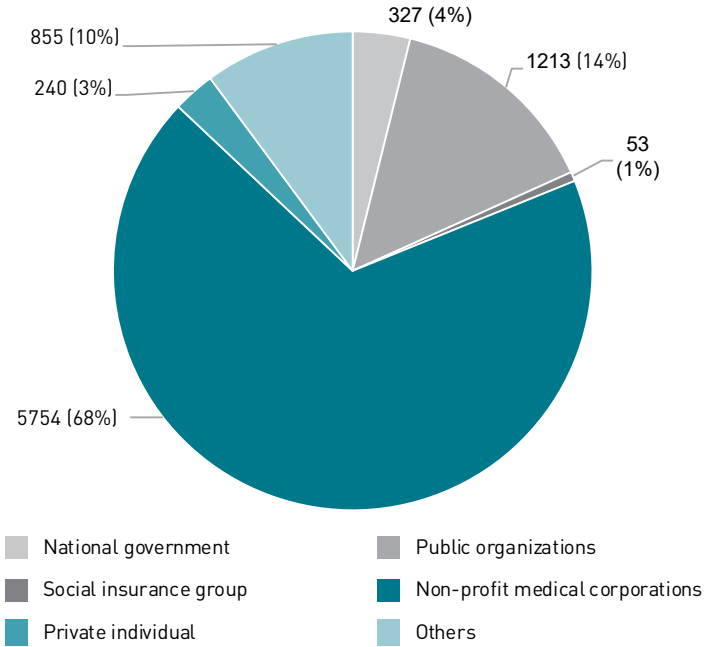
for purchasing equipment, and funds for long-term operation), while US\$ 1.5 billion was provided in loans that year (Welfare and Medical Service Agency, 2017).

To raise money more directly, the issue of medical institute bonds (known as local medical promotion bonds) was commenced in February 2004, subject to guidelines announced by the MHLW from October 2004. In June 2006, the Medical Care Act of 1948 was revised to allow social medical corporations to issue securities called social medical corporation bonds via the Financial Instruments and Exchange Act of 1948. According to a survey of the MHLW, by 2013, 18 medical corporations had issued a total of 41 medical institute bonds, with a total monetary value of US\$ 38 million (Ministry of Health, Labour and Welfare, 2013d).

4.1.2 Infrastructure

Japanese hospitals and clinics are predominantly privately owned. In 2016, of the 8442 hospitals, privately owned hospitals numbered 6849 (81.1%), with 5754 (68.2%) of these owned by non-profit medical corporations, 240 (2.8%) solely owned by private individuals, and 855 (10.1%) owned by others, including non-profit public corporations, non-profit school corporations and private medical schools (Fig. 4.1) (Ministry of Health, Labour and Welfare, 2017r). Although they are privately owned, all of them are for non-profit. 327 had been established by national agencies, 1213 by public organizations (such as prefectures or municipal governments), and 53 by social insurance groups. The number of hospitals across all categories has declined steadily by more than 1500 from a peak of 10 096 in 1990, reflecting mergers and acquisitions in recent years, and has been less than 10 000 since 1992. Under the current fee schedule set by the MHLW, large-size public hospitals mainly for acute and tertiary care are in a state of financial crisis and are largely subsidized by the Central Government and local governments, while most small, private clinics and hospitals for non-acute care are well-financed.

Fig. 4.1 Number of hospitals by ownership in 2016



Source: Ministry of Health, Labour and Welfare, 2017r

Non-profit medical corporations incorporated under the Medical Care Act of 1948 are similar to profit-making corporations, in that they are established by direct investment from private shareholders, but are prohibited from disbursing their profits to shareholders in the form of dividends. The corporate assets of the corporations are the property of the shareholders, who are entitled to sell them at market value at any time. Non-profit medical corporations are subject to regulation and supervision by prefectural governments.

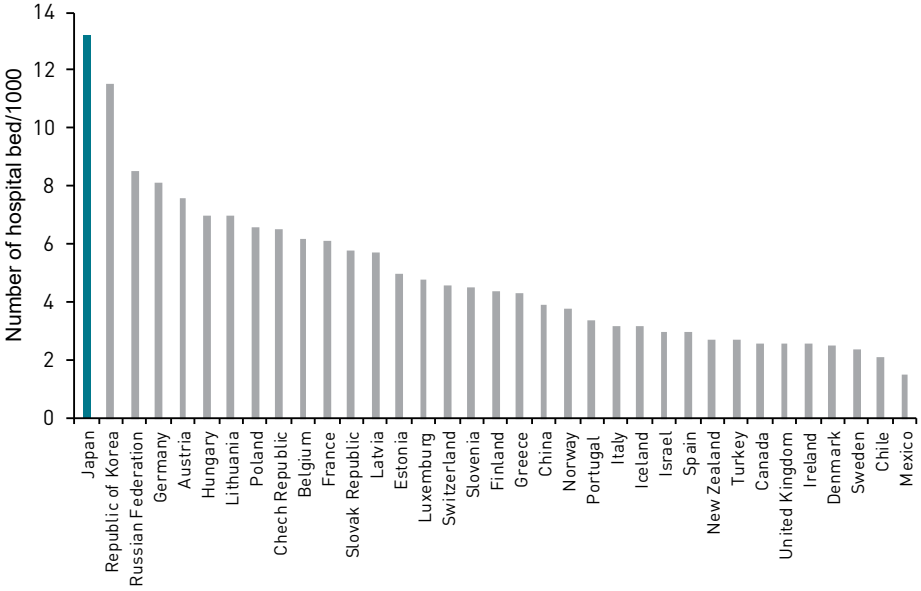
Hospital beds

Hospital beds are classified as general use, long-term care, psychiatric disorders, infectious diseases and tuberculosis. In 2016, there were 1 664 525 inpatient beds in all facilities, of which 1 561 005 (93.8%) were in hospitals. A total of 891 398 hospital beds were for general use, 328 161 (36.8%) were for long-term care, 334 258 (37.5%) were for psychiatric disorders, 1841 (0.2%) were for infectious diseases and 5346 (0.6%) were specifically for tuberculosis.

In 2015, Japan had 13.2 hospital beds per 1000 population, compared with the OECD average of 4.9 for countries with available data (Fig. 4.2) (OECD, 2015). Compared with other OECD countries, Japan has more inpatient beds per head of population, although the number has declined somewhat from a peak of 1.68 million beds in 1992 (Fig. 4.3).

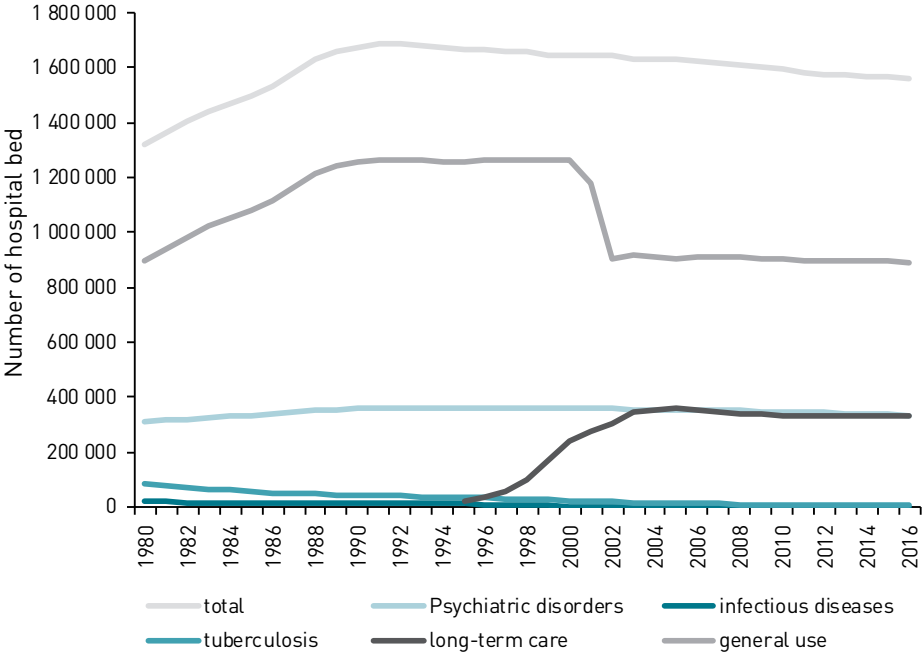
In 2016, there were 101 529 clinics, of which 7629 had beds, and 68 940 dental clinics, of which 27 had beds. The total number of beds in clinics was 103 451, and of these, 9906 were for long-term care. Like the number of hospitals, the number of beds within clinics has gradually decreased since its 1992 peak of 1 686 696 (Ministry of Health, Labour and Welfare, 2017r).

Fig. 4.2 Hospital beds per 1000 population in selected countries in 2015



Source: OECD, 2016

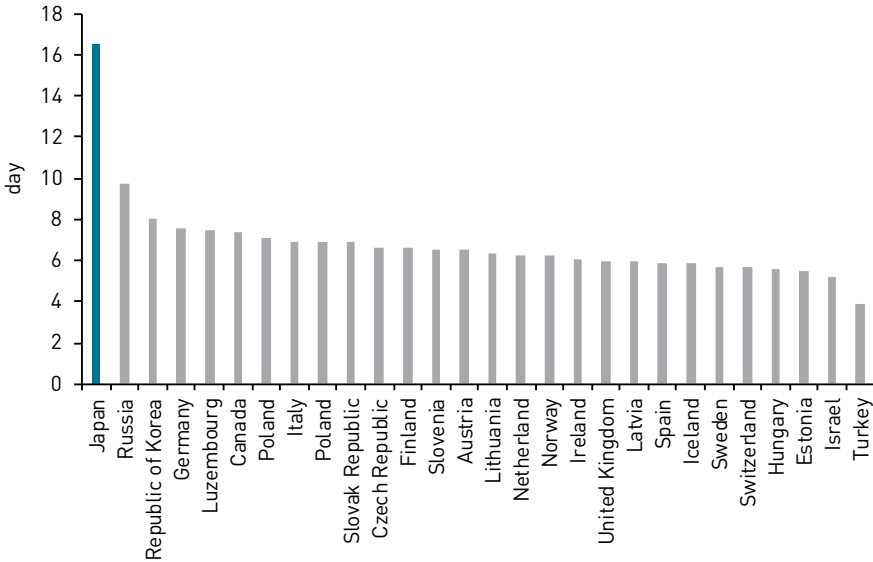
Fig. 4.3 Trend of the number of hospital bed in Japan



Source: Ministry of Health, Labour and Welfare, 2017r

Inpatient care in Japan is generally characterized by longer hospital stays than in other OECD countries (Fig. 4.4). The average length of stay for acute care was 16.5 days for all hospital beds in 2015. The average across OECD countries was 6.8 days (latest available data). The average length of stay in Japan has, however, been steadily declining because of the fee schedule revision to incentivize the reduction of chronic care beds at hospitals. Moreover, the subsequent rise of welfare homes that provide care for older people and are covered by LTCI contributes to this decrease, which is not included in the OECD statistics (OECD, 2016). As described in Section 2.4, each prefecture is required to create Medical Care Plan (MCP) once in every five years and the next revision will happen in April 2018. It is expected that transition of the elderly from hospitalization to welfare home will be further facilitated by the next MCP to promote functional differentiation and hospital bed reduction.

Fig. 4.4 Average length of hospital stay for acute care, all causes in 2015



Note: Japanese data refer to average length of stay for acute care (excluding long-term care beds in hospitals).

Source: OECD, 2018b

4.1.3 Medical equipment

Japanese hospitals are in general well equipped with high-technology devices (Matsumoto M et al., 2004). There is no restriction on hospitals that prohibits the purchase of medical equipment, and hospitals are free to open any specialty department without authorization from the Central Government. Two out of every three hospitals, including psychiatric hospitals, have whole-body CT scanners (Table 4.1). The number of CT scanners per 1000 population is 0.101, compared with a mean of 0.024 in other OECD countries, 0.051 in Australia, and 0.041 in the United States of America and Iceland. There are 0.047 MRI scanners per 1000 population in Japan, significantly higher than the OECD average of 0.014, and higher also than the rates of 0.035 in the United States of America, 0.025 in Italy and 0.024 in the Republic of Korea.

Although this high prevalence of high-technology equipment may improve patient access, it may not be efficient and may incur over-utilization and cost escalation. An important challenge facing health policy-makers is ensuring there is balance between cost effective distribution of high-technology equipment within a region and ease of access for patients.

Clinics fulfil a general diagnostic function and are usually very well-equipped with apparatus for X-rays, electrocardiography, and blood and urine tests. Clinics with inpatient beds function effectively as small-sized hospitals, and their beds constituted 9.9% of the total beds in 2004. This comprehensive function of clinics is an important basis for primary health care in Japan. People can access very convenient services at affordable prices almost anywhere in the country and receive treatment at a comparatively early stage of any illness.

Table 4.1 Number of functioning diagnostic imaging devices (MRI units, CT scanners, PET) in 2014

| Imaging modality | Unit | | |
|------------------|----------|--------|--------|
| | Hospital | Clinic | Total |
| MRI | 4531 | 1977 | 6508 |
| ≥1.5 T | 3601 | 749 | 4350 |
| <1.5 T | 930 | 1228 | 2158 |
| CT | 7716 | 5400 | 13 116 |
| Multi-detector | 6702 | 3075 | 9777 |
| Other | 1014 | 2325 | 3339 |
| PET | 72 | 29 | 101 |
| PET-CT | 346 | 100 | 446 |

Notes: CT: computerized tomography; MRI: magnetic resonance imaging; PET: positron emission tomography

Source: Ministry of Health, Labour and Welfare, 2017r

4.1.4 Information technology

The proportion of the Japanese population using the Internet is estimated to be 82.8%, with 100.4 million people and 99.9% of companies using the Internet in 2013. The most common methods of access are personal computers at home (58.4%), followed by smartphones (42.4%) and personal computers elsewhere (27.9%). Access from smartphones has recently increased. Broadband is used by 97.4% of households that access the Internet at home, with 59.3% using optical communication lines. Mobile phone lines are used in 50.2% of households (Ministry of Internal Affairs and Communications, 2014).

In healthcare, the MHLW has drawn up two documents to encourage information technology (IT) use. These are the *Grand design for informatization of the healthcare field* (2001) and the *Grand design for information utilization in medical care, health care, long-term care, and welfare sectors* (2007) (Ministry of Health, Labour and Welfare, 2001,

2007). Based on a “Declaration to be the World’s Most Advanced IT Nation” by the Cabinet in June 2013, the MHLW has encouraged sharing of information among medical and long-term care institutions (Cabinet Office, Government of Japan, 2013a). In parallel, the Cabinet launched “Japan Revitalization Strategy” in the same year, in which all insurers were required to analyze reimbursement data and to create “data health plan” so as to encourage each insurer to provide evidence-based health promotion activities to their insured population. More recently, the “Working Group on information and communication technology (ICT) usage in the area of health care” was launched in 2015 under the MHLW. Experts from this working group proposed the “Person centered Open Platform for wellbeing (PeOPLE)” concept, which connects and integrates individuals with every kind of health-related data throughout the life-course, and encourages these data to be used both by health-care professionals and the patients themselves (Working group on information and communication technology (ICT) usage in the area of healthcare, 2017a, b). Referring to these recommendations from the expert working group, the MHLW setup the “Administrative reform promotion office for data health” in 2017, which considers the seamless usage of data by both health care and long-term care professionals. All of these were designed to promote online claim systems, development of medical information databases, and exploration of other ways to make use of ICT.

In 2014, electronic health records were used in 2321 hospitals (27.3% of the 8493 hospitals). The high cost of introducing electronic health records, sensitivity of data privacy from the general public are major obstacles to disseminating electronic medical records. Ordering systems, picture archiving and communication systems were used in 3857 (45.4%) and 5755 (67.8%) of all respondent facilities (Ministry of Health, Labour and Welfare, 2017r).

4.2 Human resources

There are many types of health and health related workers in Japan providing services at various settings. Table 4.2 shows the types of health workforce members with national licensure and corresponding numbers in 2014.

Table 4.2 Types and numbers of selected health and health related workforce with national licensure in Japan

| Type | Description | Governing law | Numbers* | Source |
|----------------------|--|--|-----------|--------|
| Physicians | A person who contributes to the improvement and promotion of public health and ensures the healthy lives of the citizenry through the administration of medical care and health guidance. Medical practitioners are allowed to establish clinics or birth centres. | Medical Practitioners Act, Medical care Act | 311 205 | 1 |
| Dentists | A person who contributes to the improvement and promotion of public health and ensures the healthy lives of the citizenry through the administration of dental care and health guidance. Dentists are allowed to establish dental clinics. | Dental Practitioners' Act, Medical care Act | 103 972 | 1 |
| Pharmacists | A person who contributes to the improvement and promotion of public health by administering the dispensing of medicine, supply of medicine and other pharmaceutical health and sanitation services, thereby ensuring the healthy living of citizens. | Pharmacists Act | 288 151 | 1 |
| Public Health Nurses | A person who engages in health guidance using the title of public health nurse under the license of the Minister of Health, Labour and Welfare. Public Health Nurses provide practice at public health centres, public administrations including municipality, cities or villages, industry, schools or hospitals. | Act on Public Health Nurses, Midwives and Nurses | 51 280 | 2 |
| Midwives | A woman who engages in midwifery or health education for pregnant and postpartum women or newborns under the license of the Minister of Health, Labour and Welfare. Midwives have the right to establish a midwifery home. | | 35 774 | 2 |
| Nurses | A person who engages in providing care to persons with injuries and/or illnesses or postpartum women, or to assist medical treatment under the license of the Minister of Health, Labour and Welfare. Nurses provide care at various settings including health-care institutions, home-based care, social welfare and business industries. | | 1 149 397 | 2 |
| Assistant Nurse | A person under licensure from the prefectural governor to provide the same practice as nurses under the direction of a physician, dentist, or nurse. *Assistant nurse is not national license, licensure is granted by prefecture governor. | | 323 111 | 2 |

Table 4.2 Types and numbers of selected health and health related workforce with national licensure in Japan (Con't.)

| Type | Description | Governing Law | Numbers* | Source |
|-----------------------------------|--|---|----------|--------|
| Clinical radiologic technologists | A person who irradiate radiation to the human body, which includes photography, irradiation equipment or radioactive isotope treatment under the direction of a doctor and/or dentist. | Clinical Radiologic Technologists Act | 44 375 | 3 |
| Medical technicians | A person who engages in the service of conducting a series of examinations (microbiological, serological, haematological, pathological, parasitological, biochemical and physiological) under the direction of a doctor and/or dentist. | Clinical Technicians Act | 55 072 | 3 |
| Physical therapists (PT) | A person who provides exercise therapy and electronic thrush, physical massage, thermal or other physical services to those with physical disability in order to restore their fundamental physical and operational ability. | Physical Therapists and Occupational Therapists Act | 74 236 | 3 |
| Occupational therapists (OT) | A person who helps people across the lifespan participate in the things they want and need to do through the therapeutic activities (occupation). They target to those with physical and mental disabilities in order to restore applied motion or social adaptation ability. | | 43 884 | 3 |
| Orthoptists | A person who provides corrective exercises and necessary examination to those with impaired binocular vision function under the direction of a doctor. | Orthoptists Act | 4227 | 3 |
| Clinical engineers | A person who operates the life support management device and its maintenance and inspection under the direction of a doctor. | Clinical Engineers Act | 20 380 | 3 |
| Prosthetist and Orthotists | A person who produces and adapts prosthetic appliances under the direction of the doctors. | Prosthetist and Orthotists Act | 66 | 3 |
| Dental hygienists | A person who engages in preventive practice for teeth and oral cavity diseases under the direction of a dentist. Practice includes mechanical removal of deposits and application of medication. | Dental Hygienists Act | 123 831 | 2 |
| Dental technicians | A person who prepares, repairs or processes a prosthetic footprint, a filling or any orthodontic device to be used for dental care. | Dental Technicians Act | 34 640 | 2 |
| Emergency life-saving technicians | A person who provides life-saving practice to severely injured persons in order to prevent significant deterioration of the symptoms and avoid fatality during transportation to a hospital or a clinic. Life-saving practice includes preserving respiratory capacity, recovery of heart beat and other measures. | Emergency Life-saving Technicians Act | 31 012 | 4 |

Table 4.2 Types and numbers of selected health and health related workforce with national licensure in Japan (Con't.)

| Type | Description | Governing law | Numbers* | Source |
|--|--|--|-----------|--------|
| Massage and finger pressure therapists | A person who provides massages and finger pressure therapy besides physicians. | Act on Practitioners of Massage, Finger Pressure, Acupuncture and Moxibustion etc. | 116 280 | 2 |
| Acupuncture therapists | A person who provides acupuncture therapy besides physicians. | | 116 007 | 2 |
| Moxibustion therapists | A person who provides moxibustion therapy besides Physicians. | | 114 048 | 2 |
| Judo therapists | A person who treats external injuries related to bones and joints, including fractures, sprains and dislocations at a therapy centre or clinic. | Judo Therapists Act | 63 120 | 2 |
| Speech language hearing therapists | A person who provides speech and other types of exercises, examination and advice, guidance and other necessary assistance to those with impaired functions of speech, language and hearing in order to maintain and improve those functions. | Speech language hearing therapists Act | 15 123 | 3 |
| Registered Dietitian | A person who provides nutritional guidance necessary for medical treatment of the sick and injured and nutritional guidance for maintaining and promoting health. Dieticians engage in providing food service management and providing guidance and instruction necessary for improving nutrition at health-care and long-term care facilities | Dietitians Act | 57 295 | 2 |
| Certified social worker | A person who provide counseling, advice, guide and other services with social work knowledge and skills for those who are physically or mentally disabled and cannot lead a daily life due to environmental reasons. | Certified Social Worker and Certified Care Worker Act | 201 243 | 5 |
| Certified care worker | A person who provides long-term care to the elderly | Certified Social Worker and Certified Care Worker Act | 1 494 460 | 6 |

Notes: * figures are as of December 31 in 2014 (source 1), December 31 in 2016 (source 2), October 1 (source 3) in 2016, April 1 in 2014 (source 4) and September 30 in 2016 (source 5, 6). For source 1, 2, 4–6 is the registered number while the data for source 3 is the number of full-time workers.

Sources: 1. Ministry of Health, Labour and Welfare, 2014c; 2. Ministry of Health, Labour and Welfare, 2016n; 3. Ministry of Health, Labour and Welfare, 2017r; 4. Fire and Disaster Management Agency Ministry of Internal Affairs and Communications, 2014a; 5. Ministry of Health, Labour and Welfare, 2017w; 6. Ministry of Health, Labour and Welfare, 2017v

4.2.1 Health workforce trends

Table 4.3 shows the trends in the number of doctors, dentists, pharmacists and nurses in Japan between 1980 and 2014 (2016 for Public Health

Nurses, Midwives, Nurses and Assistant Nurses). In October 2014, there were 311 205 doctors (2.35/1000 population), 103 972 dentists (0.82/1000 population) and 288 151 pharmacists (2.27/1000 population). In December 2016, there were 51 280 public health nurses (0.40/1000 population), 35 774 midwives (0.28/1000 population), 1 149 397 nurses (9.06/1000 population) and 323 111 assistant nurses (2.55/1000 population).

Table 4.3 Health-care workers per 1000 population, 1980–2014 (latest available year)

| Human resources for health | 1980 | 1990 | 2000 | 2010 | 2014 |
|----------------------------|------|------|------|------|------|
| Physicians | 1.33 | 1.71 | 2.02 | 2.30 | 2.35 |
| Dentists | 0.46 | 0.60 | 0.72 | 0.79 | 0.82 |
| Pharmacists | 0.99 | 1.22 | 1.71 | 2.16 | 2.27 |
| Public health nurses* | 0.15 | 0.20 | 0.29 | 0.35 | 0.40 |
| Midwives* | 0.22 | 0.19 | 0.19 | 0.23 | 0.28 |
| Nurses* | 2.12 | 3.27 | 5.15 | 7.44 | 9.06 |
| Assistant nurses* | 2.04 | 2.75 | 3.06 | 2.93 | 2.55 |

Note: *2016 Data for Public Health Nurses, Midwives, Nurses and Assistant Nurses

Sources: Physicians, Dentists, Pharmacists: Ministry of Health, Labour and Welfare, 2014c; Public Health Nurses, Midwives, Nurses, Assistant Nurses: Ministry of Health, Labour and Welfare, 2016n

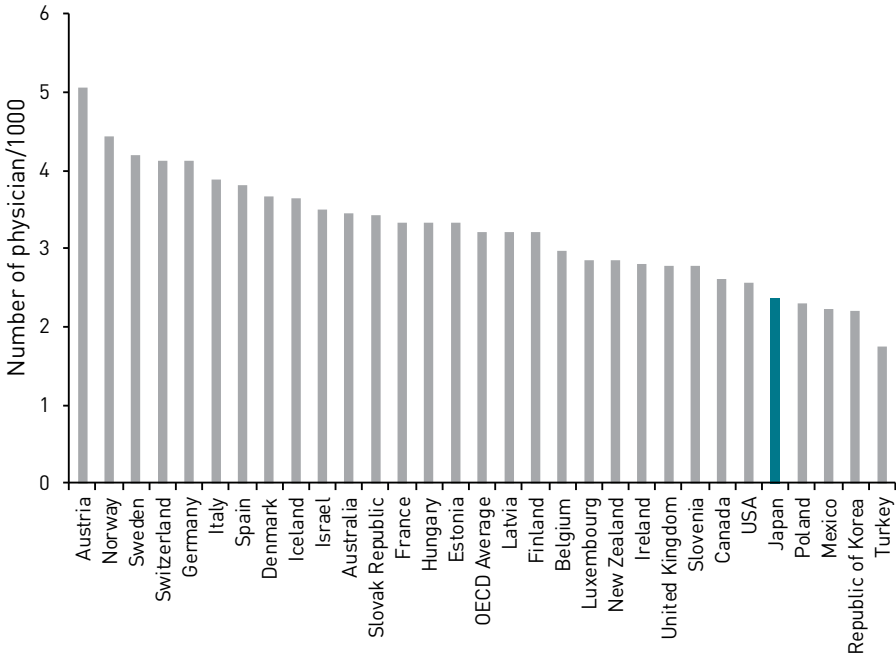
Doctors

Of the 311 205 licensed physicians in 2014, 296 845 (95.4%) were working in medical facilities, with 194 961 (62.6%) in hospitals and 101 884 (32.7%) in clinics (Ministry of Health, Labour and Welfare, 2014c). There were 15 659 women doctors (10.0% of the total) in 1980 and 60 495 (20.4%) in 2014. Of doctors aged less than 29 years, 9165 (34.8%) were women. According to the OECD data, which is slightly different from the MHLW data, Japan has a relatively low supply of doctors (Fig. 4.5), with an estimated 2.3 per 1000 population in 2013, or the latest available year, compared with an OECD average of 3.2 (OECD, 2015). This partially reflects historical decisions to reduce the number of medical student seats and a lack of easy access to overseas-trained medical staff due to medical and institutional barriers to foreign workers in the Japanese system.

The enrolment capacity for medical universities in the 1960s was set at about 3000–4000. In 1973, the Cabinet endorsed a vision of every prefecture having a medical school of its own (Basic Economic and Social Plan, the Cabinet Office). Since then, a number of new medical schools have been established. The enrolment capacity per year reached a peak of

8280 in 1981. In 1986, a special committee of the then Ministry of Health and Welfare recommended that the number of new doctors be reduced by 10% before 1995, in anticipation of a large increase in the number of graduates. As a result, enrolment capacity dropped to 7625 in FY 2003. By 2008, however, responding to public and political concerns about the insufficient numbers of physicians, the declining trend was reversed to increase the numbers of medical students again. In FY 2017, the enrolment capacity reached 9420 (Ministry of Education, Culture, Sports, Science and Technology, 2017a). Student enrolment capacity has increased in universities that provide scholarships for those engaging in community health care or set selection criteria, co-operating with other universities to provide the bases for training research physicians and decreasing the number of dental students.

Fig. 4.5 Number of physicians per 1000 population in different countries in 2014



Source: OECD, 2016

Nurses, Public Health Nurses and Midwives

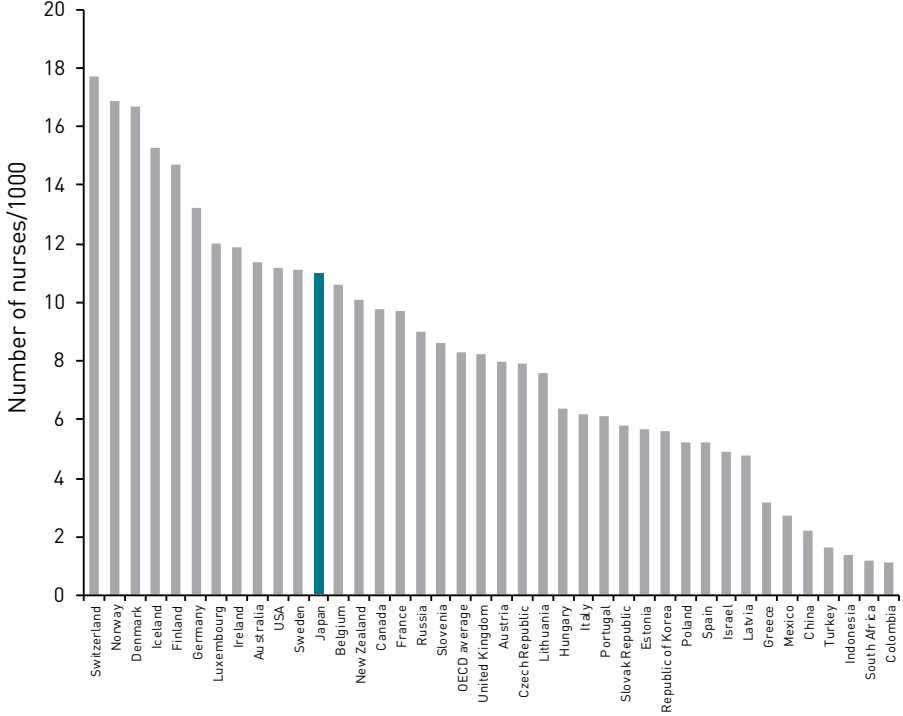
In 1980, there were 248 165 practicing nurses in Japan (2.12/1000 population), but this number increased rapidly to 1 149 397 (9.06/1000 population) by 2016, a four-fold increase in almost 40 years.

However, the nursing shortage has remained a Japanese health-care issue since 1990s, due to the increasing demand for health care that comes with rapidly ageing society. The Government estimates that there will be a shortage of 30 000–130 000 nursing personnel by 2025 under the several scenarios in the Comprehensive Reform of Social Security and Tax. Based on the *Act on Assurance of Work Forces of Nurses and Other Medical Experts* in 1992, several policies have been implemented by the MHLW in collaboration with other stakeholders in order to have sufficient number of nurses at all times while also monitoring supply and demand in the nurse market. The main policies include:

1. Reinstatement support: recruitment centre “nursing centre” in central-branch and each prefecture that supports nurses (who are not working) in job-hunting and trainings. The government started a notification system requiring nurses who are not working to report to nurse centres in order for the government to capture the potential number of nurses that could be added to the workforce.
2. Improvement of work environment: Due to a high turnover rate of 11.0%, especially among new graduate nurses (7.5% in 2013) (Japanese Nursing Association, 2015), the government at both the central and local level established a management system for improvement in health-care work environments, including all types of health workforce, aiming to enhance the quality of health care and assure patient safety through the creation of positive work environments (Ministry of Health, Labour and Welfare, 2017g).
3. Fostering of nurses: Financial support to individual university graduates pursuing non-nursing majors to enter nursing schools.
4. Financial support: A regional medical nursing care comprehensive fund was established at the prefectural level to be used for various activities aimed at improving nurse retention, training and work environments.

The total number of public health nurses was 17 957 (0.15/1000 population) in 1980, and steadily increased to 51 280 (0.40/1000) in 2016. A similar trend can be observed in midwives: figures were 25 867 (0.22/1000) in 1980, and have now reached 35 774 (0.28/1000) in 2016 (Ministry of Health, Labour and Welfare, 2016n). Japan has a similar number of nurses compared to majority of other OECD countries (Fig. 4.6).

Fig. 4.6 Number of nurses per 1000 population in selected countries in 2014

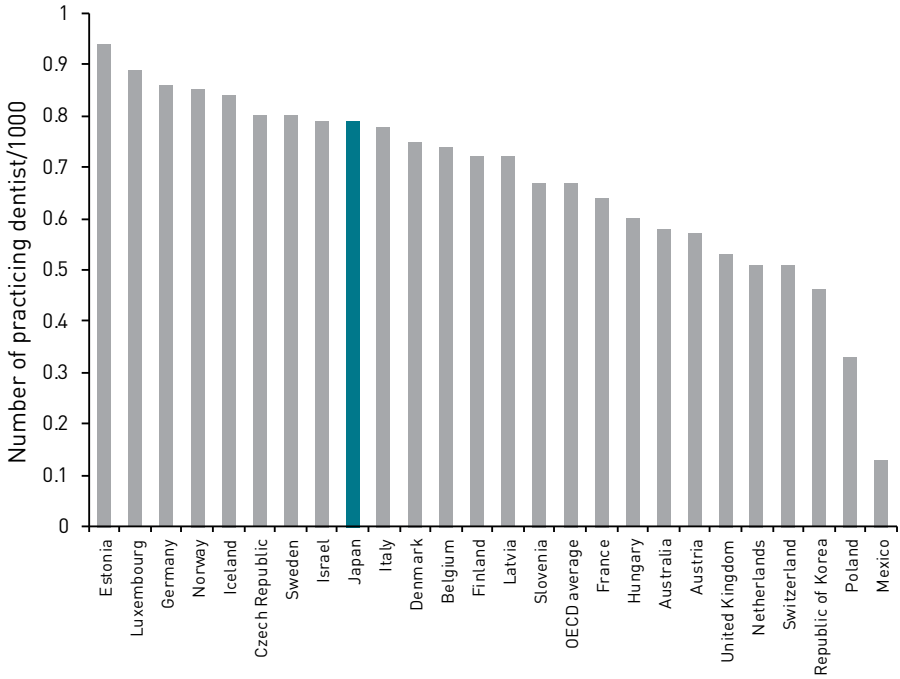


Source: OECD, 2016

Dentists

In 1980, there were 53 602 dentists (0.46/1000 population), which increased to 103 972 (0.82/1000 population) in 2014. Of these, 6590 (12.3 %) were women in 1980, but this figure rose to 23 428 (22.5%) in 2014 (Ministry of Health, Labour and Welfare, 2014c). Among dentists aged less than 29 years, 43.6% were women. Compared with the OECD average, Japan has a larger number of dentists (Fig. 4.7).

Fig. 4.7 Number of practicing dentists per 1000 population in selected countries in 2015 (or latest available year)



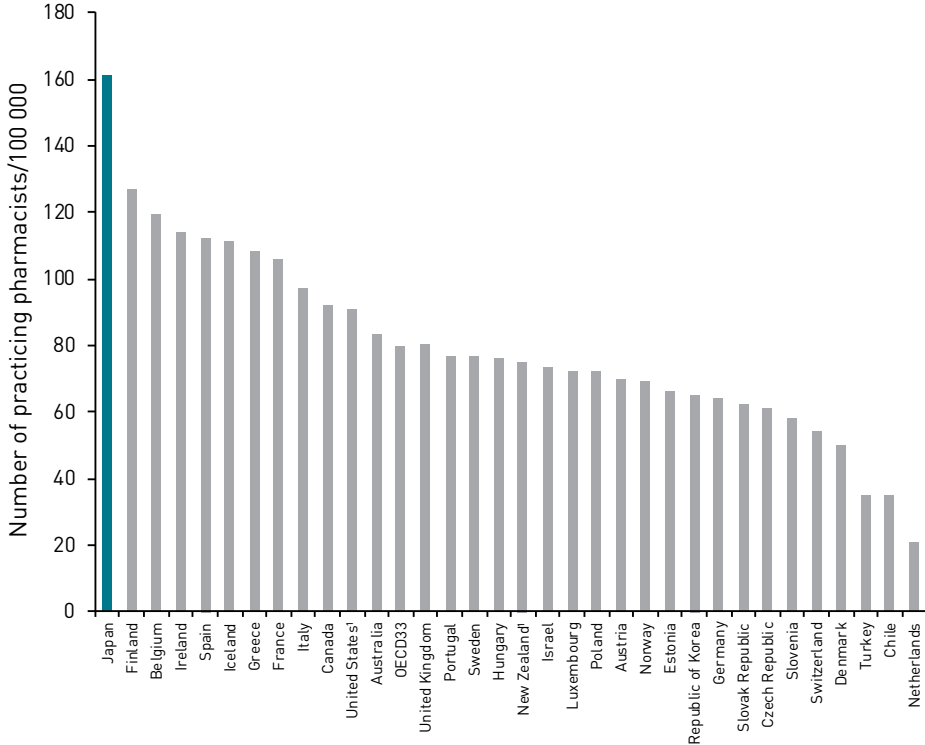
Note: 2014 data for Denmark, Finland, Japan and Sweden

Source: OECD, 2016

Pharmacists

In 1980, there were 116 056 pharmacists in total, a rate of 0.99 per 1000 population, rising to 217 477 (1.71/1000 population) in 2000, and 288 151 (2.27/1000 population) in 2014. Of these, 175 657 (61.0%) were women in 2014. In 2006, MEXT introduced a 6-year course for pharmacists instead of the original 4 years of course, which includes compulsory practical training in pharmacies and hospitals. Compared with other OECD countries, Japan has a large number of pharmacists (Fig. 4.8).

Fig. 4.8 Practicing pharmacists per 100 000 population in 2013 (or latest available year)



Note: 2012 data for Japan, Finland, Sweden, Luxembourg, Denmark and Netherlands, 2011 data for Greece to be consistent with Figure 4.6

Source: OECD, 2016

4.2.2 Professional mobility of health workers

Physicians

Professional mobility of physicians is limited in Japan, and few physicians with a Japanese medical license go abroad to practice. Those graduating from a medical school or obtaining a medical license outside of Japan are required to take documentary examinations and demonstrate their ability to provide suitable medical care in Japanese if they want to take the national examinations for medical practitioners. They may then be permitted to sit for the national examination or be required to take a pre-examination and undergo practical training for 1-year or more.

Based on formal agreements between countries, medical licenses may be given to foreign physicians who have passed the national examinations

for medical practitioners in English, provided certain conditions are met. They must undertake medical practice at medical facilities approved by the Japanese government and forbidden from accepting Japanese public health insurance. This agreement is so far limited to doctors from the United Kingdom, the United States of America, France and Singapore (Cabinet Office, Government of Japan, 2013b).

There is also a special system for foreign health-care professionals coming to Japan to undertake medical training. They seek to contribute to international networking and collaborations with physicians and nurses in the medical field. They also aim to improve medical standards in developing countries, in which they are allowed to conduct medical and nursing services. The system is currently being expanded (Ministry of Health, Labour and Welfare, 2011a).

Nurses and care workers

Similar to physicians, it is not common for nurses with Japanese licenses to go abroad for practice. As for accepting foreign nurse, the government currently has an agreement between Indonesia, the Philippines and Viet Nam; it is quite limited for other foreign nationals coming to Japan for practice.

Through the new “Indonesia–Japan collaboration on the enhancement of nursing competency through in-service training” established through the Economic Partnership Agreement (EPA) in 2008 (similar arrangements exist with the Philippines and Viet Nam), foreign applicants working towards acquiring the national license engage in training at receiving facilities with the intention of passing the national examination (Siyam A et al., 2013). 1203 potential foreign nurses and 3492 potential certified care workers had entered Japan under this scheme between FY 2008 and FY 2017. The MHLW stated that this scheme was not designed to address nursing and care worker’s shortages, but had been implemented following strong requests from other countries, meanwhile reinforcing economic cooperation (Ministry of Health, Labour and Welfare, 2017a).

Those who are applying to this scheme are required to take Japanese language courses before and after coming to Japan (6 months each) and to take training courses for nursing/long-term care at designated health care facilities. Those who fulfil both Japanese language courses and nursing/long-term care training may then take the respective national exam. In 2016, 447 took the national exam for nursing and 65 (14.5%)

passed the national exam (national average: 88.5%) (Ministry of Health, Labour and Welfare, 2017d). 209 took the national exam for certified care worker and 104 (49.8%) passed the national exam (national average: 72.1%)

4.2.3 Training of health workers

Physicians

Medical training in Japan is an undergraduate course, which involves six years in medical school after graduating from senior high school. Those who pass the national examination then proceed to two years of clinical training, after which they are included in the medical register. In 2017, 8533 students passed the national examinations. Physicians are free to choose where to work, and decisions about where to provide clinical training are made by matching physicians and venues using an algorithm.

Postgraduate clinical training after medical school became mandatory in 2004, and training facilities for doctors in the initial stages of their career have changed greatly. In 2003, about 70 % of new doctors were trained at university hospitals, and about 40% of them were trained in a single specialist department affiliated with a university. Only a few trainees received more general training from a broader rotation. Since 2004, the number of clinical training hospitals other than university hospitals has grown to comprise more than half of all training facilities.

In 2015, there were 11 052 clinical training facilities in 1023 hospitals (1410 training programmes), and a total of 8687 newly registered physicians were matched to the training programme (Ministry of Health, Labour and Welfare, 2017o). The number of training slots is far greater than the number of applicants, and trainee physicians are likely to be concentrated in urban areas. Therefore, adjustments such as setting an upper limit on the numbers recruited in individual prefectures have been in operation since 2010 (Ministry of Health, Labour and Welfare, 2017o).

Dentists

Dentists follow a 6-year course at dental school after graduating from senior high school. Although most of these schools were private before Second World War, dental schools were established at three national universities in 1965. The quota on the number of students in 2016 was 2459 at 29 schools in 27 universities (Ministry of Education, Culture, Sports, Science and Technology, 2017b). The number passing the national dental practitioners' examination was 2025 in 2014. At least one year's

worth of clinical postgraduate training has been mandatory since 2006. In 2014, there were 2428 clinical training facilities with a quota of 3603 newly-graduated dentists, which was much higher than the number of newly graduates (Ministry of Health, Labour and Welfare, 2017b).

Pharmacists

The career path for pharmacists used to be a 4-year degree course provided by a university pharmaceutical department, followed by a national examination. Students proceeding to graduate school could take a 2-year master's courses followed by a 3-year doctoral courses. However, with increased social concern about pharmacological education due to recent advances in medical technologies and the separation of dispensaries from medical practice, the course term was extended to six years and doctoral courses to four years. There are still some 4-year pharmacology courses for those wanting to gain a basic knowledge of pharmacology (eligibility for a national examination is limited to 6-years course graduates). In many cases, graduates in four-year pharmacology courses work in research and development at pharmaceutical companies and universities. In 2015, 73 universities provided programmes to a total of 13 034 students (11 455 for the 6-year and 1589 for the 4-year courses). In 2016, 11 488 students passed the national pharmacists' examination (Ministry of Health, Labour and Welfare, 2016g).

Nurses

As shown in Fig. 4.9, there are a variety of different education routes leading to a nursing qualification, from 3-year nursing school to 4-year bachelor programmes at a university after graduation of high-school, and there is another route for assistant nurse to pursue 2-year bridge course to apply nursing licensure. The number of universities providing nursing education has increased greatly from 11 universities recruiting 558 students in 1991 to 218 universities recruiting 17 878 students in 2013 (Ministry of Health, Labour and Welfare, 2014d). All courses include the minimum required hours of clinical training. Of the 45 784 nurses who passed the national examination in 2008, 9488 (20.7%) had graduated from universities or colleges (Ministry of Education, Culture, Sports, Science and Technology, 2009). In order to prevent early turnover of new graduate nurses, improving the quality of nursing and securing medical safety, facilities have been encouraged to make efforts to provide clinical training to new graduate nurses since 2010 based on an amendment to the Act on Public Health Nurse, Midwives and Nurses and Act on Assurance of Workforces of Nurses and Other Medical Experts (Ministry

of Health, Labour and Welfare, 2017u). The MHLW in collaboration with other stake holders develops and provides guidelines to the facilities as support.

Recently, the MHLW introduced “Integrated Community Care System (ICCS),” which is a comprehensive system at the community level that integrates prevention, medical services, and long-term care while also providing living arrangements and social care (see more details in Chapter 6). In this new system, nurses are expected to be a catalyst of health-care, long-term care and welfare within respective community, and to provide seamless care (from prevention to palliative care) to the elderly or person in need of support.

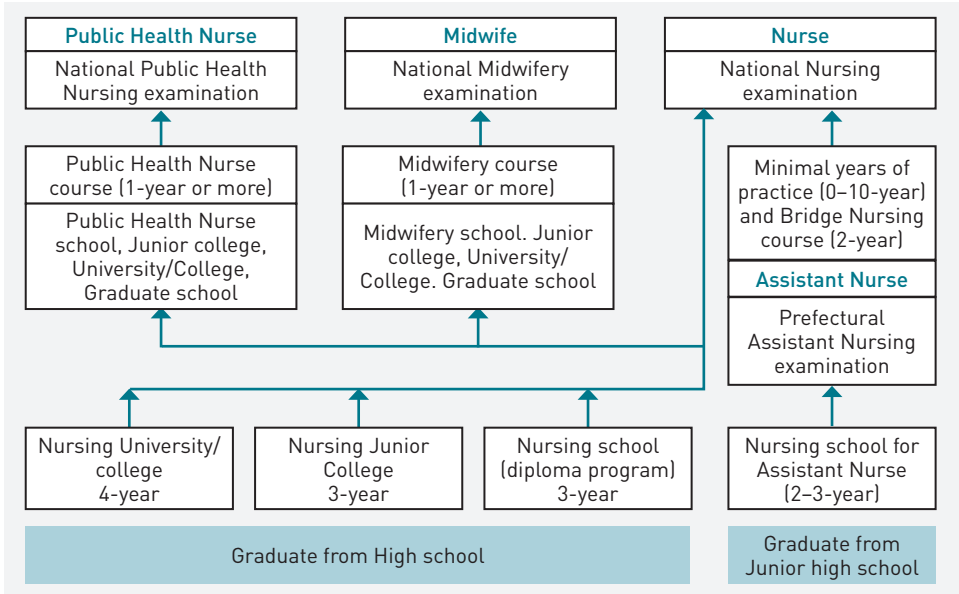
Public Health Nurses (PHN)

PHN training requires an additional year of training for nurses, so there are no PHNs without nurse licensure. This training has been combined with nursing training at the bachelor’s or master’s level program since 2016. There were 268 training institutions ranging from Public Health Nursing schools to graduate schools with a total of 20 753 student capacity in 2016 (Japanese Nursing Association Publishing Company, 2016).

Midwives

Similar to PHN, midwives are required to take one additional year of training. Some courses have been held at the master’s level since 2016. A total student capacity was 10 089 in 201 schools ranging from midwifery schools to graduate schools in 2016 (Japanese Nursing Association Publishing Company, 2016).

Fig. 4.9 Basic nursing education courses



Source: Japanese Nursing Association, 2016, modified by the authors

Certified care workers (nationally qualified)

Certified care worker is defined as a person who provides personal care necessary for daily living including bathing and cooking, and also provides care guidance to the person in need (i.e., elderly and disabled) and caregivers. They can also conduct sputum suction and tube feeding under physicians’ instruction. There are two primary ways to become a nationally qualified care worker:

1. At least three years of working experience at a nursing home or other equivalent facility.
2. 1 or 2 years of care working at a training facility

Those who fulfil either of the above qualification then need to take both a knowledge examination and a practical skill examination.

4.2.4 Doctors’ career paths

The majority of licensed physicians work in hospitals. In 2014, of the 311 205 licenced physicians, 296 845 (95.4%) were practicing; 142 655 (45.8%) worked in hospitals not attached to medical educational institutions, 52 306 (16.8%) in hospitals attached to medical educational institutions and 101 884 (32.7%) in clinics (Ministry of Health, Labour and

Welfare, 2014c). The proportion of women physicians was around 20.4% in 2016 and this proportion has been steadily increasing over time. There have been more physicians working in non-teaching hospitals than in clinics since 1986. The largest age group in each setting was comprised of those aged 30–39 years in hospitals and those aged 50–59 years in clinics. The mean age was 46.2 years in non-teaching hospitals, 38.7 years in teaching hospitals and 59.2 years in clinics.

The career path for physicians is in transition because of the introduction of mandatory postgraduate clinical training in 2004, and the introduction of a new specialty board certification system starting in 2018. Before 2004, physicians were trained at universities from which they obtained a graduate diploma. The clinical departments of medical schools, called “*ikyoku*” controlled the appointment of physicians, and individual physicians had a very limited choice in selecting which hospital they would work in (Otaki J, 1998). After the introduction of mandatory post-graduate clinical training in 2004, young physicians become able to freely choose their working placement, and they shifted to hospitals not attached to medical educational institutions.

Extensive review of the specialty board certification system has been conducted recently. Before this revision, the evaluation or approval of specialists was organized by academic societies (not nationally qualified) and provided specialty board certification for physicians fulfilling certain criteria. However, this independent accreditation process caused some problems, including a lack of uniform standards and gaps in understanding between physicians and citizens about the skills required for specialists. The MHLW has established a commission to investigate medical specialties and propose revisions to requirements for specialization. In the report published in 2013 (Ministry of Health, Labour and Welfare, 2013a), recommendations included the establishment of a uniform system for approval of specialists, evaluation/approval of training programmes, and a possible two-step system in which physicians acquire qualifications in more basic fields and then acquire further qualifications in sub-specialties. The commission has also proposed adding general practice/family medicine as an area for general certification so that these physicians provide appropriate primary care and continuous medical care for a wide range of common diseases (Ministry of Health, Labour and Welfare, 2013a). In total, 19 basic areas of board certification were established. Under this system, 7791 were recruited as clinical fellow starting FY 2018 as of 15 December 2017.

This new uniform system was planned to start in April 2017; however, it has not reached consensus among stakeholders and is now postponed to start in April 2018. The major concerns included the fact that (All Japan Hospital Association, 2015) programs needed for board certification are conducted at university hospitals or other, large hospitals, which may affect health care system in rural areas. Japan Medical Association (JMA) and Council of four hospital organization emphasizes the importance that the new system does not accelerate maldistribution of physicians, while respects professional autonomy and divers ways of working among physicians.

4.2.5 Other health workers' career paths

Nurses

The majority of midwives, nurses and assistant nurses were working in hospitals in 2016: 22 707 midwives (63.5%), 829 488 nurses (72.2%), and 130 859 assistant nurses (40.5%). More than half of all public health nurses, 28 509 (55.6%), were working for the municipal government (Ministry of Health, Labour and Welfare, 2016m).

There are several types of credentialing systems. JNA established nursing credentials in the 1990s; 1. Certified Nurse Specialist (CNS), 2. Certified Nurse (CN) and 3. Certified Nurse Administrator (CNA) (Table 4.4).

Other than CNS, CN and CNA, debate on newly creating Nurse Practitioner is also on the way. The series of review meetings to discuss the scope of work of nurse practitioner were held in 2010. The review recommended a trial of activities of nurse pertaining for Specified Medical Act who would perform specific medical interventions including relatively invasive medical interventions (Ministry of Health, Labour and Welfare, 2010b, 2017m). Based on this decision, the MHLW conducted a pilot training programme starting in April 2011 followed by a trial project to collect example data between 2011 and 2013. In 2015, a formal training system for nurses to perform specific medical intervention was established, allowing nurses who completed designated training to perform 38 specific medical interventions in 21 categories including temporary medicine administration and several device management (Ministry of Health, Labour and Welfare, 2017m). This new system of nurse practitioner is now expected to be an effective way to promote task-shifting from physicians to other health-care professionals so as to enhance an effectiveness of health-care procedures as well as to mitigate high working burden of health-care professionals.

Table 4.4 Credentialing System by Japanese Nursing Association

| Title | Total Number | Roles | Entry requirement | Field |
|-------------------------------|---------------------------|--|--|--|
| Certified Nurse Specialist | 1883 (as of Dec. 2016) | 1. Excellent nursing practice, 2. Consultation with care providers, 3. Coordination among the concerned parties, 4. Ethical coordination to protect the rights of individuals, 5. Education to improve nursing care, and 6. Research to develop and explore nursing skills and knowledge | Nurses with licensure and at least 5-year practice experience go to master's degree course for CNS, followed by certification examination | 11 (cancer, Child Health, Chronic care, Community Health, Critical care, Family Health, Gerontological, Home care, Infection control, Psychiatric Mental Health, and Women's health) |
| Certified Nurse | 19 728 (as of July. 2017) | 1. Nursing practice at high level, 2. Instruction of nurses, and 3. Consultation with nurses | Nurses with licensure and at least 5-year practice experience go to designated training course with over 615 hours (6-month) followed by certification examination | 21 (Breast Cancer, Cancer Chemotherapy, Cancer Pain Management, Chronic Heart Failure, Chronic Respiratory, Dementia, Diabetes, Dialysis, Dysphagia, Emergency, Infection Control, Infertility, Intensive Care, Neonatal Intensive Care, Palliative Care, Paediatric Emergency, Perioperative, Radiation Therapy, Stroke Rehabilitation, Visiting, Wound, Ostomy and Continence) |
| Certified Nurse Administrator | 3328 (as of July 2017) | Contributes to health and medical welfare by providing high quality systematic nursing services to individuals, family members and local residents with diverse health care needs. | Nurses with licensure and at least 5-year practice experience have mixture of training and administrating experience followed by certification examination | - |

Note: all certifications are required to renew every five years.

Source: Japanese Nursing Association, 2017

Dentists

As of 2012, the number of dentists working in medical facilities was 99 659 (97.2% of the total number of licenced dentists), which was an increase of 0.9% over the previous count. Of those working in medical facilities, 87 112 were working in clinics, 9656 in teaching hospitals, and 2891 in other hospitals. The proportion working in clinics has shown a continuously increasing trend over the past few years. The largest age groups in each setting are those aged 29 years or younger in teaching hospitals, those aged 30–39 years in other hospitals, and 50–59 years in clinics. The mean age is 35.3 years in teaching hospitals, 42.2 years in other hospitals and 51.6 years in clinics.

Pharmacists

As of 2012, there were 153 012 pharmacists (54.6%) working in pharmacies, 52 704 (18.8%) in hospitals and clinics, 5249 (1.9%) in universities, 45 112 (16.1%) in pharmaceutical companies, 6443 (2.3%) in public health administration, and 17 517 (6.3%) for other employers. Although there were almost an equal number of pharmacists working in pharmacies and in hospitals/clinics in 1990, the number working in pharmacies has increased, whereas the number working in hospitals and clinics has tended to remain stable since 1996.

4.2.6 Dual practice

According to the National Public Service Act of 1947 and Local Public Service Act of 1950, civil officials may not act as executives or advisers for commercial companies, or run any commercial company. Subsidiary businesses may, however, be allowed if specific permission is sought and approved. If permission is obtained, health-care practitioners in Japan are permitted to work privately either within or outside their public sector workplace, and either outside or within their scheduled public sector hours of work (García-Prado A et al., 2011). The Act sets out that the business should not have links to the government-related department and should not cause a conflict of interest in carrying out official duties. Executives (administrative director, administration officers and supervisors) and heads of hospitals, whose official responsibilities are considered very important, are not permitted to run any commercial companies. This is the entire extent of allowable dual practice in Japan.

5 Provision of services

Chapter summary

The current health-care service delivery system was established just after the Second World War, in parallel with the universal health insurance system. In this system, the predominant focus was the control of communicable diseases, and maternal and child health care; the municipal government, public health nurses and local health volunteers played a major role in service delivery.

In the 1960s, Japan experienced a rapid decrease in the incidence of tuberculosis and, at the same time, an increased mortality resulting from stroke. This was a key motivation for the Central Government to strengthen health promotion activities to prevent and control noncommunicable diseases (NCDs). NCDs remains a leading cause of death in Japan and under the Medical Care Act of 1948, each prefectural government is required to create a “Medical Care Plan” that enables everyone to have quality access to prevention and treatment for cancer, stroke, cardiovascular diseases, diabetes mellitus and mental health diseases. Moreover, under the Health Promotion Act of 2002, each prefecture is also required to create a “Health Promotion Plan” in accordance with local circumstances.

Japan’s population is ageing rapidly, largely due to a long life-expectancy and low birth rate. Mitigating the effects of population ageing requires a sustainable approach to long-term care systems for the elderly. The proportion of older people (age 65 years or older) in the total population was 27.3% in 2016, and it is expected that this proportion will reach 39.4% in 2055. As a result of the post-War baby boom, the population of those aged 75 years and older is expected to reach its peak in 2025. In response to the challenges posed by a rapidly ageing population, the Japanese Government introduced the LTCI system in 2000 and the Integrated Community Care system (ICCS) in 2006, both aim to create by 2025 an environment in which the elderly can live with dignity with sufficient social support. These policies remain the central tenet of the Japanese long-term care strategy. Both health care and long-term care are

provided mostly through privately-owned facilities; however, municipal governments retain the authority over the overall provision and financing of these services based on the oversight of the Central Government.

5.1 Public health

Public health activities in Japan are governed by the Community Health Act, which was passed in 1947 (Government of Japan, 1947a). This Act sets out the responsibilities of municipalities, prefectures and the national government in protecting public health. It describes organizations responsible for delivering public health services, and aims to better manage public health as Japan comes to the final stage of its demographic transition.

5.1.1 Communicable disease control functions

In 1997, the Infectious Disease Surveillance Center (IDSC) was established under the National Institute of Infectious Diseases (NIID) (National Institute of Infectious Diseases, 2017). The IDSC is responsible for surveillance of all targeted infectious diseases, which are divided into five categories according to urgency of notification and severity. Based on the *Infectious Disease Control Law* enacted in 1995, the IDSC conducts nationwide surveillance of infectious diseases by collecting reports on the detection of infectious agents from prefectural public health institutions. The Center also collects reports on incidents of infectious diseases from sentinel clinics and hospitals across Japan. This information is publicly reported on a weekly or monthly basis.

Target diseases of the Infectious Diseases Control Law

The five categories of infectious diseases, defined in terms of both urgency of notification and severity, are listed below (as of February 2017) (Ministry of Health, Labour and Welfare, 2017q).

Category I (all cases to be notified promptly after diagnosis): Crimean–Congo haemorrhagic fever; Ebola haemorrhagic fever; Lassa fever; Marburg disease; Plague; South American haemorrhagic fever; and smallpox

Category II (all cases to be notified promptly after diagnosis): acute poliomyelitis; tuberculosis; diphtheria; severe acute respiratory syndrome (SARS); Middle East respiratory syndrome (MERS); avian influenza (H5N1, H7N9)

Category III (all cases to be notified promptly after diagnosis): cholera; shigellosis; enterohaemorrhagic *Escherichia coli* infection; typhoid fever; and paratyphoid fever

Category IV (all cases to be notified promptly after diagnosis): anthrax; avian influenza virus infection (except H5N1, H7N9); botulism; brucellosis; chikungunya fever; coccidioidomycosis; dengue fever; echinococcosis; Eastern equine encephalitis; epidemic typhus; hantavirus pulmonary syndrome; haemorrhagic fever with renal syndrome; glanders (*Burkholderia mallei*); *Handra virus* disease; hepatitis A; hepatitis E virus infection; Japanese encephalitis; Japanese spotted fever; Kyasanur forest disease; melioidosis (*Burkholderia pseudomallei*); legionellosis; leptospirosis; lyme disease; lyssavirus infection (excluding rabies); malaria; monkeypox; *Nipah virus* infection; Omsk haemorrhagic fever; psittacosis; Q fever; rabies; relapsing fever; Rift Valley fever; Rocky Mountain spotted fever; scrub typhus (tsutsugamushi disease); severe fever with thrombocytopenia syndrome (SFTS); tick-borne encephalitis; tularaemia; Venezuelan equine encephalitis; Western equine encephalitis; West Nile fever (including West Nile encephalitis); yellow fever; *Zika virus* disease.

Category V

- a. Diseases to be notified by all physicians within 7 days of diagnosis (rubella and invasive meningococcal disease are exceptions and are required to be reported promptly after diagnosis)

Acquired immunodeficiency syndrome; amoebiasis; acute encephalitis (excluding encephalitis listed in category IV); carbapenem-resistant *Enterobacteriaceae* (CRE); chickenpox (limited to hospitalized cases); congenital rubella syndrome; Creutzfeldt–Jakob disease; cryptosporidiosis; disseminated cryptococcal disease; giardiasis; invasive *Haemophilus influenzae* disease; invasive meningococcal disease; invasive pneumococcal disease (IPD); measles; rubella; multiple drug-resistant *Acinetobacter* (MDRA); severe invasive streptococcal infections (streptococcal toxic shock-like syndrome); syphilis; tetanus; vancomycin-resistant *Enterococcus* infection; vancomycin-resistant *Staphylococcus aureus* infection; viral hepatitis (excluding hepatitis A and E)

- b. Diseases to be reported by sentinel clinics and hospitals
- Influenza sentinel: influenza (excluding avian influenza virus infection)

- Paediatric disease sentinel: chickenpox; erythema infectiosum; exanthem subitum; Group A streptococcal pharyngitis; hand, foot and mouth disease; herpangina; infectious gastroenteritis; mumps; pertussis; pharyngoconjunctival fever; respiratory syncytial virus infection
- Eye disease sentinel: acute haemorrhagic conjunctivitis; epidemic keratoconjunctivitis
- Sexually transmitted disease (STD) sentinel: condyloma acuminatum; genital chlamydial infection; genital herpes; gonorrhoea
- Hospital sentinel: aseptic meningitis; bacterial meningitis; chlamydial pneumonia (excluding psittacosis); infectious gastroenteritis (limited to rotavirus); mycoplasmal pneumonia; methicillin-resistant *Staphylococcus aureus* infection; multi-drug-resistant *Pseudomonas aeruginosa* infection; penicillin-resistant *Streptococcus pneumoniae* infection.

Food safety

Physicians are required by the *Food Sanitation Act* to report suspicious food poisoning cases to a local health centre (or any other equivalent institutions). Staff from local health centres then conduct interviews with patients and/or audit facilities that are suspected to be linked to cases of food poisoning. Based on the report from local health centre staff, the local government or health centre takes measures to prevent the further spread of food poisoning.

The International Health Regulations (IHR) set by WHO are an international legal instrument that is binding on 196 WHO member states and aims to help the international community prevent and respond to acute public health risks including food poisoning. According to the IHR, once the MHLW identifies an event of food poisoning, it must assess the public health risks of the events within 48 hours. If the event is determined to be notifiable under the IHR, then the MHLW must report the information to the WHO within 24 hours.

5.1.2 Environmental disease control functions

In the 1960–70s, Japan experienced several environmental pollution-related diseases outbreaks, including Minamata disease (methyl mercury poisoning), Itai-itai disease (cadmium poisoning) and Yokkaichi asthma (Table 5.1). In the process of addressing these environmental diseases

outbreaks, the Government of Japan created several countermeasures against future environmental diseases incidents.

Table 5.1 List of major environmental diseases in Japan

| Name of disease | Symptoms | Cause of disease | Health and economic consequences |
|-------------------|------------------------------|----------------------|---|
| Yokkaichi asthma | Severe Asthma | Industrial pollution | 1140 patients (estimate) |
| Itai-itai disease | Chronic Cadmium poisoning | Cadmium | 200 persons are legally designated as victims |
| Minamata disease | Organic Mercury intoxication | Methylmercury | 3000 patients (estimate) |

Source: Compiled by the authors based on (Ministry of the Environment, 2012; Yokkaichi city, 2006)

Notably, an environmental agency was established in 1971 in response to these disasters; this agency was later expanded to the Ministry of the Environment in 2001. The overall history of pollution countermeasures is listed in Table 5.2.

Table 5.2 History of pollution countermeasures

| | |
|---------------|--|
| 1960s | <ul style="list-style-type: none"> • Basic Law for Environmental Pollution Control (1967) • Air Pollution Control Act (1968) |
| 1970s | <ul style="list-style-type: none"> • Water Pollution Prevention Act (1970) • Establishment of Environmental Agency (1971) |
| 1980s - 1990s | <ul style="list-style-type: none"> • Law Concerning Special Measures for the Conservation of Lake Water Quality (1984) • Automobile NOx Law (1992) • Environment Basic Law (1993) |
| 2000s - | <ul style="list-style-type: none"> • Inauguration of the Ministry of the Environment (2001) • Automobile NOx PM Control Law (2001) |

Note: Air Pollution Control Act, Water Pollution Prevention Act and Law Concerning Special Measures for the Conservation of Lake Water Quality have been amended many times.

Source: Compiled by the authors.

Fukushima Daiichi Nuclear Power Plant Accident in 2011

The devastating magnitude 9.0 Great East Japan Earthquake and Tsunami struck north-eastern Japan on March 11, 2011, followed by the Fukushima Daiichi Nuclear Power Plant Accident. Several countermeasures were undertaken by Fukushima prefecture and the Japanese government including radiation protection of workers (decontamination process and removal of debris), water and food safety (radiation monitoring), and health check-ups for people living in Fukushima prefecture (including thyroid cancer screening). As of November 2017, there are some restrictions for entering or living in 12 municipalities in Fukushima, and 54 579 people are still evacuated (Fukushima Prefectural Government, 2017).

Following the accident, health threats have arisen in radiation-contaminated areas (particularly Fukushima Prefecture), and cumulative dose from external and internal radiation exposure remains a major public concern (Brumfiel G et al., 2011). Contrary to the concern, dosage levels attributed to the Fukushima incident have been low due to the natural weathering process and the success of contaminated food control (Hayano RS et al., 2013; Tsubokura M et al., 2012; Tsubokura M et al., 2015; Tsubokura M et al., 2014). The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and WHO have concluded that the predicted risk of lifetime cancer is very low in the general population with the exception of the most exposed infants and children in Fukushima. In these most exposed individuals, thyroid cancer cases exceeding the norm were estimated by model calculations, although this remains difficult to verify in practice because thyroid cancer is a rare disease (United Nations, Scientific Committee on the Effects of Atomic Radiation Annex A, 2014; World Health Organization, 2013).

Since the Fukushima accident, the central government has been regularly measuring radioactive contamination levels in farm and marine products. Simultaneously, the government set safety standards for radioactive cesium in food in April 2012: the upper limit for radioactive cesium in general food products is 100 becquerels per kilogram, which is more than 10 times stricter than the European Union standard. According to the agriculture ministry, 329 833 food items were inspected in fiscal year 2016, and 99.8% of farm products had cesium of less than 25 becquerels per kilogram (Ministry of Agriculture, Forestry and Fisheries, 2017). The tests showed that 450 items, or 0.2% of the total, had cesium exceeding

the upper limit, all of which were wild mushrooms, game meat, and freshwater fish, so-called ‘hard-to-control items.’

In contrast to the likely low risk of radiation-related health consequences, non-radiological, year-long health effects after the accident have been reported, including elevated markers of metabolic risk, increased prevalence of diabetes and hyperlipidaemia, and increased prevalence of psychological distress (Nomura S et al., 2016; Satoh H et al., 2015; Yabe H et al., 2014).

5.1.3 Surveillance of population health and well-being

The MHLW conducts several surveys related to health care and long-term care. Table 5.3 show the comprehensive list of surveys done by the MHLW (the MHLW also conducts surveys related to labour and welfare, which are not included in this table).

Table 5.3 List of statistical surveys conducted by the MHLW

| Responsible Division | Title of Statistical Survey |
|---|---|
| Director-General for Statistics and Information Policy | |
| Examination and Analysis Office | Survey on Input-Output Structure |
| Vital, Health and Social Statistics Office | Vital Statistics |
| | Report of Vital Statistics; Occupational and Industrial Aspects |
| | Life Tables |
| | Specified Report of Vital Statistics |
| | Report on Public Health Administration and Services |
| | Report on Regional Public Health Services and Health Promotion Services |
| | Report on Social Welfare Administration and Services |
| Health Statistics Office | Patient Survey |
| | Patient’s Behaviour Survey |
| | Survey of Medical Institutions |
| | Hospital Report |
| | Survey of Physicians, Dentists and Pharmacists |
| | Estimates of National Medical Care Expenditure |
| Social Statistics Office | Survey of Social Welfare Institutions |
| | Survey of Institutions and Establishments for Long-term Care |
| | Statistics of Medical Care Activities in Public Health Insurance |
| | Survey of Long-term Care Benefit Expenditures |

Table 5.3 List of statistical surveys conducted by the MHLW (Con't.)

| Responsible Division | Title of Statistical Survey |
|--|--|
| Household Statistics Office | Longitudinal Survey of Newborns in the 21st Century (2001 Cohort) |
| | Longitudinal Survey of Newborns in the 21st Century (2010 Cohort) |
| | Longitudinal Survey of Adults in the 21st Century (2002 Cohort) |
| | Longitudinal Survey of Adults in the 21st Century (2012 Cohort) |
| | Special Report on the Longitudinal Survey of Newborns in the 21 st Century and the Longitudinal Survey of Adults in the 21 st Century: Ten-Year Follow-up, 2001–2011 |
| | Longitudinal Survey of Middle aged and Elderly Persons |
| | Comprehensive Survey of Living Conditions |
| Health Policy Bureau | |
| Regional Medical Care Planning Division | Survey on No-doctor districts |
| | Japan Nosocomial Infections Surveillance |
| Dental Health Division | Survey of Dental Diseases |
| | Survey on No-Dentist Districts |
| Nursing Division | Survey on Admissions into Nurse Schools and Work Statuses of Graduates |
| Economic Affairs Division | Statistics of Production by Pharmaceutical Industry |
| | Statistics on Pharmaceutical and Medical Device Industry |
| | Drug Price Survey |
| | Price Survey on Special Treatment Materials |
| Health Service Bureau | |
| General Affairs Division | Fact-Findings Survey on Atomic Bomb Victims |
| Health Service Division | National Health and Nutrition Survey |
| | Survey on Public Health Nurses' Activity |
| Pharmaceutical Safety and Environmental Health Bureau | |
| Inspection and Safety Division | Meat Inspection and Other Information Return Survey |
| Equal Employment, Children and Families Bureau | |
| General Affairs Division | Survey on Children in Children's nursing home's |
| | Nationwide Survey on Fatherless Families |
| | Nationwide Survey on Families and Children |
| | National Nutrition Survey on Preschool Children |
| | National Growth Survey on Preschool Children |
| | Survey of Regional Child Welfare Services |
| Social Welfare and War Victims' Relief Bureau | |
| General Affairs Division | Current Status Survey on Welfare Offices |

Table 5.3 List of statistical surveys conducted by the MHLW (Con't.)

| Responsible Division | Title of Statistical Survey |
|--|--|
| Public Assistance Division | Survey on Living by Social Security |
| | National Survey on Public Assistance Recipients |
| | Fact-finding Survey on Medical Assistance |
| | Survey on Mother-Children Households that Receive Public Assistance |
| | Survey of Lifestyle Value and Actual Living Conditions |
| Community Welfare and services division | Survey on the Actual Status of Consumers' Cooperative Societies |
| | National Survey on the Actual Conditions of the Homeless |
| Policy planning division, department of health and welfare for persons with disabilities | Survey on Persons with Physical Disability |
| | Survey on Persons with Intellectual Disability |
| Welfare Division for Persons with Disabilities | Fact-finding Survey on Economic Conditions of Welfare Services for Persons with Disability |
| | Survey on Working Conditions of Social Worker for Persons with Disability |
| | Report on Benefits Project of Independence Support for Persons with Disability |
| Mental health and disability health division | Survey on the Situation of Certification for Classification of Degree of Disability |
| Health and Welfare Bureau for the Elderly | |
| Division of the Health for the elderly | Fact-finding Survey on Economic Conditions in Long-term Care (LTC) |
| | Briefing Survey on Economic Conditions in Long-Term Care |
| | Fact finding Survey on Long-Term Care for the Elderly |
| | Survey on Working Conditions of Long-Term Care Workers |
| | Fact-finding Survey on Project of Long-Term Care |
| Health Insurance Bureau | |
| Medical Economics Division, Actual Research Division | Survey on Economic Conditions in Health Care (Survey on Health Care Facilities) |
| Medical economics division | Survey on Charge for Dental Technique |
| | Survey on Usage of Insurance-Covered Medical Materials |
| | Survey on Home-Visit Nursing Care-Expenses |
| | Survey for Evaluation of Dentistry Medical Fee |
| | Survey for Evaluation of Dentistry Medical fee for Dentistry Repair Technique |
| Actual research division | Survey on the Trend of Medical Care Expenditures |
| Director-General for General Policy and Evaluation | |
| Counsellor Office for policy evaluation | Survey on the Redistribution of Income |
| | Survey for Planning Social Insurance System |
| The National Institute of Population and Social Security Research | |
| The National Survey on Migration | |

Table 5.3 List of statistical surveys conducted by the MHLW (Con't.)

| Responsible Division | Title of Statistical Survey |
|--|-----------------------------|
| The National Fertility Survey | |
| The National Survey on Family | |
| The National Survey on Household Changes | |
| The National Survey on Social Security and People's Life | |

Source: Ministry of Health, Labour and Welfare, 2018b

The National Health and Nutrition Survey

The National Health and Nutrition Survey is conducted every year, based on the Health Promotion Act, 2002 (Government of Japan, 2002). The aim of the survey is to ascertain the actual state of health, food intake, nutritional intake, and lifestyles of the Japanese people. The survey provides data on the prevalence of lifestyle-related diseases, physical activity and exercise, dietary habits, smoking habits, obesity and underweight, and energy/vegetable intake (data as of 2016) (Ministry of Health, Labour and Welfare, 2016o).

The participants are household members aged 1 year and over who live in the survey district. In 2016, there were 462 survey districts and 24 187 total households within all districts.

Here are key findings from the 2016 survey.

1. The number of “persons in whom diabetes is strongly suspected (HbA1c \geq 6.5 or currently under treatment)” and the number of suspected (as yet undiagnosed) cases (6.0 \leq HbA1c<6.5) were 10 million each. Suspected cases started increasing in 1997 and began to decrease in 2007.
2. There was significant variation among the 47 prefectures in terms of status regarding physical condition, diet and lifestyle. The highest quintile and the lowest quintile among prefectures had a BMI difference of 0.9 for males and 1.2 for females while the difference in vegetable intake was 59g/day in males and 60g/day in females.
3. The passive smoking rate remains high at 42.2% in restaurants and bars, followed by 34.3% in entertainment venues, 30.9% in the workplace, and 30.5% on the street.

Comprehensive Survey of Living Conditions

The Comprehensive Survey of Living Conditions is conducted every year. The purpose of this survey is to investigate people's living conditions,

including health, medical care, welfare, pension and income (Ministry of Health, Labour and Welfare, 2016d). This survey started in 1986 having integrated four series of survey undertaken previously: Comprehensive survey on welfare administration (1953-1985); National health survey (1953-1985); General survey on living conditions (1962-1985); and Public health survey (1963-1985). Since then, a large-scale survey has been conducted every third year while a small-scale survey has been conducted during each interim year. The survey consists of five questionnaires: household questionnaire, health questionnaire, long-term care questionnaire, income questionnaire and savings questionnaire.

For the largescale survey, the following sampling was done:

- Household questionnaire and health questionnaire: whole households (about 290 000 households) and household members (approximately 710 000 persons) in Japan who were sampled in 5410 districts randomly selected from the National Census in 2010.
- Long-term care questionnaire: persons requiring care under LTCI (approximately 8000 persons) in 2446 districts from the above 5410 districts in 2010.
- Income questionnaire and savings questionnaire: whole households (about 30 000 households) and household members (approximately 80 000 persons) in 1963 districts from the above 5410 districts above.

As to the small-scale survey, household questionnaires covered whole households (about 59 000 households) and household members (approximately 140 000 persons) that were randomly sampled in 1106 districts from the National Census in 2010. Income questionnaire covered whole households (approximately 9000 households) and household members (approximately 23 000 persons) in 500 districts from the former 1106 districts. The latest small-scale survey was conducted in 2015.

All statistics below are from the large-scale survey conducted in 2016⁴ (Ministry of Health, Labour and Welfare, 2016d).

1. Subjective symptoms

The proportion of people with subjective symptoms (complainant ratio) was 305.9 per 1000 population. The ratio for women (337.3) was higher than that for men (271.9). The ratio was lowest for those aged

4 Excluded data from Kumamoto prefecture because of huge earthquake happened in April, 2016

10–19 years (166.5). The number rose with age group, reaching 520.2 for those aged 80 years and above. Among men, lower back pain had the highest complainant ratio, followed by shoulder stiffness and cough or sputum. Among women, shoulder stiffness had the highest complainant ratio, followed by lower back pain and joint pains in the hands and feet.

2. Health-care utilization

The proportion of people receiving health-care services was 390.2 per 1000 population. The figure for women (406.43) was higher than that for men (372.5). It was lowest for those aged 10–19 years (141.1). A higher proportion was associated with higher age, reaching 730.3 for those aged 80 years and above. Among male respondents, high blood pressure had the highest outpatient ratio, followed by diabetes and dental diseases. Among women, high blood pressure had the highest outpatient ratio, followed by ophthalmological disease and dental diseases.

3. Attendance for health check-ups and medical check-ups

Overall, 72.0% of men and 63.1% of women respondents aged 20 years or above reported attending a health check-up, with the highest proportion of attendances seen in 50–59 year-old men (79.9%), and 50–59 year-old women (71.0%).

Patient Survey

The patient survey is conducted once every three years. The purpose of this survey is to obtain basic data for health policy by identifying the situation of patients who use hospitals and clinics including their attributes, condition at the time of visit or admission, diagnosis, and an estimate of the number of patients in Japan by region (Ministry of Health, Labour and Welfare, 2017n). In the latest survey, investigators selected 6402 inpatient hospitals, 3363 outpatient hospitals, 5893 general clinics, and 1278 dental clinics (the survey was conducted at hospitals on one designated date set for each hospital from three days during 21st – 23rd October 2014, and at clinics on one designated date set for each clinic from 21st, 22nd and 24th October 2014).

1. Estimated number of patients (per day) by sex and age

Table 5.4 Estimated number of patients per day by sex and age (unit: thousands person)

| Inpatient (total 1318.8) | | Outpatient (total 7238.4) | |
|--------------------------|-------|---------------------------|--------|
| By sex | | | |
| Male | 603.8 | male | 3131.0 |
| Female | 715.1 | female | 4107.3 |
| By age | | | |
| ≤65 | 937.3 | ≤65 | 3510.2 |
| ≤75 | 669.4 | ≤75 | 1895.1 |

Source: Ministry of Health, Labour and Welfare, 2014b

The estimated number of patients per day who received medical treatment in Japan was 1 318 800 inpatients and 7 238 400 outpatients. Of the inpatients, 603 800 were men and 715 100 inpatients were women; 937 300 inpatients were 65 years or older and among them, 669 400 inpatients were 75 years or older. Among outpatients, 1 641 900 patients visited hospitals, 4 233 000 visited general clinics, and 1 363 400 visited dental clinics. Among them, 3 131 000 patients were men and 4 107 300 patients were women. 3 510 200 patients were 65 years or older, and 1 895 100 were 75 years or older.

2. Estimated number of patients (per day) by disease and injury

Table 5.5 Estimated number of patients by diseases and injury (unit: thousands person)

| Inpatient | | | Outpatient | | |
|-----------|------------------------------------|-------|------------|--|--------|
| 1 | Mental and behavioural disorders | 265.5 | 1 | Diseases of the digestive system | 1310.0 |
| 2 | Diseases of the circulatory system | 240.1 | 2 | Diseases of the circulatory system | 933.0 |
| 3 | Neoplasms | 144.9 | 3 | Diseases of the musculoskeletal system and connective tissue | 877.8 |

Source: Ministry of Health, Labour and Welfare, 2014b

The major diseases requiring hospitalization included mental and behavioural disorders (265 500 inpatients), diseases of the circulatory system (240 100), and neoplasms (144 900).

The major diseases requiring outpatient care included diseases of the digestive system (1 310 000), diseases of the circulatory system (933 000), and diseases of the musculoskeletal system and connective tissue (877 800).

3. Home medical care

The estimated number of outpatients who received home medical care on the date of survey was 156 400. 34 000 received “on-call” visits (emergency visit), 114 800 received “home visit consultations” (scheduled visits), and 7600 received “home visit by person other than physicians or dentists”.

Vital statistics

Japan has a comprehensive vital registration system, with 99.9% of deaths recorded in this system. Recording of vital statistics started in AD 646 in Japan as part of the family registry history. Under the *Family Registration Law* in 1898, a modern family registration system was introduced in Japan in 1899. The purpose of vital statistics is to collect vital events and obtain a basic data source for the population and policy-making on health, labour and welfare. Subjects of the survey are the total events of live births, deaths, marriages, divorces, and foetal deaths notified. Municipal government heads fill in Vital Statistics Survey Forms based on notifications of live births, deaths, marriages, divorces, and foetal deaths. Detailed numbers are shown in Chapter 1.

5.1.4 Occupational health

Under the Industrial Safety and Health Act in 1972, employers who employ 50 or more workers are required to contract an industrial physician (Government of Japan, 1972; Ministry of Health, Labour and Welfare, 2015a). Industrial physicians are responsible for maintaining the health of all workers and must conduct an on-site inspection of the working conditions to make sure that they are safe and healthy. Industrial physicians are charged with offering professional opinions to employers and managers with regard to safety and health maintenance of the workers.

In general, all employees, regardless of the type of industry, are required to conduct regular health check-ups once a year for their employees. For workers working under special conditions (mainly under hazardous

conditions), additional examinations must be carried out during the health check-ups.

There were 972 deaths due to work-related accidents in 2015, and 116 311 workers left their work for more than 4 days due to work-related accidents in 2015 (Ministry of Health, Labour and Welfare, 2016l). According to the Labour Standard Act in 1947, employers are held responsible for any financial damage caused by work-related accidents (Government of Japan, 1947b). To guarantee financial liability, the MHLW operates the Workers' Accident Compensation Insurance, with insurance premiums paid wholly by employers. This not only covers the medical costs of treatment for diseases and injuries but also pays monetary damages for lost wages and disabilities, plus an annuity for bereaved family members.

Long working hours and mental health of workers are now of great concern. Japan is well known for having long working hours; it has been calculated that the annual average working hours in Japan was 2018 hours in 2013. "Karoshi" or death from overwork is now of great concern. In 2013, 306 cases of cardiac or cerebrovascular disease and 436 cases of mental illness were recognized as being caused by over-work. There were a total of 27 283 suicides that occurred in Japan, of which 2323 were attributed to working conditions (Ministry of Health, Labour and Welfare, 2013e). The survey on state of employees' health of 2012 revealed that 60.9% of employees reported work-related stress. A new program called the Stress Check Program was newly introduced in 2015 to reduce worker stress, that mandates that all workplaces with 50 or more employees conduct a stress survey of individual workers every year and a physician interview to those with high stress.

By responding to concerns about "karoshi," there are now ongoing debates regarding working conditions of health care professionals (karoshi is also seen among physicians). In 2016, the MHLW established a committee for the working environment of health care professionals, considering the dramatically changing demography and health care systems in Japan. The committee proposed the importance of flexibility of working style, optimal allocation of health care resources at the local level, maximum use of health-care technologies, and task-shifting from physicians to other health care professionals (Ministry of Health, Labour and Welfare, 2017p). Based on these recommendations, the MHLW further established a new committee on reform of working environment

for physicians in 2017 and has been debating concrete measures to promote the aforementioned recommendations.

5.1.5 Preventive services

Immunization programmes

Under the Immunization Act, immunization services for 12 diseases started in 1948 and the vaccine schedule was periodically revised until recently. Japan now maintains a childhood vaccination programme that is broadly consistent with the WHO-recommended vaccination schedule (Government of Japan, 1948a). Key elements of Japan's vaccination schedule are listed below (as of February 2017).

(i) Routine immunization

- Live vaccine: bacilli Calmette-Guerin (BCG), measles-rubella (MR), Varicella
- Inactivated vaccine: Hepatitis B, DPT-IPV (diphtheria-tetanus-pertussis and inactivated polio vaccine), Japanese encephalitis, pneumococcal, *Haemophilus influenzae* type b (Hib), human papillomavirus (HPV)

(ii) Non-routine immunization

- Live vaccine: mumps, rotavirus
- Inactivated vaccine: hepatitis A virus, influenza (for the elderly), meningococcus

During the long history of the Japanese vaccination system, vaccine-induced side effect started to be of concern in 1976, and several class action law suits have been taken against the Central and local government since then.

The fear of vaccine-induced side-effects still exist. Despite the inclusion of the measles vaccination in the routine vaccination schedule, some parents still do not vaccinate their children; sporadic outbreaks of measles were observed among college students in 2006 due to weakened herd immunity. To strengthen herd immunity, the combined MMR vaccine was introduced in 2006, and 5-7-year-old children began to receive a second booster vaccination. Efforts have been made to eradicate measles, including supplementary vaccination. Japan was verified as measles-free in 2015 by the WHO Western Pacific Region. Although 159 patients were

diagnosed with measles in 2016, this outbreak was caused by imported cases, Japan retained measles-free status.

Japan is now also experiencing an ongoing outbreak of rubella due to weakened herd immunity (possibly among adult males who were not vaccinated during childhood) and also facing controversy over decision-making regarding the HPV vaccine and the handling of adverse events (Centers for Disease Control Prevention, 2013; Gilmour S et al., 2013). The HPV vaccine has been widely recognized as the most effective measure for preventing cervical cancer, but several adolescents and their family members in Japan have insisted that they experienced neurological symptoms after receiving the HPV vaccination. Although the MHLW and experts concluded that there was no clear association between HPV vaccination and neurological symptoms, the MHLW removed the HPV vaccine from the routine immunization schedule, so the vaccination rate sharply decline from 70% to 1%.

Other challenges are inadequate surveillance system for vaccination rate (vaccination data is collected through municipal government and it largely depends on their data surveillance capacities), increasing number of children who are not vaccinated based on recommended schedule, and disparities of vaccination rate among children exaggerated by socio-economic status of their parents. Improvements in planning, management and oversight of the vaccination programme based on scientific evidence as well as R&D capacity building for developing new vaccinations are required for Japan to properly counter these preventable infectious diseases.

5.1.6 Health promotion and education

The Health Promotion Act was enacted in 2002, which requires prefectural and municipal governments to develop health promotional plans, mandates the National Health and Nutritional Survey, and requires governments at all levels to monitor lifestyle-related diseases for effective health promotion (Ezoe S et al., 2017). The Act also sets out anti-smoking activities, including efforts to fight second-hand smoke exposure.

In response to the demographic and epidemiological transitions (from widely prevalent communicable diseases to chronic and lifestyle-related NCDs), under the Health Promotion Act, the MHLW promoted the “National Health Promotion Movement in the 21st century” (abbreviated

as “Health Japan 21”) as a goal-oriented health promotion measure for the prevention of lifestyle-related diseases (Sakurai H, 2003). “Health Japan 21” emphasizes the prolongation of healthy life expectancy without disabilities (Government of Japan, 2002). Japan faces a growing number of older people with disabilities, and this programme aims to ease the burden on care givers and ambulatory services by promoting healthy ageing. The second term of the National Health Promotion Programme 2013–2022 (Health Japan 21, the second term) is currently in place (Ministry of Health, Labour and Welfare, 2012f).

The fundamental goals are:

- to improve healthy life expectancy and reduce health inequalities,
- to prevent onset and progression of life-style related diseases (cancers, cardiovascular diseases, diabetes and chronic obstructive pulmonary disease),
- to maintain and improve functions necessary for a healthy social life,
- to establish a social environment in which individual health is protected and healthy behaviours are supported; and
- to improve life-style factors affecting health, such as nutrition, physical activity and other risk factors.

Prefectural governments are required by the Health Promotion Act to set targets within a national framework and ensure that these targets are easy for local residents to understand. They should also monitor municipal-level variations in health and lifestyle, while municipal governments should incorporate national and prefectural targets into local policy.

5.1.7 Tobacco control

As shown in Chapter 1, smoking prevalence has been steadily declining in Japan. According to the National Health and Nutritional Survey, smoking prevalence among men decreased from 47.4% in 2000 to 31.4% in 2015, and that for women from 11.5% in 2000 to 8.3% in 2015. The smoking prevalence for women in Japan is lower than that in most developed countries. This decline has been achieved through increases in taxation, implementation of smoking bans in public spaces and public buildings, and the gradual expansion of non-smoking areas in private businesses. However, Japan remains behind other nations in the implementation of measures as defined by the WHO’s Framework Convention on Tobacco Control (i.e., taxation, control measures for passive smoking, smoking

cessation program, bans for tobacco advertisements) (Yorifuji T et al., 2011). Looking ahead to the 2020 Tokyo Olympic and Paralympic Games, the MHLW tried to pass a law that would prohibit indoor smoking at restaurants and bars (size more than 30 mm²) in order to tackle passive smoking, but it failed due to strong opposition from the current ruling party, which is supported by the tobacco industry. Although Japan is ranked at the worst level in terms of tobacco control by the WHO, there has been no further movement toward legislation to prevent passive smoking except in the Tokyo Metropolitan area.

With respect to youth smoking, according to a survey of junior and senior high school students conducted by the government in 2004, smoking prevalence in the past one month was 21.7% in male and 9.7% in female 12th grade students. The prevalence has been decreasing; in 2014, it was 4.6% in male and 1.5% in female students (Ministry of Health, Labour and Welfare, 2015b).

5.1.8 National screening programmes for the whole or part of the population

There are three types of health check-ups targeting the general population in Japan; general health check-ups, specific health check-ups and specific health guidance (SHCSHG), and cancer screening.

General health check-up

All employers are required by the *Industry Safety and Health Act* to provide health check-ups to all employees at the time of contract as well as once every year (Government of Japan, 1972). A general health check-up includes: (1) past medical history and occupation, (2) subjective and objective symptoms, (3) height, weight, vision and hearing, (4) chest X-ray and sputum check, (5) blood pressure, (6) Anaemia (complete blood count), (7) liver function, (8) cholesterol, (9) diabetes mellitus, (10) urine analysis, and (11) ECG. In 2015, mental health check-ups were also made mandatory. All costs are paid by employers; individual workers do not need to pay for check-ups.

Specific health check-ups and specific health guidance (SHCSHG)

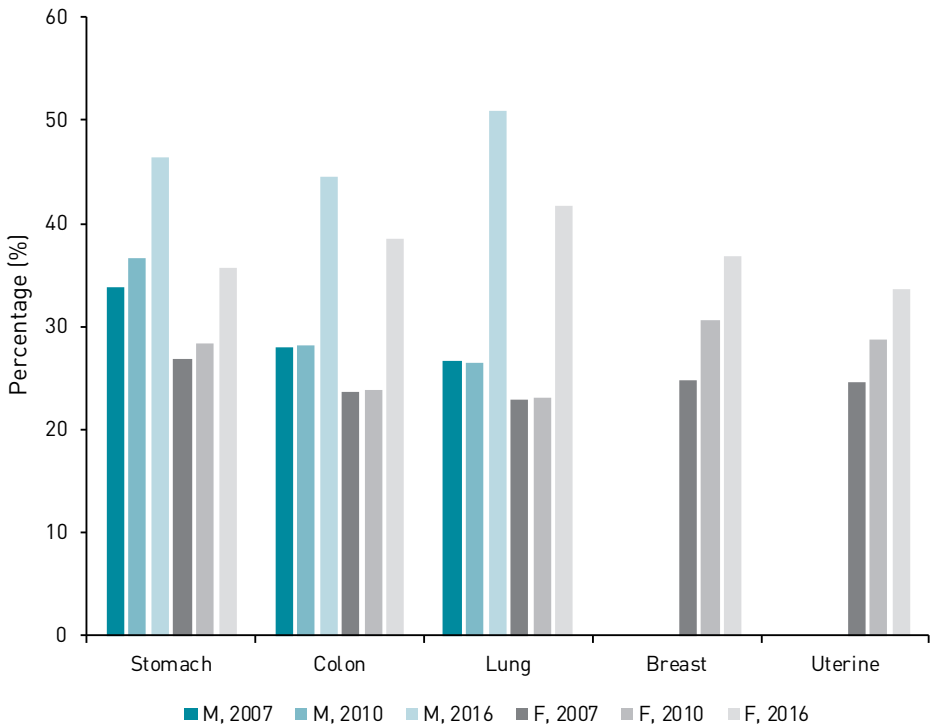
To tackle the increase in NCDs, the MHLW introduced a nation-wide screening programme called the “specific health check-ups and specific health guidance” (SHCSHG) in 2008 (Ministry of Health, Labour and Welfare, 2012a). Under this programme, all insurers are mandated by the “Act on assurance of medical care for the elderly” and the “National Health Insurance Act” to conduct SHCSHG for enrollees aged 40–74

years in addition to the general health check-up. The aim of SHGSHC is to prevent “metabolic syndrome,” a pre-clinical condition that leads to NCDs, including diabetes mellitus (Tsushita K et al., 2011). This programme expands on general health check-up programmes to include a wider range of items and, based on the results, specific health guidelines are offered to the participants identified as having risk factors for lifestyle-related diseases. All costs are covered by insurers; individuals do not need to pay for these check-ups.

Cancer screening

National government subsidization of screening for stomach and uterine cancer began in Japan in 1983, followed by screening for lung, colon and breast cancer. At that time, no other country provided publicly funded cancer screening. Although the rate is still low compared with other industrialized nations, screening rates for men rose to 45.8%, 41.4% and 47.5% for stomach, colon and lung cancer screening, respectively, in 2013 (National Cancer Center Japan, 2017; Tsuji I, 2009).

Fig. 5.1 Cancer screening rate, (Age 40–69)



Source: National Cancer Center Japan, 2017

5.1.9 Maternal and child health

The Maternal and Child Health Act, 1965 is the basis for maternal and child health services in Japan. Infant mortality in Japan used to be as high as 150–160 per 1000 live births until the early 20th century, but declined sharply to below 10 per 1000 live births in 1975. The infant mortality rate of 2.0 per 1000 live births in 2015 is one of the lowest even among developed countries (World Bank, 2018). The maternal mortality rate is also the lowest in the world, at 5 per 100 000 in 2015 (World Bank, 2018).

The Maternal and Child Health Act, 1965 entitles babies to free publicly funded preventive health services, including access to the *Maternal and Child Health Handbook* for parents before birth. Continued guidance and consultation with public health nurses are provided after birth, and publicly funded mass screening for congenital metabolic diseases are also included. Babies born to mothers living with the hepatitis B virus are given free immunoglobulin and vaccination. Additionally, newborns are entitled to well-baby check-ups three times within the first 3 years of life (3–4 months, 18 months, 3 years of age), provided at no cost by the municipal government. The first two of these examinations measures growth, nutritional status, oral health, possible physical and mental development problems, and vaccination history. At 3 years, ophthalmic and ear, nose and throat examinations are included in the check-up. Moreover, most municipalities provide free additional health check-ups for infants and children up to five times.

Recently, the number of child abuse has been increasing from 11 631 cases in 1999 to 88 931 in 2014 (including 69 death cases). As of April 2017, there are total of 210 child welfare office which are in charge of prevention and response to child abuse, and 136 child protection center where suspected abused children can stay away from their parents. In 2007, each municipal government was required to set up a regional council of countermeasures for children requiring aid consisting of relevant organizations, in order to early detect and respond potential child abuse cases. Although several countermeasures have been initiated by the MHLW, the number of child abuse case has still been increasing and further efforts are needed including capacity building for child welfare officer.

5.2 Patient pathways

In contrast to other OECD member countries such as the UK, the Japanese medical care system does not maintain a gate-keeping or waiting-list system through general practitioners. Instead, patients can choose either a clinic or a hospital as their first point of contact. Most hospitals have outpatient departments where patients regularly consult their physicians.

5.2.1 Example of a patient pathway in Japan

A patient with diabetes mellitus might be diagnosed through any of the following mechanisms:

- Being asymptomatic, the patient is diagnosed either through a general health check-up or a specific health check-up.
- The patient is identified as being diabetic while being treated for another condition in a hospital or a clinic.
- Owing to symptoms or a complication, the patient consults a doctor, either by presenting themselves to a private clinic-based physician or visiting a specialist of their choice at a hospital without referral.

When patients are diagnosed with diabetes mellitus, they are referred for management to a specialist. After initial management and stabilization of their condition by the specialist, the patient is referred back to their local clinic for follow-up. Follow-up may continue in the tertiary hospital specialist clinic, as the tertiary care hospital often functions as the first contact health-care provider for its area; patient may also be kept at tertiary care facilities if he/she has complications that require specialist care. The patient can also be referred back to the specialist clinic at any point by their local clinic if a complication develops or the patient requires a specialist's opinion.

Clinic-based physicians prescribe all the necessary medications and order any necessary tests that are covered by universal health insurance. If the diabetes worsens, the patient develops an acute complication such as ketoacidosis, or the patient is in need of inpatient care, the patient is admitted to any preferred hospital or is transferred after stabilization to a tertiary care hospital from a smaller hospital.

5.3 Primary/ambulatory care

5.3.1 Primary care

The Japanese health-care system does not necessarily distinguish between primary and secondary care and there is no gate-keeper system in Japan. Historically, Japan did not have general practitioner system, and most physicians have chosen a specialty without any national accreditation (i.e., physicians could freely profess their specialty such as internal medicine, surgery, paediatrics, ophthalmology, otolaryngology and gynaecology). Patients often go to secondary health-care facilities even with mild symptoms, and secondary health-care services are accessed directly at an affordable cost (set as the same regardless of specialty, location, public/private under the fee schedule) without the need for referral from primary health-care facilities. These secondary services can be provided locally at small clinics or treatment centres, or at outpatient departments of larger hospitals that would be considered tertiary care centres in a gate-keeping system.

Although hospital outpatient services are available without a referral, the government has attempted to introduce a referral system for the use of hospital services through clinic services. Patients without referral letters from primary care clinics are now required to pay at least \$50 at the reception of larger-size hospitals. By introducing this new system, the use of outpatient departments of larger hospitals due to free access has declined, and health service utilization has shifted to smaller community-based clinics. However, the differences between primary and secondary health-care facilities remain vague, and these community-based clinics often have access to advanced equipment such as MRI machines, enabling the provision of hospital-level services at local clinics.

5.3.2 Health-care utilization for children in Japan

In a previous study in 2011 using a nationally representative panel of households (Ishida Y et al., 2011), among 1000 children per month, 872 had at least one symptom, 335 visited a physician's office, 82 a hospital-based outpatient clinic, and 21 a hospital emergency department in the last month. Two were hospitalized, and four received professional health care in their home. Compared with data from the United States of America, children in Japan more frequently visit both community physicians and hospital-based outpatient clinics. Paediatric health-care utilization is influenced significantly by age and location of residence in Japan. Although the out-of-pocket (OOP) rate is set as 20% of total

health expenditures by the MHLW, most municipalities subsidize for OOP payments such that children can have access to health care almost free of charge (but still subsidy rate varies among prefectures). Japanese parents restrict use of over-the-counter medications for younger children, especially those younger than 2 years of age. Notably, living with grandparents was associated with significantly reduced over-the-counter medicine use (Ishida Y et al., 2011).

5.4 Inpatient care

5.4.1 Survey of Medical Institutions

In 2016, there were 8442 hospitals and 101 529 clinics in total. Approximately 80% of Japan's hospitals are provided by the private sector (medical corporations and individuals) (Ministry of Health, Labour and Welfare, 2017r). Hospitals owned by medical corporations and individuals are independent of direct government management and subject to only limited investment regulation; however, payment for medical services is strictly controlled by the government.

5.4.2 Diagnosis-procedure combination (DPC)

Japan utilizes a case-mix system called the diagnosis-procedure combination (DPC) for inpatient care to pay health-care providers. Diagnosis-related groups (DRG) are calculated based on disease category, while DPC is calculated based on per hospital admission. DPC was introduced in 2002 by the MHLW, and linked with a lump-sum payment system starting in 2003. In total, 1667 facilities with 495 227 beds participated in this system in 2016, which included 81 university hospitals that were obliged to adopt the DPC system (Ministry of Health, Labour and Welfare, 2016i). Approximately 55% of all acute care inpatient admissions in Japan were covered by this system.

DPC databases contain not only administrative data, but also detailed patient demographic, diagnostic and procedure-related data that are collected for all inpatient discharges. Japan uses disease codes defined in the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10), whereas procedures are coded with the original Japanese codes in their records. Hospital staff record the dates of all procedures, examinations and drug or device utilizations. Submission of accurate data from this system is a condition for reimbursement of payment.

5.4.3 Cost containment

The Japanese health-care system has retained a universal health insurance system since 1961. This insurance system covers almost all inhabitants and health-care services, and patients are free to choose any hospital with little payment depending on their socioeconomic circumstances (Ikegami N et al., 2011). However, the Japanese health care system also harbours features that increase health care expenditure: most health care facilities are privately owned (70% of hospitals and 94% of clinics), fee-for-service basis payment for out-patient with macro cap, free access to physicians/health care facilities (no gate-keeping system and waiting lists), and no limitation on the purchasing of expensive equipment (i.e., high density of health care equipment as described in Chapter 4).

In order to preserve this universal coverage and free access while containing costs, Japan employs a uniform fee schedule, which determines both prices and conditions for payment. It has been partially successful in containing national health-care expenditure (see more details in Chapter 3). Indeed, until 2010, Japan's public health-care spending as a share of the GDP was maintained below the OECD average primarily because of the fee schedules set by the MHLW (OECD, 2009). However, because of ageing and the rapidly increasing prices of new technologies in recent years, the total health expenditure as a percent of GDP has been increasing and is now the third highest among OECD countries.

5.4.4 Regulation of the number of beds and nurses

Under the Medical Care Plan, the Japanese government has implemented the concept of "healthcare service areas;" these are geographical units that provide and manage most health-care services. As of 2013, primary health-care service areas consisted of approximately 1700 districts (including cities, towns and villages), secondary health-care service areas consisted of 344 jurisdictions, and tertiary health-care service areas consisted of 46 prefectures and 6 areas in Hokkaido (52 areas in total). In order to balance health-care provision among prefectures, the number of beds has been regulated for different secondary health-care service areas under the Medical Service Law and related legislation (Government of Japan, 1948b). More than 200 secondary health-care service areas had more hospital beds than the objectively assessed number of necessary

beds and so were subject to restrictions on new construction that would increase bed numbers.

The number of nurses at each secondary health-care service area is also limited under the Medical Care Act of 1948. The cap is based on the types of hospital bed: 3:1 (nurse:patient) for general-use beds, 4:1 for long-term care beds, and 3:1 for psychiatric beds.

5.5 Emergency care

The Ministry of Internal Affairs and Communications (MIC) is in charge of pre-hospital care, while the MHLW is in charge of providing emergency care at health care facilities. The major challenges facing emergency care in Japan are as follows: the increasing demand for emergency care because of ageing and overutilization of ambulance services, the quality of pre-hospital emergency care and the still-low survival rate of out-of-hospital cardiac arrests, as described below.

5.5.1 Organization and provision of emergency care

Pre-hospital emergency medical service

In 2016, there were a total of 123 554 out-of-hospital cardiac arrests (OHCA) in Japan. The survival rate after one month was only 16.4% among OHCA who were attended to by bystanders, and 11.7% could go back to their daily life (Fire and Disaster Management Agency, Ministry of Internal Affairs and Communications, 2017). These rates increased by 53.3% and 45.4%, respectively, if bystanders used automated external defibrillator (AED). This number is slightly higher than that of the USA (survival rate was 12% in 2016) (The American Heart Association, 2016). There has been continuous effort to improve the quality of pre-hospital emergency care, and the MIC has provided a series of countermeasures focusing on the utilization of both emergency life-saving technicians and physicians.

1. Dispatch system

In Japan, the fire prevention headquarters of local governments – which comprised 752 fire stations with dispatch centres as of 2014 – provide standardized pre-hospital EMS (Yasunaga H et al., 2010; Yasunaga H et al., 2011). Under the MIC, the Fire and Disaster Management Agency of Japan (FDMA) supervises the EMS system throughout the nation. The designated universal emergency call number is 119. This number is directly connected to a neighbouring dispatch centre with

a computerized dispatch system. On receipt of an emergency call, the nearest available ambulance is sent to the incident location. All expenses for EMS are covered by taxes, and patients are not charged. The number of emergency dispatches increased from 5.46 million in 2010 to 6.05 million in 2015. In particular, the number of patients with mild disease had increased, which accounted for about half of all patients transported by EMS. They were able to return home without requiring hospital admission, and some of their emergency requests were non-essential. This causes a lack of ambulances and delayed transportation for other patients. The average time required to arrive at a patient's location increased from 6.2 min in 2001 to 8.6 minutes in 2014, while the total time required from the emergency call until hospitalization also increased, from 28.5 min in 2001 to 39.4 minutes in 2014 (Fire and Disaster Management Agency, Ministry of Internal Affairs and Communications, 2015a).

Fire preventive headquarters in some prefectures have started to introduce ICT into their dispatch system. Equipped with a mobile tablet with ambulance car, emergency life-saving technicians and other staff can find the nearest available emergency health care facilities without making phone calls to those facilities, all while sharing information including vital signs, severity and images of the patient prior to their arrival to the emergency care facility.

2. Emergency life-saving technician

Generally, an ambulance crew is organized with three EMS staff members in a local centre, including at least one emergency life-saving technician (ELST) who has undergone extensive training in providing pre-hospital EMS (Tanigawa K et al., 2006). As of 2014, there were a total 31 012 EMS staff who had an ELST license (Fire and Disaster Management Agency, Ministry of Internal Affairs and Communications, 2014b). ELSTs perform CPR according to the Japanese CPR guidelines, which are based on the guidelines of the American Heart Association and the International Liaison Committee on Resuscitation (ECC Committee Subcommittees and Task Forces of the American Heart Association, 2005).

ELSTs can provide only limited pre-hospital EMS procedures, such as semi-automated external defibrillation, insertion of an adjunct airway (oesophageal obturator airway or laryngeal mask airway), cannulation of a peripheral intravenous line, and infusion of Ringer lactate solution and epinephrine. Only specially trained ELSTs are permitted to insert tracheal

tubes. Because of the increasing demand for enhancing pre-hospital care, the extent of medical services which ELSTs can perform has been expanding year by year, and there is new concern on how to secure the quality of care provided by ELSTs.

In 2001, the Medical Control System for paramedics was established to ensure the quality of EMS providers' medical procedures during the transportation of patients from the emergency site to the medical facility via a physician's instruction and monitoring.

3. Pre-hospital care by physicians

In parallel with emergency care provided by ELSTs, physicians are also required to participate in prehospital care more than before. There are mainly two types of prehospital care provided by physicians: "doctor car" and "doctor helicopter." Doctor car refers to physician-operated ambulances that enable physicians to go directly to the patient and carry out any emergency treatment according to their diagnoses and judgement. They can select from many treatment options, including the use of a semi-automated external defibrillator, tracheal tube insertion, central venous catheterization, and infusion of catecholamines, lidocaine, atropine, anaesthetic drugs and thrombolytic agents. The total number of dispatched doctor cars was estimated to be 22 793 cases in 2012 (Tatsuno H et al., 2013). With regard to doctor helicopter, as of 2015, 46 helicopters were introduced in 38 prefectures and were dispatched 22 643 times in 2014.

Emergency medical care at health care facilities

System for provision of emergency care: from primary to tertiary

For primary emergency care, as of 2012, weekend and night-time emergency rooms were available for patients with non-severe illnesses in 630 districts; patients can visit the emergency rooms on foot. There were 556 holiday on-duty doctor systems in place. There were 6.2 million users of these systems in 2012. Secondary and tertiary emergency care are provided in line with each prefecture's Medical Care Plan. The number of emergency care units is determined based on the population of each secondary health-care service area. As of 2012, there were 3259 secondary emergency medical centres, which have a role in performing first aid for emergency patients and, if needed, inpatient care.

With regard to tertiary emergency care, tertiary emergency medical centres and advanced critical care and emergency centres play a central

role. As of 2012, there were a total of 258 tertiary emergency medical centres located in the 47 prefectures, and the number is increasing year by year. The increase can be attributed to the fact that each prefecture was encouraged to establish a tertiary emergency medical centre for every 1 000 000 persons under the Medical Care Plan; there are also strong incentives under the fee schedule. However, there were large differences between centres, for example, the number of full-time doctors employed or the number of seriously ill patients accepted. Some facilities do not have the capability to accept all seriously ill patients 24 hours per day. The number of patients with severe trauma has declined, while the number of tertiary emergency medical centres is increasing, resulting in a decline in the number of patients per hospital (Fire and Disaster Management Agency, Ministry of Internal Affairs and Communications, 2015b). Therefore, centralization may be necessary to maintain a high quality of trauma care.

Advanced critical care and emergency centres have a specific role to play in treating patients with several illnesses requiring special care, such as severe burns, drug poisoning and traumatic digital amputation. In addition, they play the same role as tertiary emergency medical centres. As of 2012, there were 28 advanced critical care and emergency centres across Japan.

Table 5.6 Category and number of emergency care facilities in 2012

| Category | Number | Feature |
|--|--------|--|
| Tertiary emergency care | | |
| Tertiary emergency medical centres | 258 | Accept any type of patient in 24 hours |
| Advanced critical care and emergency centres | 28 | |
| Secondary emergency care (patient needs to be hospitalized) | | |
| Emergency medical centre | 3259 | Rotation basis among the secondary health-care service areas |
| Collaborative emergency centre | 10 | Designated hospital with assistance from neighbourhood clinics |
| Primary emergency care | | |
| Weekend and night-time emergency | 630 | Managed by the Japan Medical Association |
| Holiday on-duty doctor system | 556 | Managed by the local government |

Source: Ministry of Health, Labour and Welfare, 2012c

Emergency care for children

As a pre-hospital care service, a public paediatric emergency telephone consultation service called “child emergency phone services #8000” was established in 2010. Services are provided on holidays or at night to help parents judge the severity of a child’s acute illness/injury and decide whether or not they should go to an emergency health care facility. The number of telephone consultations is increasing yearly; in 2011, it reached about 53 million consultations, of which one quarter was deemed to require emergency room visits (Ministry of Health, Labour and Welfare, 2018a).

An advanced perinatal centre is defined as a centre with six or more beds in the Maternal– Fetal Intensive Care Unit (MFICU) and nine or more beds in the Neonatal Intensive Care Unit (NICU). The MHLW requires all prefectures to have at least one advanced perinatal centre in each tertiary health-care services areas. Under the advanced perinatal centre, each prefecture has also set up regional perinatal centres and has encouraged strong collaboration between the advanced perinatal centre and regional perinatal centres. As of 2014, there were 100 advanced perinatal centres and 292 regional perinatal centres. The MHLW reported in 2011 that approximately half of the cardiac arrest cases in pregnant mothers were caused by non-obstetric diseases, including stroke and cardiovascular diseases. In some cases, first aid for such cases was delayed due to lack of cooperation between perinatal centres and tertiary emergency care centres.

Example of patient pathway for emergency care in Japan

A 55-year-old male taxi driver, residing in Tokyo, felt a sudden severe headache when he got up early in the morning on 30 December 2017. He told his wife that his headache was a “thunderclap headache,” which was his “worst headache ever.” Several symptoms appeared immediately after the headache, including nausea, vomiting, confusion and irritability. His wife called 119, and an ambulance car arrived at his home 7 minutes after the call. He was transported by the ambulance car to the nearest secondary-care hospital located 10 km away from his home. On arrival at the hospital, he showed decreased consciousness and alertness. The first-aid physician quickly did physical examinations, and he found a stiff neck and focal neurological deficit. The doctor strongly suspected a subarachnoid haemorrhage and made a prompt decision to transfer the patient to a tertiary-care hospital with a Stroke Care Unit.

The patient was then transferred by the same ambulance car to the tertiary-care hospital located 20 km away from the secondary-care hospital. Soon after he arrived at the hospital, a head CT scan followed by cerebral angiography was performed, which showed a ruptured intracranial aneurysm. Open craniotomy and clipping of the aneurysm were performed by a neurosurgical specialist on the day of admission. Postoperative intensive care included medication for controlling the blood pressure, calcium-channel blockers to prevent arterial spasms and phenytoin to prevent seizures. After two weeks of intensive care, his condition became stable and he was moved from the Stroke Care Unit to a general ward. He continued rehabilitation for his postoperative mild neurological deficits, and was discharged to home on 10 March 2015. The fees for surgery and hospitalization were mostly paid from the universal health insurance fund with cap payment for high medical expenditure, except for his OOP payment amount of approximately US\$ 1400. Now he is happy to receive a rehabilitation programme from long-term health insurance (described later in this chapter), and wishes to go back to work in the near future.

5.6 Pharmaceutical care

5.6.1 *Pharmaceutical sector's production capabilities*

Pharmaceutical markets in Japan

The global pharmaceutical trade accounts for US\$ 1072 billion in 2015, and Japan contributes approximately 7.6% of this figure (Japan Pharmaceutical Manufacturers Association, 2017a). Japanese pharmaceutical companies sold US\$ 109.1 billion worth of pharmaceuticals annually, including US\$ 100 billion for prescribed medicines and US\$ 6.4 billion for over-the-counter (OTC) drugs in 2014 (Ministry of Health, Labour and Welfare, 2013f). Imported and exported medicines in 2015 accounted for US\$ 25.6 billion and US\$ 4.1 billion, respectively (Japan Pharmaceutical Manufacturers Association, 2013). The export value of medicines had been stable at around US\$ 3.2–3.3 billion between 2001 and 2014 and jumped to US\$ 4.1 in 2015, while total imports have dramatically increased from US\$ 8.1 billion in 2005 to US\$ 25.5 billion in 2015 (Japan Pharmaceutical Manufacturers Association, 2013).

Pharmaceutical companies

In 2015, the market share of USA companies was 42.6%, followed by Japan (7.6%), Germany (4.0%), France (4.0%), the UK (2.6%) and Italy

(2.5%) (Japan Pharmaceutical Manufacturers Association, 2017a). The number of Japanese pharmaceutical companies decreased from 1123 in 2000 to 310 in 2014, due to mergers and acquisitions. Sales of the five leading companies in Japan accounted for 37.1% of all prescribed medicines in 2014 (Japan Pharmaceutical Manufacturers Association, 2017b). Most pharmaceutical companies just sell generics: generally small and medium-sized companies that do not have adequate R&D capacity to develop new medicines. Among the top 25 pharmaceutical companies globally in terms of total sales of medicines, there are five Japanese pharmaceutical companies; the biggest is *Takeda*, which ranked 16th in the world in terms of total sales in 2015.

The proportion of research costs in total sales was 11.7% in 2013. The cumulative success rate of developing new drugs was 1:29 140 between 2009 and 2013.

The pharmaceutical industry employed 167 514 workers in 2012. There are approximately 73 817 (44.1% of total employed) medical representatives in Japan. They visit physicians to provide information on drug efficacy and safety and collect information on adverse effects.

Wholesalers

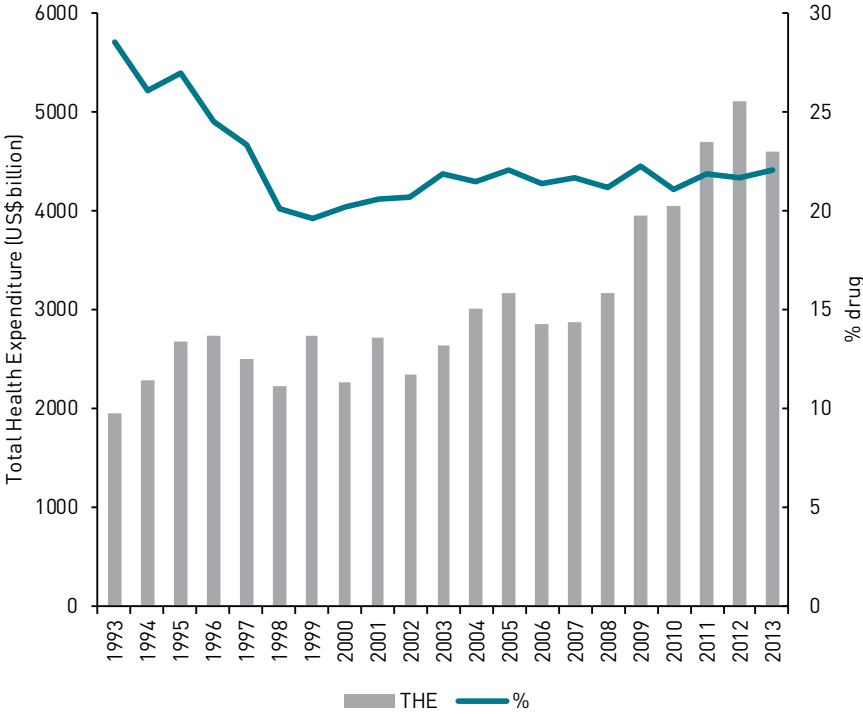
As of 2016, 79 wholesale companies were affiliated with the Japan Pharmaceutical Wholesalers Association, and there were 53 875 people working in the wholesale industry (The Federation of Japan Pharmaceutical Wholesalers Association, 2017).

In 2015, 21.4% of wholesales drugs were sold at large-sized hospitals, 6.0% at small- and medium-sized hospitals, 16.9% at clinics and 55.2% at pharmacies and drug stores (The Federation of Japan Pharmaceutical Wholesalers Association, 2017).

Health-care expenditure on medicines

Drug costs accounted for 22.1% of all health expenditure in 2013. Although the total drug expenditure has been increasing yearly, its rate of increase is almost the same as the rate of increase in health expenditure (Fig. 5.2). About 800 million prescriptions were written, and about US\$ 64.2 billion was disbursed by public health insurance for prescribed medicines (Ministry of Health, Labour and Welfare, 2016a).

Fig. 5.2 Trend in total health expenditures and proportion of drug expenditures (%)



Note: total health expenditure is converted (from ¥ to US\$) based on the currency rate as of 1st January in each year
Source: Ministry of Health, Labour and Welfare, 2016c

Generic drugs

The percentage of generic drugs among all pharmaceuticals purchased was 33.5% by volume and 12.4% by sales in 2015, which is substantially lower than in other developed countries, including the USA, the UK, and Germany at 91.9%, 75.0% and 84.8% by volume, respectively (Ministry of Health, Labour and Welfare, 2016h, 2017c).

Brand-name pharmaceuticals receive market protection for a long time in Japan, and generics are not widely used after patent expiration. Recent government policies have been developed to improve the rates of generic substitution, and promotion of generic drugs has formed one of the centrepiece in the effort to reduce medical expenditure (Iizuka T et al., 2011).

In 2007, the Cabinet Office's Council on Economic and Fiscal Policy created an "Action programme on promoting the safe use of generics" and set a target to increase the quantity-based share of generic pharmaceuticals to 30% by FY 2012. However, the actual share of generics had till then not kept pace with high expectations and, in 2013, the MHLW introduced the "Roadmap for further promotion of generics" with a target to increase the share of generic pharmaceuticals to 70% by volume by FY 2017, and to further reach 80% by FY 2020 (56.2% as of September 2015). This new roadmap consists of six pillars of action: (1) stable supply of generics; (2) secure quality of generics; (3) sharing information and communication; (4) create environment for further use of generics; (5) modification of universal health insurance; and (6) monitoring and evaluating the roadmap.

5.6.2 Price-setting for pharmaceutical reimbursement

The government sets the prices of all drugs reimbursed by the universal health insurance system with the "fee schedule." The list of reimbursable drugs includes nearly 16 000 items for oral, parenteral and topical administration.

For new drugs, reimbursement prices are determined with reference to the prices of similar drugs that have already been approved. If there is no similar drug, the prices are determined based on accounting for material and other costs.

The reimbursement price used to be revised every two years. The revised price is determined according to market prices during the past two years. To calculate the price, the government is authorized by the *Health Insurance Act* to conduct a market drug price survey before the revision. This survey is conducted in close cooperation with wholesalers, who submit their transaction records with health care providers. The official reimbursement price is set at the weighted average of the transaction price with an adjustment, which is usually set at 2%. This system reduces the reimbursement prices of all the drugs, and approximately US\$ 4.5 billion of pharmaceutical costs are cut at every revision.

However, in 2017, a new chemotherapy called Nivolumab was released for sale originally for malignant melanoma, costing approximately US\$ 336 110/year/person. Its use was then expanded to some types of lung cancer and renal cell carcinoma, and it has started to put severe financial burden on the universal health insurance system. The MHLW

urgently revised the reimbursement rate down to 50%. Since then, the MHLW decided to change the revision schedule from every two years to every year so as to better reflect the market trend and to contain rapid increases in pharmaceutical expenditure. Debate questioning how to balance cost-containment for new medicines while also promoting R&D (i.e., incentives for pharmaceutical companies) has been ongoing.

5.6.3 Antimicrobial resistance

In general, the total amount of antibiotics used is at the same level as in other countries, while the use of Cephalosporin, Quinolone and Macrolide are higher in Japan than in other countries. Additionally, the prevalence of antimicrobial resistances is higher in Japan than in other countries. In 2014, the rate of penicillin-resistant *Streptococcus pneumoniae* (PRSP) was 48%, and the rate of Methicillin-resistant *Staphylococcus aureus* (MRSA) was 51%, which were higher than the rates found in other OECD countries (Ministry of Health, Labour and Welfare, 2016e).

At the Sixty-ninth World Health Assembly in 2015, Member States unanimously adopted the Global Action Plan on Antimicrobial Resistance (AMR) as well as the resolution, which urged all Member States to create their own national action plan on AMR. Responding to this resolution, Japan launched the National Action Plan on AMR in April 2016. In the Action Plan, Japan decided on six important areas of focus: (1) public awareness and education; (2) surveillance and monitoring; (3) infection prevention and control; (4) appropriate use of antibiotics; (5) research and development; and (6) international cooperation (Ministry of Health, Labour and Welfare, 2016f).

5.6.4 Pharmaceutical monitoring and surveillance

The sorivudine tragedy of 1993, in which 16 patients died within a month of a new drug being put on the market, led to the enhancement of safety measures, such as the introduction of a new standard of post-marketing surveillance for pharmaceutical companies. In July 2003, adverse drug reaction reporting became mandatory for all physicians and pharmacists. Reported cases are analysed and investigated by the Pharmaceuticals and Medical Devices Agency (PMDA), established in 2004. The MHLW publishes Pharmaceuticals and Medical Devices Safety Information 10 times per year and issues Emergency Safety Information in an ad hoc manner.

Blood products

Consumption of blood products per capita in Japan is almost at the same level as or even lower than of most industrialized countries. In 2008, there were total 23.6 unit/1000 for red cell concentrate (RCC), 7.8 unit/1000 for fresh frozen plasma (FFP) and 6.3 unit/1000 for platelet concentrate in Japan, compared to 46.1 unit/1000, 14.4 unit/1000 and 6.5 unit/1000, respectively, in the USA (Ministry of Health, Labour and Welfare, 2012b). All blood products consumed domestically should be in principle supplied by donated blood. However, donated blood alone is not sufficient to fulfil the domestic demand, so much of the blood necessary for production of fractionated plasma products is imported. As of 2012, 95.7% of globulin was supplied by domestic blood donation; however, only 59.6% of albumin and 16.7% of factor VIII were supplied by domestic blood donation.

In May 2015, one of the biggest blood product companies in Japan, *Kaketsuken* was accused of illegal blood product generation and processing by the MHLW, which revealed several challenges related to blood products: there is no clear vision or national strategy on blood products, the supply system is weak due to poor governance of production companies and over-dependence on a select few companies, and Japanese blood products companies are left out of the global market. Responding to these challenges, a task force consisting of several experts made recommendations to the MHLW in 2016, which include the promotion of evidence-based blood production policy, reforms of the blood production market by increasing effectiveness and transparency, reforms of blood production companies so as to strengthen their capacity to sell products overseas, and strengthening the supply system (Ministry of Health, Labour and Welfare, 2016k).

5.7 Rehabilitation/intermediate care

In Japan, with an aim to provide seamless rehabilitation services, the government provides rehabilitation care for inpatient, out-patient and in-home settings.

Acute phase and restorative rehabilitations are covered by universal health insurance, while chronic phase rehabilitation is covered by both universal health insurance and long-term care insurance (LTCI) (health-care insurance started to cover restorative rehabilitation facilities in 2000). Services covered and the duration of coverage are decided by the government. The government sets different levels of expenses to be reimbursed based on the disease –cardiovascular disease,

cerebrovascular disease, disuse atrophy, musculoskeletal malfunction and respiratory diseases.

5.7.1 Rehabilitation under health-care insurance

National health-care insurance covers inpatient rehabilitation at acute care and restorative facilities. In acute care hospitals, a medical rehabilitation team, which includes rehabilitation specialists, physical therapists, and occupational and speech therapists, is used to deliver rehabilitation services. Some patients who need long-term intensive care after severe traumatic injuries receive long-term rehabilitation in acute care hospitals, but where possible, rehabilitation is better provided in other settings, especially rehabilitation care or chronic care hospitals (Mizuochi K, 2012).

5.8 Long-term care

5.8.1 Population ageing

As Japan's total population began to decline while the older population continued increasing, the proportion of older people in the population (aged 65 years or older) rose from 17.4% in 2000 to 26.7% in 2015. It is expected that the proportion of older people will reach 39.4% in 2055 (Cabinet Office, Government of Japan, 2016). As a result of the two baby booms (1947–1949 and 1971–1974), the population of older people above 75 years of age will reach its peak in 2025.

In every country, population ageing implies drastic transformations at the societal, economic and political levels. The ageing of the population and the decline in birth rates have been particularly significant in Japan, becoming a major obstacle to the establishment of a sustainable social security system. Health expenditure for those aged 65 years and above is 4.3 times higher than for other age groups, and the majority of costs are covered by the working class population through the payment of taxes and medical insurance premiums.

5.8.2 Long-term care insurance

The traditional family system in Japan placed primary responsibility for support of older people on families, and nearly 55% of people aged 65 years and above lived with their children in 1995. However, the proportion of one-person households among this older population more than doubled between 1975 and 1995. With rapid demographic change and

the dissolution of traditional family structures, the government took a number of measures to promote the “socialization of care” for frail older people during the mid-1990s. In response to the expected shift from traditional family care to social care, the Japanese government started the national LTCl system in 2000 to alleviate the burden on family caregivers.

LTCl is based on the Long-Term Care Insurance Act (Ministry of Health, Labour and Welfare, 2016b). This system aims to certify the care-level needs of the elderly and to provide care services suited to this level. There are seven care levels, including two requiring support (levels 1 and 2) and five requiring long-term care (levels 3–5). Although the original purpose of LTCl was to support the elderly with physical and/or cognitive malfunction due to ageing, its focus has been shifting from supporting disabilities to promoting self-independence. The total number of the elderly certified as requiring one of these care levels was reported to be 5.69 million in 2013 (Ministry of Health, Labour and Welfare, 2016b), which is twice the number it was at the time the system was implemented in 2000 (2 180 000 beneficiaries) (Olivares-Tirado P et al., 2011). Because of this, the sustainability of the system has been a major issue.

5.8.3 Beneficiaries

Municipalities act as insurers for the LTCl scheme, as they are responsible for implementing the Long-Term Care Plan and for determining insurance premiums by looking at the balance between the needs of the population and the quantity of services provided in the area. In the LTCl system, prefectures support the municipalities, while the national government decides the overall direction of the system.

Municipal governments start to collect insurance premiums at the age of 40 years. Half of the finance comes from taxes (25% from the Central Government, 12.5% from the prefectures and 12.5% from the municipalities) and half comes from premium contributions. The beneficiaries are divided into two categories: category I beneficiaries are the elderly aged 65 years and above, and category II beneficiaries are people aged 40–64 years with disabilities. For category I beneficiaries, most of whom are pensioners, the premium is withheld from their pension payment. For category II beneficiaries (aged 40–64 years), most of whom are employed, health insurers levy the premium by adding it to the health insurance premium. Beneficiaries can use LTCl services by paying 10% of the costs.

5.8.4 Needs assessment

When people wish to receive LTCI, they must apply to the municipal government for a needs assessment. The purpose of this assessment is to analyze physical and cognitive functions so as to decide which category the person belongs to (two levels requiring support (levels 1 and 2) and five levels requiring long-term care). The municipal government dispatches a surveyor, who must be a qualified care manager, to the applicant. An on-site survey is conducted using a uniform assessment tool, which consists of 73 survey items to measure activities of daily living and behaviours. Depending on the surveyor's findings, a computer-assisted evaluation is conducted for preliminary assessment of care levels. Municipal governments also seek a medical opinion from attending doctors. The Needs Assessment Review Committee, consisting of around five health and welfare professionals, reviews the surveyor's findings and the doctor's opinion to decide whether the preliminary assessment should be altered. There is a significant difference in certification rates (the number of individuals who are certified either as requiring support or requiring long-term care) among prefectures, and transparency and comparability of the certification process is now of great concern.

5.8.5 Benefits

The benefits provided by the system include both institutional and domiciliary services. Domiciliary services include health care such as nursing visits, rehabilitation visits, and ambulatory rehabilitation and welfare services such as home help services, cooking, bathing and day services. Although for-profit corporations are not allowed to participate in health-care services, they are permitted to provide welfare services. The proportion of for-profit corporations has been increasing and reached 47.2% for nursing visits and 65.5% for welfare services in 2016.

5.8.6 Care management

Under LTCI, licensed care managers coordinate different services provided by different providers to accommodate geographically dispersed home settings within the limits of an allocated budget. Those who would like to be licensed care managers are required to pass an examination for long-term care support. This exam does not confer a national license; it is managed at the prefectural level. There was a total of 131 560 applicants in 2017, but only 28 233 passed the exam. These managers are expected to serve as neutral agents representing clients' interests rather than acting as sales agents for providers.

5.8.7 Care market

One of the most radical changes that followed the launch of the LTCI has been the creation of the care market. In the conventional system, the local government decided who needed care services and who was admitted to nursing homes, and service users had no right to choose the type or provider of services. Under the LTCI, service users can contract any long-term care provider and choose the type and frequency of services, within benefit limits that vary by individual eligibility status and are determined by a nationally standardized needs certification system.

A central purpose of the reform was to encourage new providers to operate in aged care services so as to increase the volume of services, and to attain efficient and quality care services via user choice. A wide range of providers, including for-profit providers, were allowed to enter the market in community-based care, and compete with traditional public and quasi-public social welfare providers. These non-governmental, non-profit organizations provide public services for children, people with disabilities and the older people under governmental contracts.

The care market created by the LTCI has been well accepted in Japan, and usage of LTCI services has increased, especially in home-based care: the number of home-care visits increased from 1 240 000 in 2000 to 3 890 000 in 2015 (Ministry of Health, Labour and Welfare, 2015c). However, the overall cost of the LTCI system also increased by 321%, from about US\$ 31.6 billion in 2000 to about US\$ 101.3 billion by 2016. The market created by LTCI is not a pure market and is perhaps better understood as a “quasi-market” in which some factors are controlled by the government and 90% of care service purchasing is covered by premium revenue and taxes. Unlike the quasi-market system introduced in the UK, there is no predetermined level of supply, and there is free entry and exit of providers. There is strong competition between providers for clients, so the more the market expands, the more public expenditure increases, and the government is faced with the need to control costs to sustain the system.

Care providers seek to cut labour costs under market competition, but under poor working conditions, the turnover rate of care workers is high, with potentially negative effects on quality of care. The market under LTCI was successful in terms of the volume of services, but most providers were skeptical as to whether competition in the market could facilitate quality care services (Kubo M, 2014).

According to the MHLW, care workers who are about 40 years old and working under open-ended contracts receive US\$ 1750 a month, while the average salary for similar workers across all occupations is US\$ 2926 (Ministry of Health, Labour and Welfare, 2008b). Wages were set too low, even though the demand for care workers was very high. Evidence that workers were discouraged from choosing a career in aged care is seen in reports, which showed that, in late 2012, only about 58.4% of the total of about 1 085 994 certified care workers (*Kaigo fukushishi*) specified by the Social Welfare Worker and Certified Care Worker Act in Japan were working in care services (Kubo M, 2014). Turnover among home-based care workers is approximately 15% per annum, and as many as 40% of those who leave do so after less than a year in the job. As a result, a large number of care workers tend to have low skills (Hotta S, 2007).

Shortages of care workers were more pronounced in Tokyo than in other areas because there is also a high demand in other service industries, and providers have to compete with those industries as well as with other providers. Additionally, wage differences between care workers and other occupations were more marked in Tokyo because the premium added to the stable base benefit for care services was not enough to cover the difference in wages in other service industries (Yamada A et al., 2009). This shortfall is the main cause of the more serious shortage of care workers in Tokyo compared to elsewhere.

Efforts to ensure a supply of trained workers appear to be failing. Training institutes for certified care workers have not met their student quotas because of a shortage of applicants for several years. In April 2007, there were 16 696 applicants for 26 095 places available in 419 training institutes, only 64% of the quota, and a growing number of institutes began to close (Kubo M, 2014). Potential workers have clearly started to give up on care services as a career due to the poor working conditions.

Failures in schemes for qualification and career programmes are related to fixed-term contracts and low wages. Although 80% of care workers were employed under fixed-term contracts on low wages, they are required to undertake extensive pre-employment training, at their own expense.

Providers are also required to encourage employees to undertake further training. While setting higher training requirements to become care workers could be expected to enhance the status of care work, such requirements have not been linked to good working conditions.

Under these circumstances, professionalization through enriched training and higher qualifications has not improved the supply of care workers, and may have made shortages worse. Providers have faced the difficulty of pursuing the almost contradictory goals of attempting to expand the workforce while keeping wages low and certification requirements high.

The challenge that must be tackled in the near future is how to design a market for aged care, including how to finance it, enhance efficiency and incentivize the provision of quality services, so that the LTCI system can ensure both the quantity and quality of services (Kubo M, 2014).

5.8.8 Where people die

Most Japanese currently die in hospitals. Historically, people died in their homes and very few died at health-care facilities: 82.5% at home and 9.1% at healthcare facilities in 1951 (Ministry of Health, Labour and Welfare, 2011b). However, in 2009, 78.4% died in hospitals, while only 14.2% died at home; the proportion of people dying at home is very small compared to other countries. Under Integrated Community-Care System (ICCS), the government is currently attempting to promote an environment in which people can live to the very end of their life stage and die in their home, including nursing homes and long-term care facilities; this vision aligns with the wishes of the majority of the elderly. However, the number of people who die at nursing homes and long-term care facilities for the elderly has been increasing, though the proportions are still low at 1.5% and 1.1%, respectively, in 2009 (Ministry of Health, Labour and Welfare, 2012d).

Integrated Community Care system

Along with societal changes, such as the increase in numbers of unmarried people, urbanization and the growth of single-person households or parent-child separated households, the number of elderly persons living alone has increased (Ministry of Health, Labour and Welfare, 2016d). In response to Japan's rapid ageing, the Japanese government has promoted an ICCS since 2006. This system aims to provide appropriate living arrangements, appropriate social care and daily life support services within the community and integrate prevention, medical services and long-term care by 2025, when the elderly population is expected to peak. This system is managed by municipal governments, using a fund from the LTCI system.

The ideal size of each community is defined by the approximate range of a 30-minute walk, which is consistent with the scale of most Japanese school districts. The National Assembly report on Social Security also confirmed the necessity of building a system to provide social care and lifestyle support services in addition to long-term care and appropriate health care within the community.

From a broader social services perspective, the best method to improve collaboration between social care and health care providers is not well understood. Considering the rapid ageing of the Japanese population, the community-based integrated care system rapidly drew attention, but one of the major obstacles to its implementation was the lack of coordination between various providers and the lack of clarity concerning the assignment of responsibilities. Also, even though health care services play an important role, the LTCL system still relies on the contribution from families (see also in Chapter 6).

5.9 Services for family/informal carers

Although long-term care largely depends on family/informal carers, there is no formal mechanism for supporting families or informal care-givers in Japan. LTCL covers a wide range of services including shopping, cleaning the house and preparing meals, there are still scarce evidence if LTCL can compensate for the work of families.

5.10 Palliative care

Under the Basic Plan to Promote Cancer Control Programs endorsed in 2012, the MHLW set palliative care as one of the important areas in cancer control and formulated a series of policy measures (Ministry of Health, Labour and Welfare, 2010a). The overall goals of the palliative care policy are given below:

1. Every physician involved in cancer treatment has basic knowledge and skills in palliative care.
2. Create an environment where the patient can receive an adequate level of palliative care.
3. Create a supportive environment both in the home and community so that patients and their families can have the option of continuing to receive palliative care in a familiar setting.

The major policy options are as follows.

1. to provide basic training in palliative care for physicians who attend to cancer patients;
2. to create a supportive environment at specialized cancer hospitals, where they are required to have a palliative care centre, palliative care unit and outpatient clinic for palliative care;
3. to develop the capacity of health-care professionals to provide palliative care;
4. to promote in-home palliative care; and
5. to raise awareness of palliative care among the general public, including the patients themselves and health-care professionals.

5.11 Mental health care

The Japanese government approved the mental health policy entitled, “Reform Vision for Mental Health and Welfare” in 2004 (Ministry of Health, Labour and Welfare, 2004). Before that, patients with mental disorders tended to be hospitalized even without any medical problems. This new reform vision promotes shifting patient-care from the hospital to their respective communities by (1) raising awareness about mental disorders among the general public, (2) reforming the mental health-care provision system, and (3) strengthening community support so patients can live in their community.

5.11.1 Patient statistics

The number of patients under treatment for mental disorders was estimated at 3.92 million in 2014, with 0.31 million inpatients and 3.61 million outpatients. Schizophrenia was the most common cause among inpatients with mental disorders; mood disorder, schizophrenia, and neurotic disorders were common among outpatients (Ministry of Health, Labour and Welfare, 2015d).

5.11.2 Mental health care

Mental health care in Japan is characterized by long periods of hospitalization. A large number of hospitals and beds are allocated for mental health, and there is an increasing number of dementia cases due to ageing. In 2014, the average duration of hospitalization was 281 days, which is far higher than that in other OECD countries (Table 5.7). In total, 90% of the psychiatric beds are privately owned, which makes deinstitutionalization more difficult. Following the Japanese Government’s

policy decision to shift mental health services from inpatient care to community care in 2004, the number of beds in psychiatric hospitals started to decline, from 354 000 beds in 2004 to 338 000 beds in 2014, which is still higher than that in other high-income countries. Outpatient and inpatient treatment of any mental disorder is covered by the universal health insurance system.

Table 5.7 Average length of hospital stay (days) for mental and behavioural disorders

| | 2000 | 2005 | 2010 | 2015 |
|-------------------|-------|-------|-------|-------|
| Australia | 15.6 | 14.9 | 14.6 | 14.2* |
| Austria | 23.3 | 18.9 | 22.0 | 25.8 |
| Belgium | 11.5 | 11.0 | 10.3 | 9.6* |
| Canada | 15.5 | 15.4 | 17.3 | 23.0 |
| Chile | - | 34.5 | 44.1 | 27.7* |
| Czech Republic | 56.5 | 55.5 | 52.7 | 40.2 |
| Denmark | - | 25.7 | 20.8 | 17.3 |
| Estonia | 20.7 | 14.6 | 16.7 | 16.9 |
| Finland | - | 43.5 | 39.9 | 29.4 |
| France | 6.8 | 6.5 | 5.9 | 5.8 |
| Germany | 25.0 | 24.4 | 24.2 | 24.7 |
| Greece | 113.0 | 111.0 | 80.0 | - |
| Hungary | - | 22.6 | 27.5 | 31.0 |
| Iceland | 16.2 | 12.8 | - | 11.8 |
| Ireland | 14.4 | 11.1 | 11.1 | 12.3* |
| Israel | 207.3 | 79.8 | 53.3 | 53.3 |
| Italy | - | 14.7 | 14.0 | 14.1 |
| Japan | 377.0 | 338.0 | 307.0 | 274.0 |
| Republic of Korea | - | 95.4 | 111.8 | 132.5 |
| Latvia | - | - | - | 22.9 |
| Luxembourg | 13.8 | 27.9 | 26.8 | 26.5 |
| Mexico | 46.7 | 28.2 | 25.3 | 27.8 |
| Netherlands | 29.4 | 22.6 | 19.0 | - |
| New Zealand | 64.6 | 55.5 | 49.9 | 36.3* |
| Norway | 4.5 | 4.1 | 3.2 | 19.3* |
| Poland | - | 27.8 | 36.2 | 35.4 |
| Portugal | 16.5 | 16.9 | 16.6 | 16.9 |
| Slovak Republic | 35.1 | 31.5 | 28.7 | 27.4 |
| Slovenia | 8.0 | 40.4 | 36.7 | 34.9 |
| Spain | 52.9 | 25.2 | 26.3 | 26.3 |
| Sweden | 19.5 | 18.1 | 15.6 | 16.1 |
| Switzerland | - | 43.4 | 32.7 | 28.0 |
| Turkey | - | - | - | 20.7 |
| United Kingdom | 64.2 | 58.2 | 47.9 | 37.7 |
| United States | 7.3 | 6.9 | 6.4 | - |

Note: * Data as of 2014.

Sources: OECD, 2017c, Japan's data; Ministry of Health, Labour and Welfare, 2017r

5.11.3 Special patient care

There are mainly five types of hospitalization: involuntarily hospitalization (without any consent, limited to patients who have a high risk of harming themselves or others), emergency involuntarily hospitalization, involuntarily hospitalization for medical care and protection (which requires consent only from the family), emergency hospitalization (which does not require consent either from the patient or family) and voluntarily hospitalization. In 2012, about 53.9% of inpatients were voluntarily hospitalized, while most of the remaining were involuntary hospitalization for medical care and protection (44.9%); a small proportion (0.6%) were involuntarily/emergency involuntarily hospitalization. Special inpatient care is also provided for people who commit a severe crime due to a state of insanity.

5.11.4 Welfare and rehabilitation services

Welfare services for people with chronic mental illness are provided under the Services and Support for Persons with Disability Act, which includes payment for care, payment for employment support and community life support (Government of Japan, 2005). Medical costs for outpatient care of persons with chronic mental illness are also supported by this welfare system, with about 10% of payments coming from direct patient contributions. Medical institutes also provide several rehabilitation programmes, such as psychiatric day care, night care, day/night care and short care.

5.11.5 Systems for community mental health

The Act on Mental Health and Welfare for the Mentally Disabled provides a basis for community mental health in Japan. Public health centres of prefectures and major cities are the first-line service providers, cities and municipalities provide direct services for persons with chronic mental illness, and prefectural mental health and welfare centres provide technical and advanced support. The prefectural government is responsible for planning mental health services. These services provided by public health centres includes preventive and welfare-services such as rehabilitation, capacity building and employment support, while most medical services (therapeutics) are provided by private clinics and hospitals.

5.11.6 Suicide prevention

The number of suicide cases had increased since around the late 1990s and peaked at 34 427 cases in 2003, after which it began a gradual decline. In 2015, the Cabinet Office reported 24 035 suicides (Ministry of Health, Labour and Welfare, 2016q). Although suicide cases have been decreasing, Japan still has one of the 10 highest suicide rates in the world. The suicide rate among older people is gradually decreasing, while that of the younger population and middle-aged men is increasing, in particular, among those who are unemployed and divorced.

In order to tackle this trend, the government passed the Basic Act for Suicide Prevention in 2006 and formulated the General Principles for Suicide Prevention (GPSP) policy in 2007. In parallel with the GPSP, the government established a special fund programme for local governments to provide a comprehensive and community-based approach. Moreover, the government strengthened interventions in the work environment including prevention and treatment for depression, while strengthening counter measures for alcohol addiction patients who are at a higher risk of suicide. The government also provides training courses for the general public so that people can promptly and effectively react to individuals who are trying to commit suicide. In 2015, Takeshima et al. analysed the overall suicide prevention policy described above in Japan. They concluded that the suicide rate has been steadily decreasing in Japan and that these initiatives have been effective (Takeshima T et al., 2015).

5.12 Dental care

Dental care in Japan dates back to the late 1980s. In 1989, the Ministry of Health and Welfare started to advocate for the “8020” campaign, which attempts to improve dental health among those aged 80 years older by maintaining the presence of at least 20 natural teeth. Because major reasons for the natural loss of teeth are periodontal disease and cavities, attention has been paid to these diseases, including annual check-ups for elementary and junior high school students.

Dental care costs of ¥2678 billion (equivalent to US\$ 23.7 billion) made up 6.9% of the national health expenditure in 2012. There were 103 831 dental hygienists and 34 640 dental technicians who assisted in the practice of 103 972 dentists⁵ in 2016. The MHLW conducts a nationwide

5 The number of dentists is as of December 31 2014.

sampling survey on oral health every five years (it used to be every six years and changed to five years in 2016). The latest findings show that the proportion of the elderly aged 80 years and above who have at least 20 teeth has increased from 40.2% in 2011 to 51.2% in 2016.

People can use the dental health-care services provided by the health insurance system, and dentists are paid using a fee-for-service system, although some restrictions apply to the materials that can be used. For example, orthodontics for cosmetic purposes is not covered by health insurance and all costs must be paid OOP by patients.

Currently, as the population ages, the role of dental care must change. The Japanese government is currently developing a new vision for oral health care to facilitate inter-professional collaboration among physicians, nurses, care-givers, pharmacists and other health-care professionals in order to provide oral care services in the context of ICCS.

5.13 Complementary and Alternative Medicine and Traditional Medicine

5.13.1 CAM providers

Japan has a national certification programme for complementary and alternative medicine (CAM) providers. The Medical Practitioners' Act states that curative health care must be provided by doctors or dentists supplemented by co-medical professionals such as nurses, therapists or dental hygienists. However, there are government-certified professionals who practice "quasi-health-care services" independently. The most typical are massage therapists, acupuncturists, moxocauterists and osteopaths; they are authorized to open their clinics and obtain reimbursement from health insurance through prescriptions from doctors. As of 2016, there were 116 280 massage and finger pressure therapists, 116 007 acupuncturists, 114 048 moxocauterists and 63 120 Judo therapists (see also Section 4.2).

5.13.2 Kampo medicine

Japan has a tradition of herbal medicines called *kampo*, which originated from ancient Chinese medicine but are classified as pharmaceutical products (Maegawa H et al., 2014). Although *kampo* is based on Chinese formulas, these medicines have evolved to a native Japanese style over time and may differ from Chinese medicine. *Kampo* medicines are prescribed by physicians under the universal health insurance

reimbursement system in the same way as normal medicines, and can be obtained either from specialist *kampo* suppliers or from standard pharmacies.

Japan produced ¥11 309.3 billion (equivalent to US\$ 100 billion) worth of pharmaceutical products dispensed inside hospitals/clinics in 2016. Of this, only 1.4% was traditional medicine (Tsumura & Co, 2017). However, *kampo* medicines are commonly used in the Japanese health-care system despite their small share of production value.

Some *kampo* medicines can be purchased for self-medication. In total, 294 *kampo* formulas are listed in the traditional medicine standards (Maegawa H et al., 2014).

The prevalence of the use of CAM had not been well documented until recently. The MHLW funded research in 2005, which showed that a considerable proportion of patients with cancer used CAM. According to a questionnaire survey of patients treated at 16 cancer centres and 40 palliative care units, of those who replied to the questionnaire, 44.6% of patients with cancer and 25.5% of those with benign tumours used some form of CAM. Among patients with cancer, 96.2% used products such as mushrooms, herbs and shark cartilage, a much higher prevalence than qigong (3.8%), moxibustion (3.7%) and acupuncture (3.6%). Positive effects were experienced by 24.3% of CAM users with cancer, although all of them received conventional cancer therapy concurrently. However, CAM products were used without sufficient information by 57.3% of users with cancer and without consulting a doctor by 60.7% of users (Hyodo I et al., 2005). A recent survey from the USA shows that the use of CAM has led to comparatively worse results (Johnson SB et al., 2018), suggesting that there is an urgent need for research on the use of CAM for cancer patients in the Japanese context.

5.14 Health services for specific populations

Although the Japanese government provides national health-care insurance for all people living in Japan, the government provides health care for specific populations under different schemes: people living below the poverty line, those with intractable diseases and those with specific diseases.

Table 5.8 shows the list of diseases covered by both the Central Government and local government. Service coverage is different among

prefectures and some local governments add further diseases to their list.

Table 5.8 List of diseases covered by both the Central Government and local governments

| Name of Law | Target population |
|---|---|
| Act on Special Aid to the Wounded and Sick Retired Soldiers | Soldiers during the Second World War |
| | General public with disabilities from the Second World War |
| Atomic Bomb Survivors' Assistance Act | Atomic bomb victims |
| Act on the Prevention of Infectious Diseases and Medical Care for Patients with Infectious Diseases | Emerging infectious diseases |
| | Tuberculosis |
| | First and second category infections (see Section 5.1.1) |
| Child Welfare Act | Children with chronic diseases (e.g. asthma, type 1 diabetes, connective tissue diseases) |
| | Children with tuberculosis |
| Services and Supports for Persons with Disabilities Act | Children with disabilities |
| | People with disabilities |
| | People with mental illness |
| Maternal and Child Health Act | Children with a low birth weight |
| Act on Compensation, etc. of Pollution-related health damage | Patients with designated diseases due to environmental reasons |

Source: Compiled by the authors.

5.14.1 People living below the poverty line

Those living below the poverty line are covered by a social welfare system and are provided secure access to health care for free at the same level of care provided by the universal health insurance system. The number of people living below the poverty line has been increasing, and reached 2 165 892 people in 2014 (1.7% of total population).

The budget for this population was ¥3.7 trillion (equivalent to US\$ 33.3 billion) as a whole in 2013, including health care, housing and living expenses (75% comes from the Central Government and 25% comes from the local government), and almost 50% of this budget was dedicated to health care.

5.14.2 Public subsidy programmes for certain diseases (intractable diseases)

Japan has disease-specific research and public subsidy programmes for specific diseases that are intractable. As of 2016, 306 diseases were listed (started with four diseases in 1972 and expanded to 306 in 2015, although

this expansion was made possible by cutting benefits from disease-related public subsidy). These programmes aim to promote research into these intractable diseases while also encouraging patients to live with dignity and promoting social participation.

5.14.3 Public assistance for victims of the atomic bombs

Given the unique situation attributable to the atomic bombing of Hiroshima and Nagasaki in August 1945, the survivors of these bombings are entitled to special public assistance not available for other war casualties. These victims include those who were exposed to intra-uterine radiation at the time of the bomb blast and those who entered the bombed area within two weeks of the incident. The number of listed victims has decreased somewhat because of ageing and stood at 174 000 as of March 2014. The benefits of this special assistance include public subsidies to waive cost-sharing for health insurance. These survivors, based on their health conditions, can receive cash benefits of ¥33 800 (approximately US\$ 300) per month (146 000 people) or ¥139 460 (approximately US\$ 1230) per month (8511 people) (Ministry of Health, Labour and Welfare, 2017e). This wide eligibility criterion means that approximately 88.8% of those eligible receive the cash benefit.

5.14.4 Haemodialysis

Under the Services and Supports for Persons with Disabilities Act, dialysis patients are recognized as patient with disabilities and get health care for free even for symptoms that are not related to kidney diseases (e.g., cough). Japan had 4321 dialysis facilities with 133 538 dialysis units and 342 986 patients receiving dialysis at the end of 2015. This figure accounts for approximately 0.2% of the entire population and approximately one fifth of the world's dialysis patients (The Japanese Society for Dialysis Therapy, 2016). This reflects the small number of kidney transplants that occur (1661 in 2016, of which only 167 were cadaver transplants) and the generous coverage under the health insurance system for renal dialysis, which caps the patient's co-payment at ¥10 000 (approximately US\$ 90) per month. Renal failure used to be considered fatal until December 1962, when dialysis was added to the list of health insurance benefits. At that time, the health insurance system required a 20–30% co-payment, which would collectively amount to a considerable sum for a long-term treatment such as dialysis. In October 1972, a public subsidy was introduced to help ease the financial burden of dialysis. In October 1984, the Health Insurance Act was amended to cap the monthly

co-payment for long-term treatment such as dialysis and haemophilia at ¥10 000. On a population basis, Japan is ranked at the top in terms of the number of patients undergoing dialysis and at the bottom in terms of kidney transplant in developed countries (United States Renal Data System, 2011). Dialysis (costing ¥5 million per patient annually) costs approximately ¥1.3 trillion or 4% of total health-care expenditure in Japan. The increasing costs do not show signs of easing. The substantial increase in the number of people undergoing haemodialysis is primarily attributable to diabetic nephropathy, suggesting that there is an urgent need for controlling the complications of diabetes.

5.14.5 Organ transplantation

The history of organ transplantation in Japan dates back to when the first heart transplantation from a 21-year-old brain-dead male to a 18-year-old high-school boy who had congenital heart disease was conducted by Professor Jyuro Wada at Sapporo Medical University in 1968. It was the first-time organ transplantation conducted using a brain-dead donor in Japan, which led to several debates about the transparency of the diagnostic process for brain-death, criteria for both donors and recipients, and the technical difficulties of organ transplantation from a brain-dead donor. It took almost three decades to conduct the next organ transplantation from a brain-dead donor in 1998. Dr. Wada's transplant surgery remains a reason why organ transplantation is still uncommon in Japan.

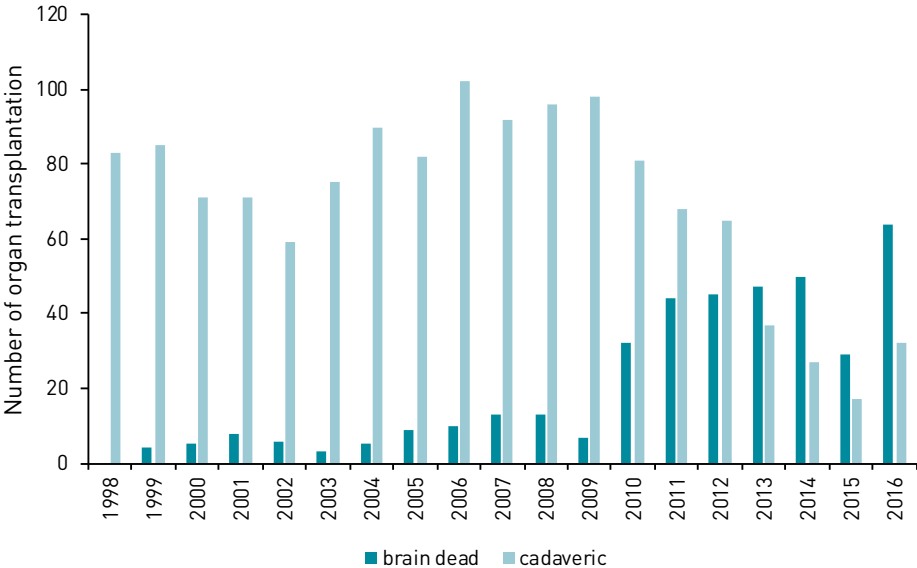
Cadaveric transplantation and brain-dead transplantation

Kidney transplantation was included in health insurance benefits in 1978, but cadaver transplantation was not available in the absence of a law that authorizes removal of organs from corpses. The Cornea and Kidney Transplantation Act was enacted in 1980 to authorize removal of the cornea and kidneys from corpses under certain conditions (Japan Organ Transplant Network, 2017a). After this Act was endorsed, 150–250 kidney transplantations and 1600–2500 corneal transplants were conducted annually. However, the widespread use of cadaver transplantation was still hampered by the prohibition of organ removal from brain-dead bodies. Surgeons had to wait until the heart-beat stopped completely before they could remove the donated organs, which compromised the success rate of transplantation. Cadaveric transplantation was somewhat enhanced by establishing the organ-sharing information network in 1983.

In October 1997, the long-awaited Organ Transplantation Act was enacted to authorize removal of donated organs from brain-dead bodies. The Act also prohibits the buying and selling of organs for commercial purposes. In a peculiar twist of legal reasoning, the law authorizes brain death only in those who had expressed a wish to donate organs of their choice and had given their consent to acknowledge brain death at the time of death. Moreover, the declaration of brain death may be made only after following strict guidelines set out in the law. Some patients therefore resorted to travelling abroad to receive transplants, provoking public protest in some countries and commercial organ transactions in others. Forty per cent of corneal transplants rely on corneas imported from abroad (Japan Organ Transplant Network, 2017a).

Responding to these concerns, the revised Organ Transplant Act was enacted in 2010, which enabled organ donation after brain death even when an individual’s intention was unclear (consent of the donor’s family is still required). Donation of organs after brain death by children under the age of 15 years has also become possible. In 2016, 32 cadaveric transplantations and 64 brain-dead transplantations were conducted (Japan Organ Transplant Network, 2017b).

Fig. 5.3 Trend of numbers of organ transplantation from brain-dead body



Source: Japan Organ Transplant Network, 2017b

Living donor organ transplantation

Living donor kidney transplantation was first conducted in 1964 and living donor partial liver transplantation was first done in 1989. The number of both living donor kidney and liver transplantations has been increasing and reached 1494 cases and 391 cases, respectively, in 2015 (The Japan Society for Transplantation and Japanese Society for Clinical Renal Transplantation, 2016; The Japanese Liver Transplantation Society, 2013).

A bone marrow bank and umbilical cord blood bank were started in early 1990; these are databases for human leukocyte antigen (HLA) typing of potential bone marrow donors and umbilical cord blood. The database contained specimens from 696 041 bone marrow and 11 287 umbilical cord blood donors by March 2017 (Japanese Red Cross Society, 2017). The bank was able to match the cumulative number of 20 309 (bone marrow) and 14 317 (umbilical cord blood) patients who underwent transplants by January 2017.

5.15 Disaster Risk Management for Health (DRM-H)

Following the great Hanshin and Awaji Earthquake in 1995, the Japan government established disaster medical assistance teams (DMATs), which rapidly dispatch trained medical teams to a disaster site. These teams respond to the demands of acute emergencies at the site, in conjunction with the MHLW and professional medical institutions in Japan (Kondo H et al., 2009). The provision of emergency relief and medical care, and the enhancement and promotion of DMATs for wide-area dispatch during disasters were formally incorporated in the Basic Plan for Disaster Prevention (the foundation for disaster-reduction programmes created in 1963) in 2005.

In 1997, at least one hospital from each prefecture was designated as a disaster-base hospital, which is to be the hub for patient treatment at the time of disaster. As of April 2015, there are a total of 694 disaster-base hospitals in Japan (Ministry of Health, Labour and Welfare, 2017i).

Although these previous disaster management efforts (DMAT and disaster-base hospitals) focused on emergency care caused mainly by crash syndrome, the Great East Japan Earthquake, for which the majority of victims were the elderly, showed the need for chronic disease control and basic sanitations. Therefore, government focus on disaster management is now expanding to these areas including medicines for

hypertension, diabetes and other chronic conditions, mental disorders, dementia, dialysis and home oxygen therapy (HOT).

As one of the disaster-prone country, Japan hosted World Conference on Disaster Risk Reduction (WCDRR) for three times in order to share lessons learnt from past natural disasters with other countries and adopted declarations on prevention and mitigation of natural disasters: in Yokohama (1994), in Kobe (2005) and in Sendai (2015). The recent one was held in Sendai, Miyagi prefecture which is one of the most affected area by the Great East Japan Earthquake in Japan. The Sendai declaration adopted at that conference has been still one of the core policy for disaster prevention and mitigation globally (United Nations, Office for Disaster Risk Reduction, 2015).

6 Principal health reforms

Chapter summary

The Japanese health-care system is currently facing two major challenges: (1) financial sustainability of and fiscal pressures on the health-care system; and (2) a rapidly ageing population. In response, several reforms have already been implemented by the Central Government and MHLW. However, population ageing and the increasing price of pharmaceuticals and medical devices has led to a consistent increase in health-related expenditures, while the decades-long economic stagnation has decreased the premium and tax revenue intended for use in the public health insurance scheme, resulting in an ever-increasing rate of health expenditure per GDP.

In order to tackle these challenges, in 2008, the government, the ruling party (Liberal Democratic Party-LDP), as well as the opposition party (Democratic Party of Japan-DPJ), together initiated debate on the sustainability of health care and long-term care. Later, in December 2010, the Cabinet pass the “Comprehensive Reform of Social Security and Tax”, a joint reform of the social security and taxation system that should improve fiscal sustainability for the Japanese social security system. The Cabinet Office indicated that the priority areas of the social security system should include measures for the support of children and child-raising, increasing the employment rate of Japanese youth, reform of medical and long-term care services, pension reform, measures against poverty and income inequalities and measures for low-income earners as cross-system issues.

The Comprehensive Reform of Social Security and Tax has remained a central tenet for healthcare and long-term care policy in Japan. Since its passage in 2010, several related laws have been enacted or amended under the umbrella of this reform plan in order to address current inefficiencies and inequity.

6.1 Analysis of recent major reforms

6.1.1 Background of recent major reforms

The 2009 Japan HiT review covered major reforms undertaken between the introduction of universal health insurance in 1961 and the passage of the Health Structural Reform Package Plan by the Diet in 2006. However, some reflections on the former reforms, their context and their limited policy impacts might help readers better understand the goals of currently ongoing reform efforts and their challenges because the Diet's reform goals have effectively remained stable since 2006.

Since the achievement of UHC in 1961, the expansion and equalization of financial protection between Employee's Health Insurance and National Health Insurance (NHI) was the first reform project until 1973 when co-payment rate of NHI beneficiaries were reduced from 50% to the current rate of 30%, and free medical care for the elderly age over 70 years under the Elderly Welfare Act became available until 1983 (Ikegami N et al., 2011; Oshio T et al., 2014; Reich MR et al., 2016). On the supply side, the expansion of supply volume of health care by increasing hospital capacity and the number of physicians was carried out in the same period. After the first "oil-shock" in 1973 when the members of the Organization of Arab Petroleum Exporting Countries proclaimed an oil embargo and the sharp increase of oil price happened, Japan faced serious economic stagnation and the Ministry of Health and Welfare shifted its policy focus to cost-containment primarily through price- and volume- control (Hashimoto H et al., 2011).

Control over hospital bed volume was mainly exercised through amendments to the Medical Care Act. The first amendment enacted in 1985 ironically resulted in a drastic increase of bed volume before its implementation, instigated by the opportunistic behaviour taken by private hospital owners. Since the passage of the second amendment to the Medical Care Act in 1992, the Ministry of Health and Welfare changed its strategy to induce functional differentiation of hospital beds into acute and chronic care for efficient resource use. This is because the chronic care beds were actually used as nursing homes for the elderly. In 2000, when the public Long Term Care Insurance (LTCI) system was introduced, the Ministry announced that it would be replacing chronic care beds with long-term institutional services for cost containment purposes by 2011.

In terms of cost containment, Japan has been relatively successful since the late 1970s despite its greying population (and the subsequent

increase in demand) and fee-for-service based payment scheme. This is the result of item-by-item price controls set through the national fee schedules, of which details are available elsewhere, including in Chapter 3 of this report (Hashimoto H et al., 2011; Ikegami N et al., 2011). In essence, Japan's reimbursement policy for medical care does not allow extra charges other than those officially set by the national fee schedule, with certain exceptions for limited types of services. Furthermore, eligibility for reimbursement is tightly regulated via detailed claim bill submissions and institutional certification conducted by regional social insurance bureaus. Under this scheme, prices set by the national fee schedule have been a useful tool for the Ministry of Health in controlling resource allocation, regulating the entry of innovative but expensive technology, and maintaining total expenditure under the macro-cap set by the Ministry of Finance.

Table 6.1 List of major reform steps since 2006

| Year | Title | Key contents |
|------|--|---|
| 2006 | Health-care Structural Reform Package Act (enacted in 2008) | Fifth amendment of the Medical Care Act to induce mandated evaluation of regional health-care resource allocation plan by prefectural governments and hospital governance |
| | | Amendment of Health Services for the Elderly Act |
| 2008 | Late-stage medical care system for the elderly | |
| | Future map of health-care demand for 2025 announced by the National Council on Social Security | |
| 2010 | The report on the Comprehensive Reform of Social Security and Tax | |
| 2012 | Bipartisan agreement on Comprehensive Reform of Social Security and Tax | |
| | Social Security System Reform Promotion Act | Ear-marked consumption tax rate raise |
| 2013 | Social Security Reform Program Act | Set the schedule for following the act and amendment by 2017, with expected increase in consumption tax rate for financial resources |
| 2014 | Act for Securing Comprehensive Medical and Long-term Care in the Community | Regional health care vision and new local governance for efficient resource allocation |
| | | Amendment of National Health Insurance Act (2015) |
| | | Long-term care insurance reform |

Source: Compiled by the authors

Even under such tight price control, however, population ageing and the increasing price of new medicines and medical devices lead to a constant increase in expenditure, while decades-long economic stagnation has decreased premium and tax revenues for public health insurance schemes, resulted in a skyrocketing rate of health expenditure per GDP. The Japanese government realized that uncontrolled health-care expenditure constituted a threat to the system's financial sustainability, and concluded that conventional price- and volume-control efforts would not be enough to support health-care financing. Consequently, the 2006 Healthcare Structural Reform Package Act was born.

6.1.2 Recent reforms since 2006

6.1.2.1 Healthcare Structural Reform Package Act (2006)

Since 2006, the government's strategy to create financial sustainability in the health care system began to change, indicated by the passage of the Healthcare Structural Reform Package Act in 2006. For the first time, the reforms of the delivery system of health care services and the insurance system were jointly treated as a singular policy package. The 2006 Reform Act aimed to recapture the financial sustainability of the health-care system through improved efficiency of the delivery system of health care services and improved accountability of public health insurers. More specifically:

- The Medical and Health Services for the Elderly Act of 1982 was partially amended by the National Health Insurance Act and renamed as the Securing Medical Care for the Elderly Act. The amendment mandated public insurers to encourage cost-control by disease management via prevention services such as screening and following health education programmes. The amendment also stipulated a newly established national claim information database (i.e., National Receipt Database; NDB), as part of the MHLW, to closely monitor expenditure and find policy leverage for cost-control. Finally, the amendment required the establishment of a new, independent insurance scheme for the older-old (age 75 years and above) (late-stage medical care system for the elderly) in order to liberate existing public insurers from the financial pressure incurred by elderly health-care costs (details are given in Chapter 3).
- The fifth amendment of the Medical Care Act mandated prefectural governments; (1) to collect and disseminate information on

hospital functions to better support beneficiary citizens' rational choice for care utilization, and (2) to prepare specified goals/indices for performance evaluation of the regional health-care plan. The Act also mandated hospitals (especially the private sector) to improve their management transparency and organizational governance (Table 6.1).

Late-stage medical care system for the elderly (2008)

As was scheduled by the Healthcare Structural Reform Package Act in 2006, the late-stage medical care system for the elderly was introduced in 2008. Before the new system, the Medical and Health Services for the Elderly Act of 1982 required those retired and aged above 65 years to join the Elderly Health Systems (EHS), which was supported by the transfer of insurance premiums from both from the NHI and the Employees' Health Insurance system. However, due to the reduced premiums and co-payments collected from a rapidly ageing society, this transfer has come to threaten some insurers that are a part of the Employee's Health Insurance system. Since then, there has been an increasing demand for establishing new insurance systems for the elderly. The new late-stage medical care system for the elderly in 2008 mandated that 50% of the programme's budget should be funded by government tax revenue, 10% by beneficiaries' contributions, and the remainder by the transfer of insurance premiums from existing health plans (NHI and Employees' Health Insurance). Then the opposition party (Democratic Party of Japan-DPJ) responded by disseminating a campaign that the new scheme was plagued by ageism, disproportionately burdening elderly households, and in so doing, created a wave of political backlash. Although the campaign was ultimately considered to be a false accusation, the discussion behind the newly proposed care scheme revealed that the system in its current form (i.e. favouring the older population at the cost of the younger generation) is not financially sustainable (see more details in Chapter 3).

6.1.2.2 Process of comprehensive Reform of Social Security and Tax (2010–current)

The report on the Comprehensive Reform of Social Security and Tax (2010–)

Also in 2008, a government task force called the National Council for Social Security released a future map of health-care demand and its expected cost in 2025 when the population of those aged 65 years and above is predicted to reach its peak. According to the report, even with

tight price- and volume control, the increased demand for long-term care will exceed the nation's financial and medical capacity; thus, both healthcare and long-term care need drastic reform in service provision systems and financing. The report accelerated policy debate in the government and the ruling (Liberal Democratic Party-LDP), as well as in the opposition Democratic Party of Japan, especially with respect to the appropriate balance of health-care and long-term care provisions and cost-containment. The debate continued even after the change in the ruling party from LDP to DPJ after the 2010 general election. Under the DPJ ruling cabinet, the National Council for Social Security concluded the report on the Comprehensive Reform of Social Security and Tax, which was passed by the Cabinet in December 2010. This is the joint reform for the social security and taxation systems, which enables broader support for the social security system in Japan. In the Cabinet agreement, five principals for social security reform were confirmed: social inclusion, universalism for all generations, decentralization, integrated service provision, and regaining financial sustainability without future debt (Cabinet Office, Government of Japan, 2011).

Although the 2011 mega earthquake delayed the original schedule, the policy guideline finally reached Cabinet decision in February 2012.

Social Security System Reform Promotion Act (2012)

Although the report on the Comprehensive Reform of Social Security and Tax was initiated by the DPJ, the idea of the Comprehensive Reform of Tax and Social Security finally reached a bipartisan agreement in June 2012, and the Social Security System Reform Promotion Act was passed in the Diet in August 2012 (Government of Japan, 2012). The Social Security System Reform Promotion Act stipulated policy reforms for pensions, health care, long-term care and child raising. With respect to health care, the Act mandated the maintenance of universal insurance coverage, stabilization of health care financing, equalization of public insurance premiums across plans, and re-evaluation of benefit coverage.

Since the LDP returned to a ruling position in the December 2012 general election, the implementation of the Act has been overseen by the new LDP ruling Cabinet. The consumption tax rate was raised from 5% to 8% in April 2014; it was originally supposed to reach 10% in October 2015 to make financial space for the "reform" (the timeline was extended to October 2019). Increases in marginal revenue were specifically earmarked for social security expenditures including pensions, medical

care, long-term care, child welfare and welfare for households living in poverty. An estimated ¥14 trillion (US\$ 113 billion) was collected due to the tax-rate increase from 5% to 8%. Of this, approximately 10%, or ¥1.5 trillion (US\$ 12 billion), was to be invested in the regional health-care systems (medical and long-term care systems).

Box 6.1 Japanese economy and financial pressure by health-care expenditure

Since the collapse of the economic bubble in 1992, the nominal GDP of Japan has stagnated, and the primary balance of the nation has been negative. Serious austerity measures between 2004 and 2008 tentatively closed the gap, although the economic downturn due to the Lehman Shock widened the negative gap yet again. In 2009, the proportion of transfers to social security, including pensions and medical and long-term care, finally exceeded half of the nation's general expenditures. During 2008–2012, when political turmoil and a natural disaster burdened the country, the passage of the Comprehensive Reform of Tax and Social Security placed highest priority on regaining the balance by the year 2020.

Social Security Reform Program Act (2013)

Following the vision set by the Social Security Reform Promotion Act, the Social Security Reform Program Act was enacted in December 2013 (Government of Japan, 2013). The Social Security Reform Program Act translated visions into strategies to be implemented, and required due legislation and the amendment of related laws by a 2017 deadline.

The Act acknowledged that reform in the provisional systems would face several challenges, namely, dominance of the private sector, a lack of system accountability without shared visions, and closed decision-making processes in local politics. To overcome these challenges, the Act concluded that the local government should be responsible for submitting a vision for discussion on reform of the local delivery system reform, with clear goals grounded by reliable statistics of system performance (i.e., Regional Healthcare Vision). To improve local system efficiency, the Act also urged that local health-care institutions should form an effective network for the optimal allocation of resources and functional capacity to better meet local needs. The Act also required municipal government to consolidate NHI insurers at the prefectural level so that they could obtain more stable risk pools and equalize premium rates within the prefecture (Ikegami N et al., 2011).

6.1.2.3 Act for Securing Comprehensive Medical and Long-term Care in the Community (2014)

In June 2014, a reform plan for healthcare and long-term care was finalized by the enactment of the Act for Securing Comprehensive Medical and Long-term Care in the Community (Government of Japan, 2014), or a package of amendments for 19 related laws, mainly in the Medical Care Act, National Health Insurance Act, and Long-Term Care Insurance Act. Each of amendment is presented in detail below.

Amendment of the National Health Insurance Act to consolidate municipal public insurers with the prefecture authority

Another output from the Program Act was the drastic amendment of the NHI Act. Since its beginning in 1958, the municipal (or city) governments were local insurers of the system that set a municipality-specific premium rate under a nationwide standardized benefit packages. Beneficiaries of NHI, or community-based health plans, are households comprising small business or retirees who tend to have a higher health risk and lower income. With the small pool sizes, the financial status of public insurers of the NHI have been chronically in deficit and unstable, primarily subsidized by transfers from the Central Government and prefectural governments. Moreover, premium rates were unequal across municipalities, depending on their financial status. The 2015 Amendment sought to improve the financial stability of local insurers and equality in premium contributions by newly assigning an insurer management centres to the prefectural governments.

Prefectural governments are mandated to coordinate financial management, set prefecture-specific standard premium rates, and provide re-insurance to municipalities with a higher financial risk. The new scheme may reduce inequality in premium contribution across municipalities, though it is not a perfect solution because it still leaves the adjustment up to municipality insurers.

Regional Healthcare Vision and new local governance for efficient resource allocation

A “publicly-funded, privately-provided” system – tight control of cost and a laissez-faire approach to service delivery – was the major characteristics of Japanese healthcare (Hashimoto H et al., 2011). This new Act is the first governmental action to directly regulate the health-care service delivery system in local regions. It emphasizes the governance of the

local health-care system by: (1) strengthening the regulatory power of local prefectural governors, (2) enhancing the active and coordinated contributions of private/public hospitals to the governance of local systems, and (3) establishing the functional differentiation of hospitals and an effective referral networks between them by the introduction of hospital performance reports. The Act also requires every hospital to report their own medical service functions (highly acute, acute, recovery and chronic) to the prefectural governor's office for benchmarking local resources and performance. Based on the collected information, every local stakeholder is to be invited for discussion in order to decide efficient resource allocation that would appropriately meet estimated service needs.

Long-Term Care Insurance (LTCI) reform

The Long-Term Care Insurance Act was enacted in 2000 and has been periodically revised every three years. Due to ageing society, the LTCI has been facing escalating costs and recent reforms focus on cost containment, while keeping the quality and quantity of long-term care services. The latest reform was conducted in 2015: (1) before the revision, beneficiaries paid 10% of service fee as OOP, but this rate was increased to 20% post-reform and (2) the reform prescribed reduced payments from those living below the poverty line. Based on the severity of the patient's condition and need, beneficiaries are divided into seven categories, including two requiring support (levels 1 and 2) and five requiring long-term care (levels 1–5) (the lightest is requiring level 1 support and the most severe is requiring long-term care level 5) (see details in Chapter 5). Although all beneficiaries had been covered by LTCI, the two levels requiring the lightest support (level 1 and 2) are now excluded from LTCI after revision in 2015 for cost containment; they are now supposed to be covered and financed by the local government (benefit package and coverage vary among municipalities). The next round of LTCI revisions will take place in 2018.

6.1.2.4 Integrated Community Care System (ICCS) by 2025

The Integrated Community Care System (ICCS) has been proposed as a strategy to meet social needs emerging in the community because of population ageing; it would enable people to continue to live in their homes with a sense of security throughout their lifetime, regardless of their functional capacity. The MHLW portrays the ICCS as an integrated system that provides (1) medical care, (2) long-term care, (3) long-

term preventive care, (4) living support, and (5) housing services in an integrated manner to the local community (Ministry of Health, Labour and Welfare, 2017h; Tsutsui T, 2014). For this purpose, a new fund for integration of medical and long-term care services is to be collected in each prefectural government by using expected additional revenue from the increase in the consumption tax rate.

6.1.3 Political analysis of recent reforms by the Central Government

The key characteristics of a recent series of major reforms are three-fold. First, the Cabinet directly leads the debate to break through political inertia and bureaucratic silos that have historically deterred major reforms. Second, the central theme of health-care reform is clearly linked to regaining the nation's primary balance in the face of population ageing and economic difficulties. Third, for these purposes, the Program Act was used to set the agenda of the reform, deadlines, and due budget sources (e.g., raising consumption tax rate) in order to push the reform debate forward before specific amendments of individual laws were discussed.

Although the time period between 2008 and 2012 was politically dynamic – four prime ministers, two transitions between a conservative liberal party (LDP, current ruling party) and a radical liberal party (DPJ) – the core agenda for regaining the primary balance has been consistently treated as a bipartisan agenda, which also provided political readiness for the reform debate in the Diet. The current Abe administration kept expenditure increase by US\$ 44.5 billion per year, and keep going.

The benefits of this new policy making processes can be seen in the powerful leadership exercised by the Cabinet, which made a considerable move forward towards the reform goals. However, this drastic change in policy making processes created logistical difficulties because the MHLW, which usually implements health care-related strategies and policies, was not substantially involved in the decision-making process. Despite the vision presented by the Program Act, it has been inconsistently translated by different bureaus in the MHLW because inter-sectoral governance in the Ministry remains weak.

The response of local governments to the new scheme is also slow and heterogeneous, because the local prefectural governments are diverse in terms of size, financial and human resource capacity, demographic structure and political governance. Consequently, whether or not the new reform scheme is successfully translated into local implementation

requires careful monitoring, else it might lead to the widening of inequality in the performance of the health care system across regions. This would be contrary to the principle of “equal benefit for all”, that has been touted since Japan’s universal health insurance system was established.

Finally, another major challenge is the provision of financial resources for enacting the reforms. Raising the consumption tax is the only source of funding expected to support the reforms. However, the current Abe Cabinet has postponed the schedule of raising the consumption tax rate to 10%: from October 2015 to April 2017, and most recently even further October 2019 because of political and economic concerns that further increases would unduly weaken the economy. As an increase of consumption tax is highly political matter, the future progress of reform process is still unclear.

6.2 Future developments

As presented in the previous section, due legislation has been enacted, and implementation of each act is now in progress. The core policy focus is to address the financial balance between the increasing demand due to population ageing and financial sustainability under limited economic growth. The Fiscal System Council in the Ministry of Finance has tentatively set the upper limit of social security expenditure growth at ¥500 billion (or US\$ 5 billion) per year as “natural growth due to population ageing.” A major fee schedule amendment for medical and long-term care services is expected in April 2018, without any financial provisions to cover its growth. The current Abe Cabinet announced in July 2016 that under expected budget restrictions, the priority will instead be welfare programmes designed to enhance child development and female participation in the labour force.

Besides financial issues, the tactical implementation of the ICCS remains unclear: e.g., how to design incentives to invite local stakeholders to the community discussion table, or who will and how to coordinate diverse interests into a local consensus on efficient resource allocation. Both the public and private sectors in the local systems for providing health and long-term care have their own sunk costs for the current operations. If the local community faces an “over-supply,” which is likely, how to reach consensus and trade between interest parties needs clear rules and governance.” The Ministry itself still suffers from bureaucratic red tape, and their definition of “ICCS” is not unanimously shared and standardized

across bureaus. A new style of governance to foster inter-sectoral coordination is required.

Despite the expected challenges ahead, the concept of the ICCS is regarded as promising for shifting from the traditional health-care model at the institutional level to the integrated, community-based system (Tsutsui T, 2014). It covers the patients' value chains in the community — from family practice, acute care rehabilitation, long-term care, and palliative care. The ICCS is also likely to meet the expanding needs of the community's elderly, who are more likely to live alone, with more limited social and economic capacity than ever, and are especially in need of non-medical support to maintain their social participation and functioning in the community (Tsutsui T, 2014).

Traditionally, public health nurses have played a central role in community building and public health practices in Japan. In the ICCS, it remains to be seen whether public health nurses could act as local coordinators for linking medical professionals with welfare programme workers and/or community volunteers.

Finally, the new health-care system requires each Japanese citizen to seriously reflect and share vision on what value would be added to Japanese society through the social security system. As proposed in *"Japan Vision: Health Care 2035,"* a report for the Health Minister by young Japanese health policy leaders in June 2015, the new health system should be based on the social values of fairness and solidarity, while building on individual autonomy and active engagement in community (Miyata H et al., 2015).

7 Assessment of the health system

Chapter summary

For the past decades, the health system in Japan has played a vital role in ensuring that Japan has been one of the healthiest countries in the world. Although overall health system performance has been improving, many challenges still remain: the sustainability of health-care financing, increasing inequity within the population, and an ageing population.

This chapter provides a comprehensive analysis of the health-care system in terms of financial protection, equity in financing, user experience, equity of access to health care, health outcomes, health service outcomes, quality of care, health system efficiency, and transparency and accountability.

7.1 Stated objectives of the health system

As the previous 2009 Japan HiT review described, Article 25 of the Constitution provides the fundamental basis for social security and health policy in post-War Japan. The Article states that “all people shall have the right to maintain the minimum standards of wholesome and cultured living”, and Item 2 further stipulates that “in all spheres of life, the State shall use its endeavours for the promotion and extension of social welfare and security, and of public health.” (Government of Japan, 1946).

Originally, the launch of the universal health insurance system for formal sector workers in 1927 was for military purposes. However, post-War policy debates in the 1950s strived for the creation of a welfare state that supports equality among its citizens under the spirit of Article 25, resulting in the establishment of universal health insurance coverage in 1961 by amending the National Health Insurance Act (Hashimoto H et al., 2011). Since then, equal access and fair contribution have been a central tenet of the Japanese health care policy (Hashimoto H et al., 2011; Oshio T et al., 2014).

Since the late 1970s, when the Japanese economy slowed down and the demand for healthcare increased because of population ageing, cost

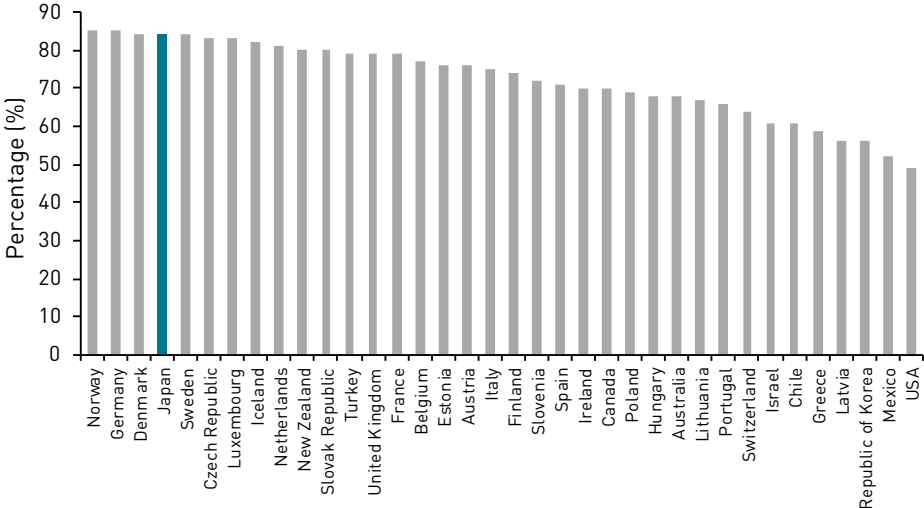
control has become a significant policy theme during discussions on maintaining the sustainability of the health-care system. As was detailed in the previous chapter, in principle, strict price control has been observed on the supply side while a free access policy has been maintained on the demand side until present. Even under the current reform vision, where regaining a financial primary balance is set as the nation’s top priority, reforms still emphasize the maintenance of universal insurance coverage and equalization of public insurance premium contributions across plans. Some criticize that prioritizing equity inherently abandons the means to achieve quality and efficiency. The most recent policy vision for 2035 by the former Minister of Health maintains universal coverage as the key health policy, while also emphasizing citizen’s autonomy in making rational choices and solidarity among citizens as a norm basis for designing social security to achieve quality healthcare with financial sustainability (Miyata H et al., 2015; Shibuya K, 2016).

7.2 Financial protection and equity in financing

7.2.1 Financial protection

As of 2016, 84% of the total health expenditure in Japan is covered by public funds, ranking the fourth highest among OECD countries after Norway, Germany and Denmark (Fig. 7.1).

Fig. 7.1 Percentage share of government transfer and compulsory contribution per total health expenditure in 2016



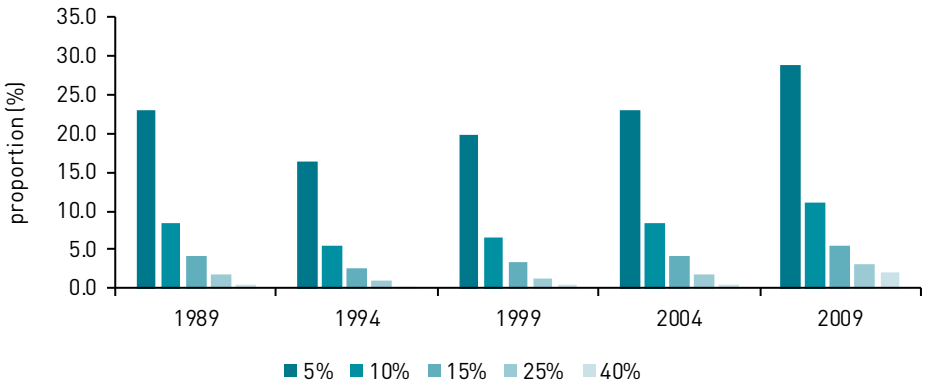
Source: OECD, 2018a

Since 2003, the co-payment rate has been set at 30% for all beneficiaries between 6 and 69 years of age, with a monthly upper ceiling adjusted to household income so as to protect households from catastrophic payments. Moreover, premium exemptions for low-income households, co-payment subsidies for children, and subsidy policies for patients with certain conditions (i.e. chronic and intractable) are also intended to exercise a protective function against catastrophic health-care payments, suggesting that there are multiple mechanisms in place to deter household financial crises when it comes to health-care expenditure.

The 2007 Survey of Social Security Status conducted by the National Institute of Population and Social Security Research found that 0.76% of surveyed households reported that they withheld a health-care visit due to economic concerns in the previous year. Simple comparison of the number between 2007 and 2012 survey was difficult because the items in the questionnaire had changed, but the proportion that withheld a health-care visit due to economic concerns in 2012 was up to 2.9% among those aged between 20–65 years, and 1.1% in those 65 years and above (National Institute of Population and Social Security Research, 2017).

In spite of Japan’s relatively excellent in financial protection, recent time trend analyses suggest that this robust protection is weakening over time because of decreasing household income in both real and nominal terms due to economic stagnation since the late 1990s. As Fig. 7.2 depicts, the share of health-care expenditure per household’s non-food expenditure is increasing over time.

Fig. 7.2 Proportion (%) of household health expenditure as share of monthly household expenditure (non-food)



Note: Health-care expenditure includes OOP payment for outpatient and inpatient services (medical as well as dental care), and prescribed medication.

Source: Statistics Bureau, Ministry of Internal Affairs and Communication, 2018, calculated by the authors

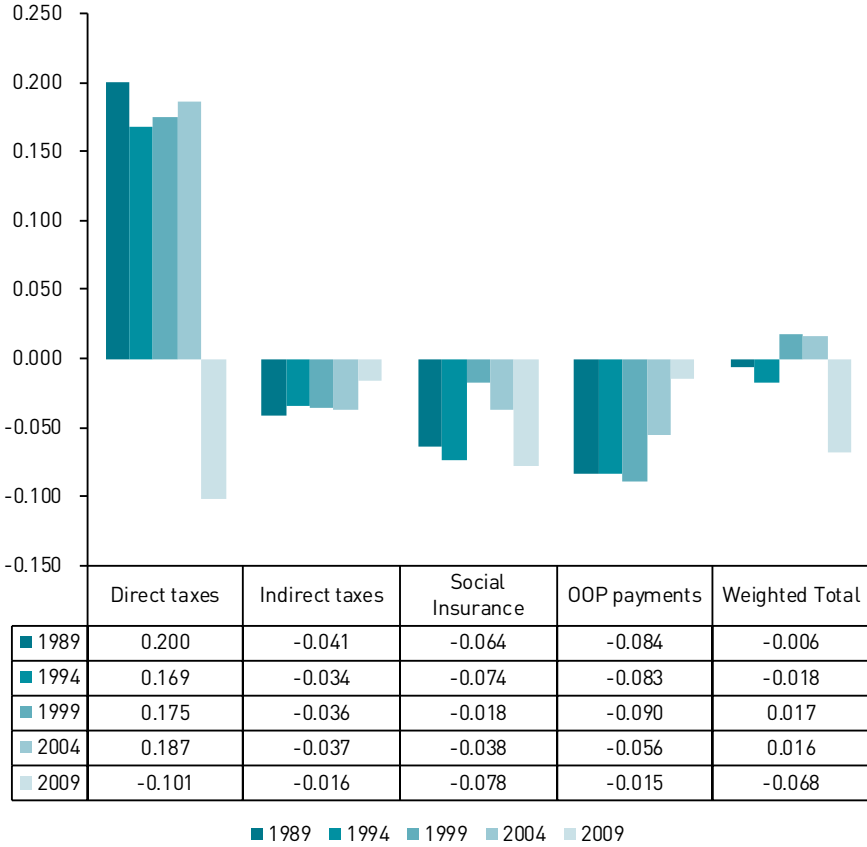
It should be noted that because the policy is effectively universal with only a rough classification of income level, the poor household has to pay relatively higher amount of OOP compared with the high-income household (i.e., the cap is set at the same rate from annual income US\$ 33 300 to US\$ 69 360). Moreover, the subsidy to protect households from financial burden may lead to a moral hazard and related overuse of health-care services in middle–high–income households, rather than effectively protecting low-income households from catastrophic OOP payment. Due to limited data availability, only a restricted empirical assessment can be conducted on this issue.

Even under universal health insurance, another emerging issue remains — an increasing proportion of the population in Japan that may be left without effective public health insurance. Since Japanese public insurance is divided into formal and informal sectors, a recent increase in non-full-time workers without production assets may lead to a higher risk of no-insurance status. Although there are no official statistics on non-insured members of the population, one estimate suggests that approximately 1.3% of the population is without effective health insurance coverage as of 2007 (Hashimoto H et al., 2011). If the same working definition is adopted (those who paid any direct tax but no health insurance premium, and those who do not belong to the NHI scheme), the number would increase to 3.2% as of 2013 (estimated with microdata from the Comprehensive Survey of Living Conditions, 2013).

7.2.2 Equity in financing

As Oshio and colleagues clearly described in the World Bank study report in 2014, the Japanese public health insurance system has been financed by a hybrid of social insurance premiums and government tax transfers to foster financially weak health plans for equal benefit (Oshio T et al., 2014). The re-distributional function to equalize household income was strengthened mainly through an inter-generational mechanism of tax transfers and benefit provisions of a pay-as-you-go based social security for the elderly population, rather than by an intra-generational mechanism of taxation. Indeed, the re-distributional function of social security has been extended since the 1980s in parallel with population ageing.

Fig. 7.3 Kakwani indices as a measure of progressivity in health-care financial contribution by households

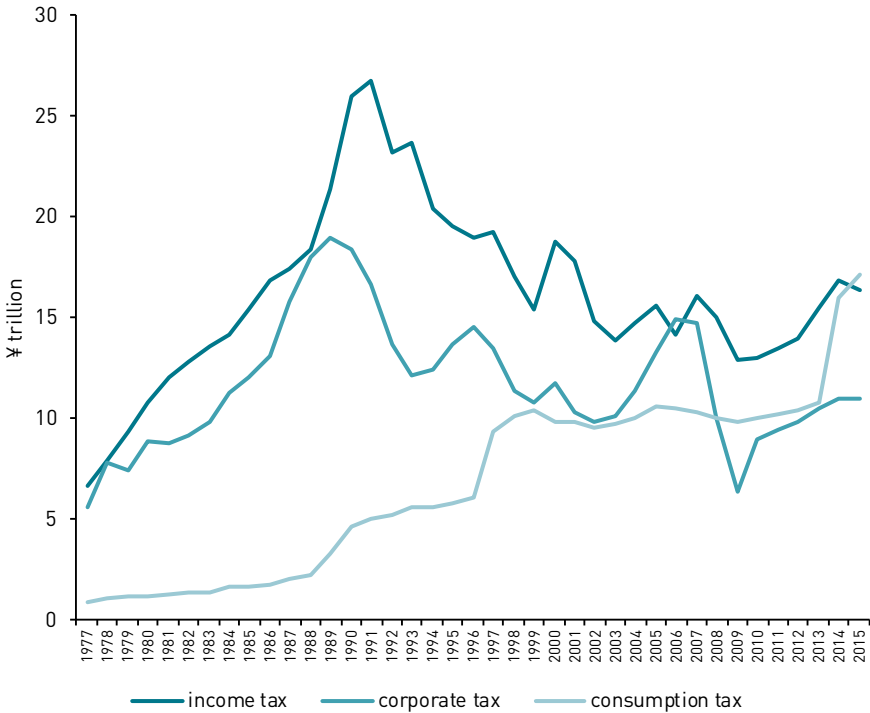


Source: Calculated by the authors

By using microdata from the National Survey of Family Income and Expenditure, the progressivity of health-care contribution was evaluated following the method proposed (Fig. 7.3) (O’Donnell O et al., 2008). The Kakwani index represents whether the contribution is fair across households with different levels of ability to pay (i.e., monthly expenses and tax contribution). Positive numbers indicate that richer households pay a relatively larger contribution, while negative ones indicate that the burden rests disproportionately on poorer households. As Fig. 7.3 shows, contribution through indirect taxes (consumption tax and value-added tax on tobacco and alcohol), social insurance premium, and out-of-pocket (OOP) payments show negative indices, suggesting that relatively poorer households contribute more regressively. On the contrary, direct tax shows strong and positive values due to progressive taxation. Finally,

the weighted total effect was nearly zero, indicating that the regressivity of indirect taxes, social insurance premiums and OOP payments was cancelled out by direct tax contributions. However, the trend was reversed in 2009: the direct tax showed strong negative values, suggesting that the burden of financial contribution was disproportionately incurred on poorer households. It should be noted that the year 2009 was marked by global economic shock, resulting in the sharp decline of household income, pension benefits and government tax revenue (Fig. 7.4). It is estimated that this unfair financial contribution would be worsening in recent years.

Fig. 7.4 Time trend of tax revenues (general tax)



Source: Ministry of Finance, 2017b

7.3 User experience and equity of access to health care

7.3.1 User experience

Despite high performance in equity of access and financial protection so far, some cross-country surveys on consumer satisfaction contradictorily revealed that Japanese customers/patients are less satisfied with their current health-care system compared to those in other countries (e.g. International Social Survey Program) (Murata H et al., 2014). However, the

comparison of user experiences in cross-country settings suffers from a methodological flaw: rated satisfaction should depend highly on the consumer's expectation of their system as it is embedded in the social, historical and political contexts unique to each country. Thereby, cross-country comparisons preclude the fair evaluation of process quality and service provision outcomes.

Within a country, a time trend analysis of consumer perceptions about the performance of their health-care system would better prove any trending change in the system's "responsiveness" to patients' expectations. The Patient's Behavior Survey conducted every 3 years by MHLW (<http://www.mhlw.go.jp/english/database/db-hss/pbs.html>) revealed that patient satisfaction was prevalent and improving over time, though low quality remained a problem in smaller, chronic care hospitals in Japan. Moreover, the survey results indicated that information provided by health professionals to effectively aid patients in choosing treatment and seeking out quality services needed further improvement. In particular, the Bureau of Health Service in the MHLW has been preparing an information platform to better inform patients who suffer from cancer since the enactment of Cancer Control Act in 2006. Although some information has been publicly available, the contents remain to be improved to efficiently support consumer's decision making.

Thanks to the free access policy and high density of clinics/hospitals in the community, waiting time for specialty services is rarely a complaint. However, some have claimed that speciality services are harder to come by in rural areas because of a skewed distribution of specialists who favour urban centres. Tanihara et al. (2011) indicated that the unequal geographical distribution of physicians has not changed since the late 1980s, despite an increase in physician numbers per population of 100 000 during the same period (Tanihara S et al., 2011).

7.3.2 Equity of access to health care

Horizontal equity in health-care access

Equity of access to health care could be assessed from several viewpoints. In this section, horizontal equity in health-care access—defined as equal treatment for equal needs (ETEN) following Wagstaff et al. was assessed (Watanabe R et al., 2012). Briefly, two types of the concentration index were calculated: actual health-care visits over a household's income level, and expected health-care needs based on

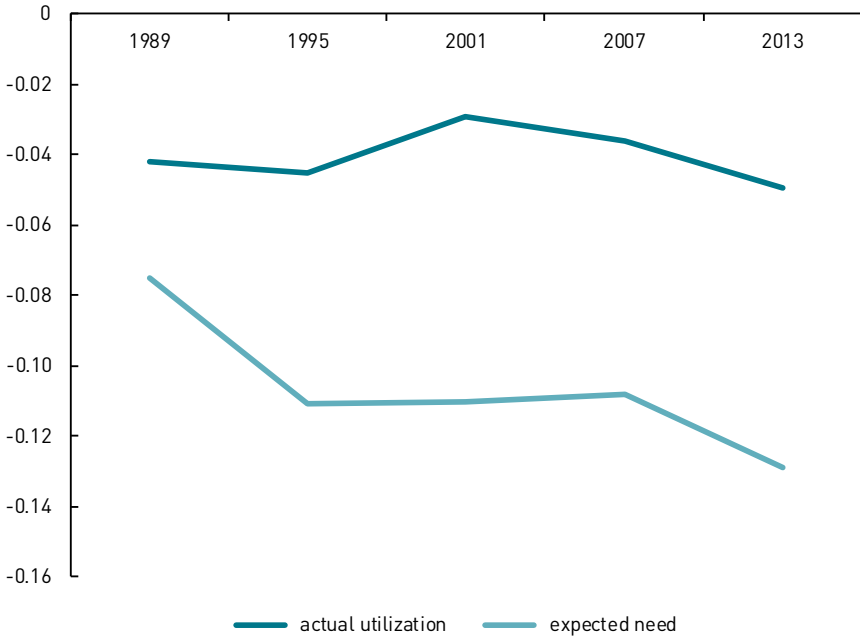
demographic and clinical conditions. The difference between the two is the index of “horizontal inequality” (HI).

By using cross-sectional, nationally representative household surveys (the Comprehensive Survey of People’s Living Conditions) from 1986 to 2007, Watanabe and Hashimoto (2012) revealed that the HI was relatively low in Japan, though the degree of HI was increasing over time for people aged below 65 years, while the HI was minimal and constant for those aged above 65 years.

Two additional waves of the Survey (2010 and 2013) were obtained for this HiT report and the assessment was redone to see the impact of the global economic shock in 2008 and the subsequent decrease in household income in real terms on the HI of health-care access. During this period, despite a sharp decline in GDP growth, the Japanese Government did not take strong austerity measures to cut down health-care expenditure, but instead modified the fee schedule to allow marginal growth due to population ageing. On the demand side, the elderly with a high income who used to pay 10% co-payment were asked for 20% co-payment since 2003, and further increased to 30% since 2006. Otherwise, the co-payment rate was amended to 20% for all the elderly above 70 years regardless of household income levels, although the government postponed this change until 2014. The Ministry estimated that about 6–7% of elderly households belong to the high-income group (Ministry of Health, Labour and Welfare, 2012e).

The results are presented in Fig. 7.5. The concentration indices for actual health-care service use among those aged 20 years and above were constant and negative, suggesting that lower income households actually utilized more of the services. This can be explained by the fact that utilization has been high among the elderly with a lower income, due to increasing health-care demand and a reduced co-payment rate compared to younger households. The gap between the actual utilization and expected health needs, or the HI, was negative, suggesting that people with a lower household income were likely to withdraw health-care use despite their needs. The inequality faced by low-income households was the strongest in 2001, then recovered up to around -0.05 . The change in the HI was mainly attributable to the change in estimated health-care needs, which hit its lowest point at -0.12 in 1998 just after the International Monetary Fund (IMF) currency shock in 1997, and then slowly recovered to -0.08 in 2013.

Fig. 7.5 Horizontal equity in access to healthcare (concentration indices over household income) all ages 20+ years

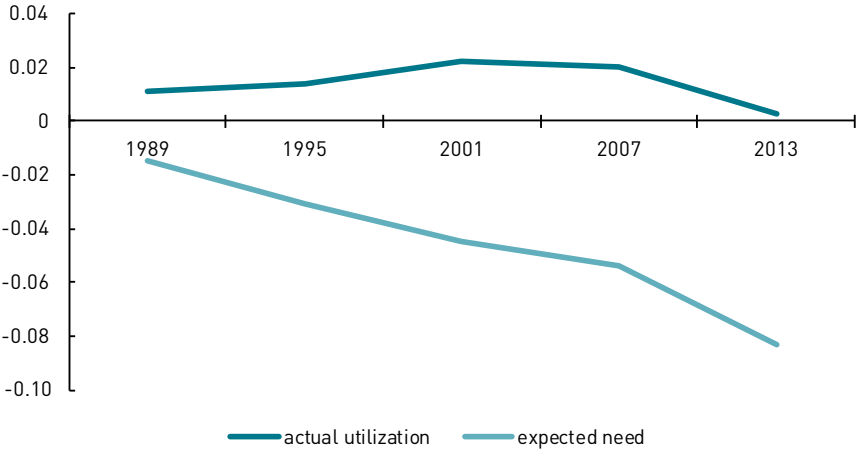


Note: Actual utilization: concentration indices for actual health-care use, expected need: concentration indices for expected health-care needs (estimated health status)

Source: Estimated by the authors based on (Ministry of Health, Labour and Welfare, 2016d)

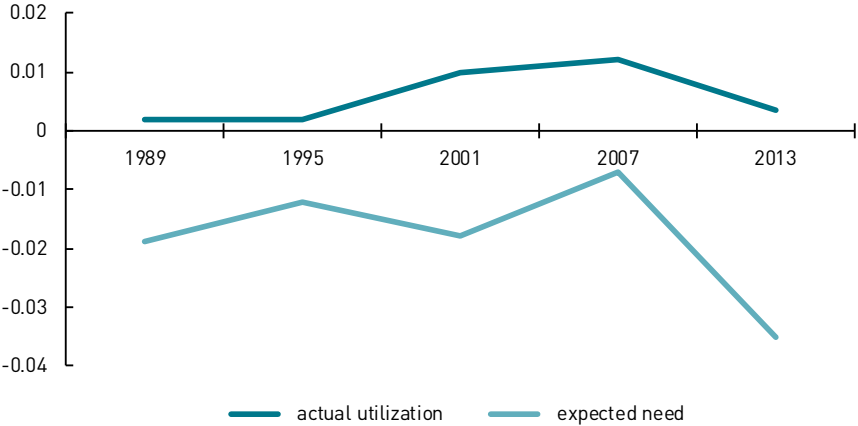
Compared to their younger counterparts that faced an increasing gap in access, the HI has been small among people aged above 65 years, presumably due to favourable reductions in the co-payment rate reductions for the elderly population, which have been successful in equalizing health-care utilization regardless of income levels (Fig. 7.6). The introduction of an increase in the co-payment rate specifically for the high-income elderly in 2010 seemed to result in improved horizontal equality as of 2010. However, a sharp decline in 2013 may require careful monitoring, since it may be an early sign of declined household capacity to pay for healthcare due to economic stagnation. Once the latest data for 2016 become available, further monitoring is also needed after 2014, when the co-payment rates for the elderly went up to 20% and the consumption tax rate was simultaneously increased from 5% to 8%.

Fig. 7.6a Horizontal equity in access to healthcare (concentration indices over household income) ages 20–64 years



Note: Actual utilization: concentration indices for actual health-care use, expected need: concentration indices for expected health-care needs (estimated health status)
Source: Estimated by the authors based on (Ministry of Health, Labour and Welfare, 2016d)

Fig. 7.6b Horizontal equity in access to healthcare (concentration indices over household income) ages 65+ years

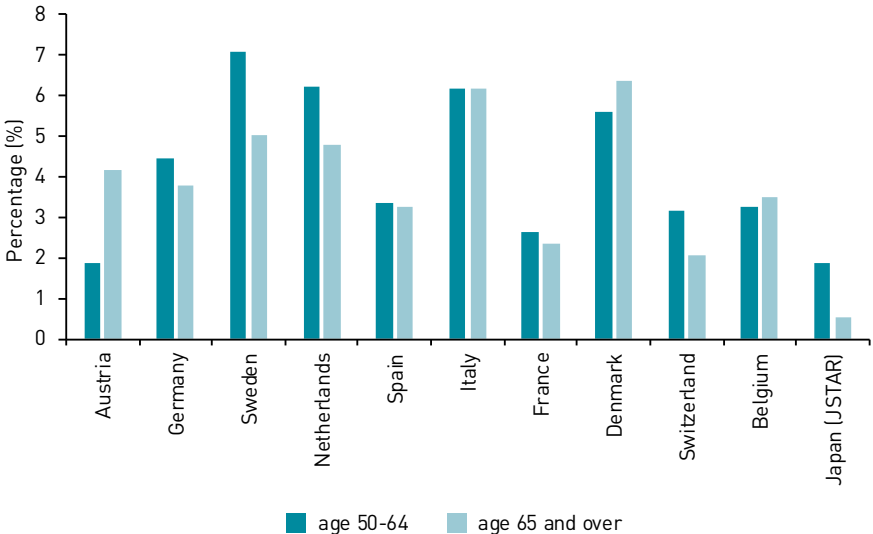


Notes: Actual utilization: concentration indices for actual health-care use, expected need: concentration indices for expected health-care needs (estimated health status)
Source: Estimated by the authors based on (Ministry of Health, Labour and Welfare, 2016d)

For the purpose of a cross-country comparison, the Japanese Study of Ageing and Retirement (JSTAR) and its sister survey in Europe (Study of Health and Retirement in Europe [SHARE]) were compared. Both surveys are a part of a global harmonization of elderly panel surveys led by the US Health and Retirement Study. Since JSTAR took a random, not probabilistic, sample from selected Japanese municipalities, the results should be interpreted with caution.

Fig. 7.7 shows that the proportion of those who claimed any foregone healthcare due to financial concerns in the previous year is lower in Japan than in Europe, especially among those above 65 years, presumably due to reduced co-payments. Nishi et al. (2002) analysed a nationally representative household survey and reported that the reduced co-payment rate was significantly associated with better health status among those above 70 years, especially with regard to mental health (Nishi A et al., 2012). However, Shigeoka (2014) did not identify any health benefit in terms of reduced mortality, despite increased utilization due to the reduction in co-payment rate (Shigeoka H, 2014).

Fig. 7.7 People who experienced any foregone care for financial reasons in the previous year (%)



Source: SHARE Wave1, 2004–2005 and JSTAR Wave2, 2009

Equity of access in terms of resource distribution and cultural gap

As mentioned earlier, physicians and subspecialists are unequally distributed towards urban settings; Sakata et al. (2016) conducted a time trend analysis of the regional distribution of nurses between 2002 and 2011, and concluded that despite an increase in the number of nurses per 100 000 population, their distribution was biased by a reimbursement policy that motivated acute care hospitals in urban settings to increase nurse-per-bed ratios for better payment (even acute care hospitals face biased nurse distribution between urban and rural settings) (Sakata Y et al., 2016).

It is worth noting that the Japanese health-care system harbours a cultural gap when it comes to the needs of ethnic minorities, especially with respect to language barriers. Some efforts are being made towards 2020 Tokyo Olympic and Paralympic games including interpretation services in multi languages. However, systematic and empirical evidence is scarce, making it difficult to identify the magnitude and severity of this particular problem. There are some case reports describing poor accessibility due to economic and language barriers among minority populations, which can lead to fatal consequences in the worst-case scenario (Sawada T, 2007).

7.4 Health outcomes, health service outcomes and quality of care

7.4.1 Equity in outcomes

As is mentioned in Chapter 1, drastic improvements in population health in Japan since 1970 have been attributed to the rapid decrease in deaths due to stroke, which was likely the result of health education on the risk of hypertension by community health practitioners, improved housing conditions, dietary intake, and access to antihypertensive medication (Ikeda N et al., 2011). For descriptive statistics of and trends in population health (e.g. life expectancy, neonatal mortality, maternal mortality), please refer to Chapter 1.

Domestic disparity in life expectancy

Although Japanese people enjoy excellent population health, there remains a persistent discrepancy across the nation and the disparity in life expectancy across prefectures narrowed until the 1990s, but again began to widen afterwards. Nomura et al. reported in 2017 that the gaps between prefectures with the lowest and highest life expectancies and

healthy life expectancies have widened between 1990 and 2015, from 2.5 to 3.1 years and from 2.3 to 2.7 years (see details in Table 1.3 in Chapter 1), respectively. Although overall age-standardized death rates decreased by 29.0% (28.7–29.3%) from 1990 to 2015, the rates of mortality decline during this period substantially varied across prefectures, ranging from -32.4% (-34.8 to -30.0) to -22.0% (-20.4 to -20.1) (Nomura S et al., 2017).

What determines the persistent difference across prefectures remains to be studied including the relationship between social determinants and health disparities. There was no correlation between health outcomes and the number of human resources for health and health-care expenditure by prefecture level, and detailed risk-factor analysis at prefecture level is also needed. For now, it is known that there is a substantial and systematic difference across prefectures in the prevalence of known risk factors such as smoking, as well as socioeconomic indicators such as mean household income, educational attainment, industrial structures and subsequent unemployment rates.

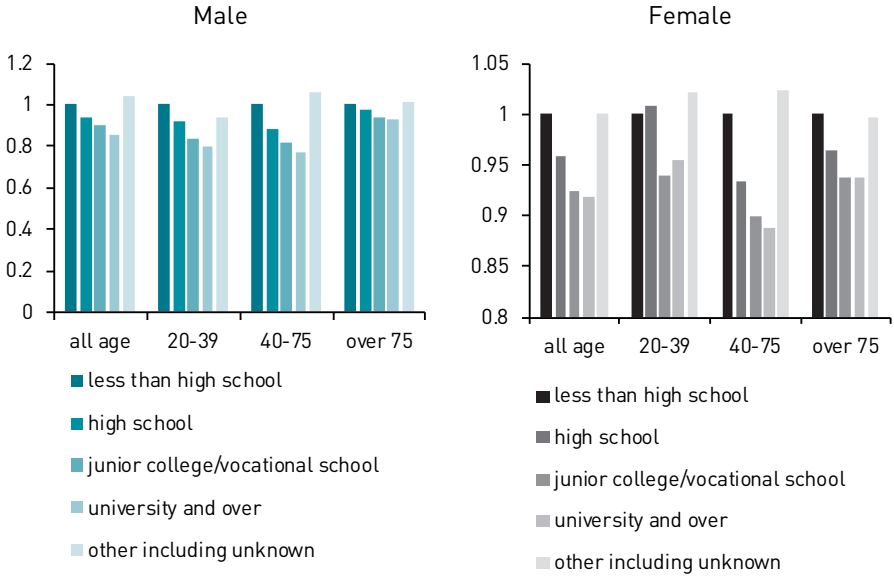
Health disparity across socioeconomic conditions

Since Japanese vital statistics do not include information regarding socioeconomic status in terms of educational background and household income, limited information is available on socioeconomic disparities in disease incidence, survival rates and mortality at the national level.

In a large, epidemiological cohort (The Japan Collaborative Cohort Study for Evaluation of Cancer Risk; JACC), Fujino and colleagues (2005) showed mortality differences across different levels of educational attainment (Fujino Y et al., 2005). The study revealed a significant association between all causes of mortality and educational attainment among adults above 40 years of age who participated in community health check-ups.

The authors probabilistically linked census microdata with death records to address mortality difference across educational attainment, following Blakely and Salmond (2002) (Blakely T et al., 2002). The results indicated that the education-related disparity in all-cause mortality was more salient among men, and those in middle-aged and early elderly (Fig. 7.8).

Fig. 7.8 All-cause mortality risk ratio by educational attainment in 2010



Sources: National Census, 2010 and vital statistics, November 2010–April 2011, calculated by the authors

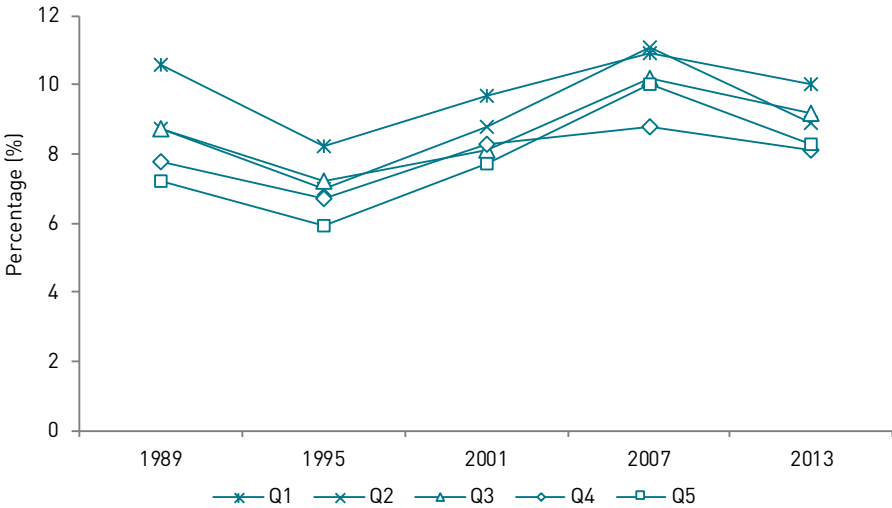
Wada et al. (2012) reported that occupational class was significantly associated with mortality risk (Wada K et al., 2012). Contrary to findings in Europe and the USA, time trend analysis showed that the economic downturn had a negative impact in Japan by raising mortality in the “manager class” rather than in blue-collar workers. Although the trend is most clearly observed in suicide rates, it is also visible in the rates of cancer mortality. Otherwise, due to the lack of socioeconomic information in Japanese vital statistics records, there is no empirical data regarding socioeconomic disparities in mortality across income levels or educational attainment levels in a nationally representative sample.

Income-related disparities regarding self-reported health status were reported by Kachi et al. (2013) (Kachi Y et al., 2013), with the use of nationally representative household surveys between 1986 and 2007. In this report, data from 2010 and 2013 were added in order to see the trends after the global economic downturn in 2008 (Fig. 7.9 and 7.10). As already reported, the discrepancy in subjective health status across income quintiles narrowed up until 2004, but then resumed widening after-wards. Notably, data indicated a sharp health decline among the

lowest quintile relative to other strata, suggesting that economic hardship had most affected those with the lowest household income.

Since socioeconomic data were not linked with health-care utilization records, there are virtually no empirical data regarding socioeconomic disparities in clinical outcomes at this stage. Ito et al. (2014) used a population-based cancer registry in the Osaka area and found that there was consistently a gap in cancer survival across the regional deprivation index; the disparity remained throughout the period 1993–2004, despite improved survival overall (Ito Y et al., 2014).

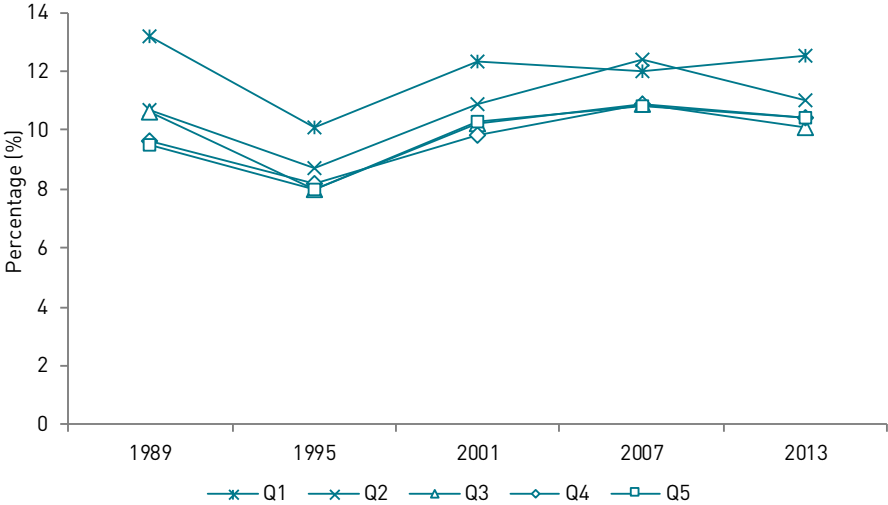
Fig. 7.9 Self-reported poor health prevalence by income quintile (male)



Note: Q1 is the lowest income quint, while Q5 is the highest income quintile.

Sources: Comprehensive survey of living conditions, Ministry of Health, Welfare, and Labour, 1986–2013. Estimated data for 1986–2007 derived from Kachi et al. 2013 by courtesy of Dr Yuko Kachi. Estimation for 2007b, 2010 and 2013 by the authors, following the published estimation method.

Fig. 7.10 Self-reported poor health prevalence by income quintile (female)



Note: Q1 is the lowest income quint, while Q5 is the highest income quintile.
Sources: Comprehensive survey of living conditions, Ministry of Health, Welfare, and Labour, 1986–2013. Estimated data for 1986–2007 derived from Kachi et al. 2013 by courtesy of Dr Yuko Kachi. Estimation for 2007b, 2010 and 2013 by the authors, following the published estimation method.

7.4.2 Health service and quality of care

A free access policy, universal insurance coverage and several subsidized measures to support health-care access for those with greater needs (e.g. children, the elderly and disabled persons) should theoretically result in good health outcomes for the Japanese population. Indeed, some attribute Japan’s excellence in population health (e.g. longevity) to high-quality health care and secure accessibility. However, there is very limited evidence on the effective coverage of health-care services in Japan.

Preventive care

Free immunization programmes for children are scheduled for Hib, hepatitis B, BCG, measles, rubella, DPT-IPV (or DT), varicella, pneumococcus and Japanese encephalitis. Vaccination out of schedule must be paid for OOP. Otherwise, vaccination for rotavirus, mumps, hepatitis A, and influenza are voluntary and paid for OOP, with various subsidies across municipalities. Pneumococcal vaccine for older people (above 65 years) recently became available with a co-payment that also varies across municipalities.

Surprisingly, there are no official statistics on effective vaccination coverage in Japan. For child vaccinations, the MHLW has published information on the target population and the reported number of vaccines provided at health-care institutions (<http://www.mhlw.go.jp/topics/bcg/other/5.html>). However, whether the vaccines successfully reached the target population as scheduled is not validated by these published numbers. According to studies based on household surveys, the rate stays at around only 90%, and barely exceeds 95% (Baba K et al., 2011; Ueda M et al., 2014).

Although provided free, whether the coverage of routine vaccinations is equally distributed or not remains another health policy question to be answered. In metropolitan and urban settings, Ueda et al. (2014) reported that children of mothers under the age of 25 years, who were less educated, and had an at-work status without childcare leave were more likely to miss timely vaccinations for measles and DPT (Ueda M et al., 2014). Combination and multiple vaccinations are not widely used in the Japanese vaccination policy partly because the government takes defensive positions against civil activists' law suits to accuse the government of "failed regulation to prevent side effects of vaccination" (Hanley SJB et al., 2015). Consequently, the Japanese vaccine schedule is very complex, which places temporal and financial pressures on parents. Cultural and language barriers further curtail the coverage rate of children of foreign origin (Tsukui S et al., 2009).

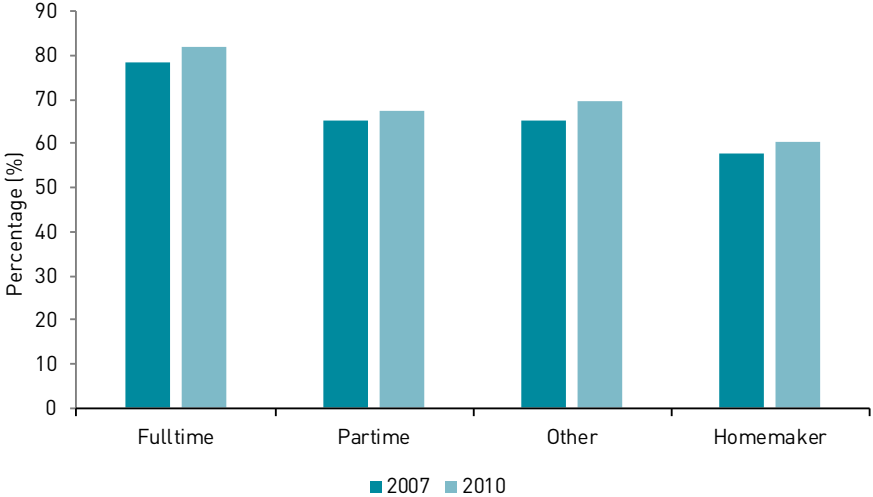
For voluntary vaccinations with OOP payments, the coverage rate is substantially lower, and household income and the degree of subsidy by the municipality are known to be influential in determining coverage rates (Shono A et al., 2015).

Health check-up and screening

The Japanese Government introduced the Specific Health Check-ups and Specific Health Guidance (SHCSHG) policy in 2008, with the intention of controlling health expenditure by screening and early intervention for chronic conditions such as the metabolic syndrome (see more details in Chapter 5). Since the introduction of the policy, the check-up participation rate has significantly increased. However, in addition to the limited evidence on the effectiveness of some health check-ups (Matsuda S, 2015), there remains a substantial discrepancy in check-up rates across public health plans tightly linked to work status. Full-time workers covered by company-based plans have the highest check-up rates at around 90%, while workers in informal sectors, part-time employees,

and unemployed persons (e.g. home-makers) had substantially lower rate (Fig. 7.11). The introduction of this “check-up for all” policy has facilitated check-ups for fulltime workers disproportionately, resulting in a significantly widening disparity across employment status.

Fig. 7.11 Check-up coverage before/after policy introduction (%)

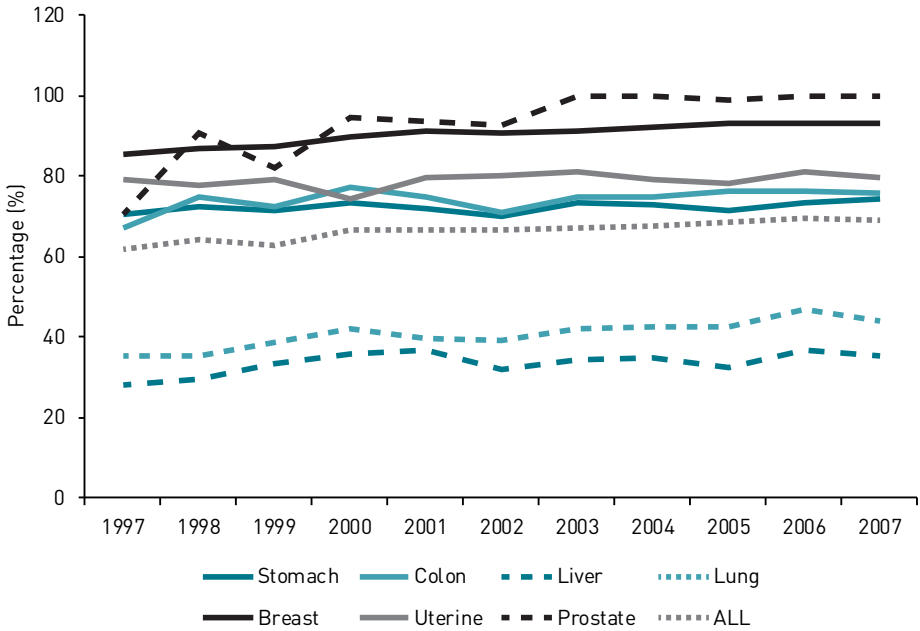


Source: Estimated by the authors based on (Ministry of Health, Labour and Welfare, 2016d).

Cancer screening programmes (stomach, colon/rectum, cervical and breast) are provided by municipalities and some worksites on a voluntary basis with varying co-payment rates. Overall, the screening rate is lower than that of OECD countries. National anti-cancer measures from 2012 stipulate a 50% screening coverage benchmark in five years (from 2012 to 2015). Notably, there is a substantial gender discrepancy in cancer screening, which may also be related to accessibility determined by time, cost and regional resource accessibility of the screening programme, and males are more likely to have cancer screening over the survey period (see also Fig. 5.1 in Chapter 5)

The National Cancer Center recently published data on five-year cancer relative survival rates for breast, cervical and colorectal cancers (Fig. 7.12). These showed substantial improvement in survival for several cancerous conditions. Whether the improvement was due to primary prevention, early screening programmes, technical innovations in treatment, or over-diagnosis remains to be empirically studied.

Fig. 7.12 Five-year relative survival rates for various types of cancer



Note: All figures are percentages.

Source: Matsuda T et al., 2010; National Cancer Center Japan, 2017

Primary care services

There is limited empirical evidence regarding the performance of primary care services in Japan. As the specialty of “general practitioner” is relatively new in Japan, primary care services are provided mainly by clinic physicians who may have little background in general/family medicine; instead, they tend to be certified as a specialist in some subspecialty (e.g. a certified orthopaedic surgeon also provides care in general surgery and internal medicine).

Hashimoto et al. (2011) showed that compared to the USA, where the primary care system is well established, effective coverage for the control of hypertension and hyperlipidaemia is poorer in Japan (Hashimoto H et al., 2011). Using administrative data with clinical process indicators, Tanaka et al. (2016) reported that clinical practices for diabetes control, especially screening for microvascular complications, is suboptimal (Tanaka H et al., 2016). The relatively poor quality in care of chronic diseases could be attributed to the absence of standard guidelines, limited training in general practice as a specialty, and the division

between preventative and curative services in Japan (Hashimoto H et al., 2011).

Acute care services

Since the introduction of DPC (diagnosis-procedure combination) in acute care hospitals in 2003 (see more details in Chapter 5), the performance of participating acute care in hospital services has dramatically improved in Japan. Table 7.1 displays post-operative hospital mortality in Japan and the USA: mortality rates for major surgery are similar between the USA and Japan in some areas; however, the rates for liver and gastric surgery are better in Japan, mainly due to a lower complication rate, partly because of better patient risk profiles (e.g. less obesity).

Table 7.1 Surgical mortality in Japan and the United States of America

| | Japan (diagnosis-procedure combination, 2006–2008) | | | | | USA (nationwide inpatient sample, 2008) | | | | |
|---|--|------------------------|--------------------------|----------------------|-----------------------------|--|------------------------|--------------------------|----------------------|-----------------------------|
| | N | Age>75 years [%] | Comorbidity index [%] | In-hospital death | Crude mor- tality [%] | N | Age>75 years [%] | Comorbidity index [%] | In-hospital death | Crude mor- tality [%] |
| All major surgeries | 1 794 268 | 19.6 | 9.2 | 23,049 | 1.28 | 11 902 905 | 16.1 | 13.9 | 146 350 | 1.23 |
| Coronary artery bypass graft surgery (CABG) | 13 382 | 28.5 | 21.3 | 404 | 3.02 | 222 250 | 21.5 | 26.6 | 4935 | 2.22 |
| Valvular surgery | 11 669 | 26.3 | 7.2 | 437 | 3.74 | 107 939 | 33.2 | 23.1 | 5757 | 5.33 |
| Breast cancer surgery | 51 755 | 13.8 | 14.8 | 22 | 0.04 | 37 353 | 20.2 | 50.0 | 33 | 0.09 |
| Lung cancer surgery | 28 096 | 27.0 | 45.0 | 271 | 0.96 | 38 399 | 25.4 | 72.6 | 959 | 2.50 |
| Oesophagectomy | 5398 | 15.1 | 33.9 | 236 | 4.37 | 2024 | 17.0 | 56.7 | 157 | 7.76 |
| Gastrectomy | 49 787 | 31.1 | 33.0 | 781 | 1.57 | 8869 | 33.3 | 70.3 | 453 | 5.11 |
| Hepatectomy | 16 502 | 22.6 | 74.4 | 437 | 2.65 | 3676 | 16.1 | 76.8 | 191 | 5.20 |
| Pancreatic cancer surgery | 10 143 | 24.1 | 39.6 | 301 | 2.97 | 8007 | 22.6 | 69.7 | 352 | 4.40 |
| Colorectal cancer surgery | 70 678 | 33.8 | 35.1 | 1458 | 2.06 | 341 666 | 26.4 | 30.9 | 14 861 | 4.45 |
| Nephrectomy | 13 571 | 25.8 | 10.3 | 107 | 0.79 | 72 371 | 14.5 | 37.2 | 814 | 1.12 |
| Hysterectomy for uterine cancer | 12 072 | 7.4 | 17.3 | 29 | 0.24 | 40 474 | 15.0 | 43.3 | 178 | 0.44 |
| Total hip or knee arthroplasty | 52 938 | 38.0 | 1.8 | 69 | 0.13 | 901 022 | 25.4 | 4.3 | 1124 | 0.12 |

Source: Estimated by the authors.

OECD Health Statistics 2015 have provided cross-country comparison data on mortality within 30 days of admission in several services, including acute myocardial infarction, haemorrhagic stroke and ischaemic stroke (OECD, 2015). According to the report, Japanese hospitals had poorer performance in acute myocardial infarction, with a death rate about 12%, compared to the OECD average of 8.0%. These data are reported by the National Patient Survey 2011, conducted every three years by the MHLW with a weighted sample of hospitals, including chronic care hospitals. The Survey provides information on cases discharged in a designated one-month period, which may be biased as this ignores seasonal trend of diseases. According to the DPC database that covers around 90% of acute care hospitals annually, the in-hospital mortality was 7.2%, suggesting that comparisons of acute care performance across countries needs further improvement of data base quality when it comes to the comparability of data quality and sources.

7.5 Health system efficiency

7.5.1 Allocative efficiency

Policies regarding health-care resource allocation have been decided between providers (mainly the Japanese Medical Association-JMA), payers (public insurers) and the government (Ministry of Finance and MHLW) until very recently (see details in Chapter 3). A new scheme was proposed after the enactment of the Act for Securing Comprehensive Medical and Long-term Care in the Community in 2014, which stipulate the national database (NDB) on claim bills and other utilization information should fully analysed to estimate optimal allocation of hospital beds and other resources in local settings.

As explained in Section 3.3.3, health-care institutes submit monthly claims for reimbursement to the Claims Review and Reimbursement Organizations (CRROs). All claims submitted are reviewed by CRROs and then reimbursed to health-care institutes based on “fee schedule.” During this process, all the claim data is stored into NDB. NDB covers all health-care insurance claims under the universal health insurance including diagnoses, age, sex, procedures and drugs provided, volume and tariff. Annually more than 1700 million records are registered into NDB annually (Matsuda S et al., 2014). Each municipal government collects detailed information on hospitalized patients through NDB (data are automatically collected through NDB and health-care facilities do not need to report to municipal government), and based on the data collected

and analyzed, municipal government estimates the number of patients and treatment needed in 2025 (Nichi-Iko Medical Practice Institute Co Ltd, 2014). The data estimations of local resource demand will be tabled for discussion at the local party level. However, how this new scheme improves allocative efficiency should await empirical evaluation in the near future.

7.5.2 Technical efficiency

Since the introduction of the DPC with performance reporting in 2003, the average length of inpatient stay and the difference in the length of stay among participating hospitals have dramatically decreased in the past decade: from 21.2 days in 2002 to 16.7 days in 2007 (Ministry of Health, Labour and Welfare, 2008a). Such a decrease suggests that the standardized case-mix evaluation was successful in standardizing the process of care across hospitals. Noguchi et al. (2010) empirically showed that the introduction of this new scheme improved technical efficiency in several surgical conditions (Noguchi H et al., 2010).

However, there remains much room for improvement when it comes to the technical efficiency of Japanese health care. The government has currently started to enhance efficiency by introducing cost-effectiveness analysis in drug price adjustment under universal health insurance system, encouraging the use of generic medications (see more details in Chapter 5), and setting penalty co-payments for patients who use higher-function services without referral. The impact of these policies is still limited and awaits further evaluation.

Another issue regarding a productive improvement in physicians' performance by introducing a new board certification system and eligible assistant staff (e.g. nurse practitioners and physician assistants) has also been discussed. However, political inertia has slowed progress on this issue room the summer of 2017 (see more details in Section 4.2.4).

7.6 Transparency and accountability

Since the introduction of the DPC system with standardized submission of discharge data, the transparency and accountability of participating acute-care hospitals are improving. The system's introduction further facilitates the publication of a voluntary performance index in some hospital groups, e.g. National Hospital Organization (the management body of national hospitals) and the Quality Improvement Project organized

by the Department of Health Economics and Quality Management at Kyoto University (<http://med-econ.umin.ac.jp/QIP/>), among others.

Leadership has been undertaken by the National Clinical Database (NCD) affiliated with specialty surgery boards to register all surgical cases for quality monitoring and improvement purposes (<http://www.ncd.or.jp/>). As of March 2014, there are more than 1 500 000 operation cases registered annually from 4105 health-care facilities, which covers more than 95% of all the operations done in Japan.

The government intends to further extend the performance reporting system in the latest amendment of the Hospital Service Act, which requires every hospital to report their functions (i.e., number of beds in each four categories: high-tech acute, acute, rehabilitative and chronic) to the prefectural authority for a public decision on local resource allocation under the Regional Healthcare Vision scheme. However, there is no clear blue print on how the discussion should proceed: whether the discussion table should be opened to local community citizens remains unclear. To facilitate data-driven, open discussion, the Cabinet Office recently disseminated an estimation of local health-care needs and future projections (Cabinet Office, Government of Japan, 2015b), again, what the policy reform brings about is open to empirical evaluation.

Compared to DPC database which covers acute-care in-hospital services (see details in Section 5.4.2), performance evaluation is still limited in outpatient services and chronic-care inpatient services. These data (outpatient services and chronic-care inpatient services) are covered mainly by NDBs. As the primary purpose of NDB is for reimbursement and not for research/analysis, NDB does not contain detailed procedure or outcome data. Lack of empirical evidence on cost-effectiveness analysis has prevented a transparent discussion on resource allocation and pricing in public domain.

For data-driven, evidence-based policy-making, the government has slowly but steadily changed their policy to make government data available openly, including administrative records for analysis for the purpose of policy planning and evaluation. However, the organizational infrastructure needed to improve the quality of data and to support wider use is still missing.

8 Conclusions

For the past decades, Japan has ranked high in a range of population health metrics including the world's longest life expectancy. Thanks to its overall effectiveness of the health system and paralleled advances in technology, Japan has for many years enjoyed increased life expectancy along with decreased maternal and infant mortality and burden of communicable diseases. While this was achieved through various socioeconomic factors, the health care system guided by the principles of a universal health insurance system undoubtedly played a major role. Since its founding in 1961, the universal health insurance system in Japan has provided comprehensive coverage to all Japanese citizens.

Japan's health system is characterized by universal insurance scheme through social insurance premiums and tax subsidy, where participants are free to choose health care facilities and good quality of care with comparably low price. However, as a greater proportion of the population can expect to live a long life, in recent decades the incidence of NCDs such as obesity and diabetes have increased significantly. This rise, along with population ageing, continues to place strain on the national health system. Coupled with over two decades of economic slowdown, Japan must now find policies that balance universal coverage, support for the elderly, and financial sustainability.

The Ministry of Health, Labour and Welfare is the central leading institution in Japan's health system. The structure of the MHLW is complex, as well as the manner in which it interacts with other ministries, insurance associations, the private sectors including health care industries, care providers and patient and professional organizations such as the Japan Medical Association and Japanese Nursing Association. In Japan, there were 8442 hospitals, 101 529 clinics and 68 940 dental clinics in 2016 and 81.1% are predominantly privately owned. Although one of the unique attributes of Japanese health care system is that most of the services are provided through private organizations, the government regulates and controls nearly all aspects of the health system,

particularly a uniform fee schedule, at three levels national, prefectural, and municipal.

One of the characteristics of Japanese health care system is its free access to health care facilities. Compared to other OECD countries, inpatient care in Japan is characterized by longer average hospital stays with a greater number of inpatient beds per capita with comparably low number of physicians. The number of physicians and nurses per 1000 were 2.35 in doctors and 9.06 in nurses. Although its number of nurses is higher than the 8.3 average in OECD, the number of physicians is below that of OECD average of 3.02. This is likely to be caused by the ease of access to the health care system at any point. This style of system has financial consequences that need to be accounted for. Japan's policy of tight control of health-care cost and a laissez-faire approach to service delivery, with inadequate governance of provider organisations, created a mismatch between need and supply of health-care resources and impeded accountability for care quality.

Japan's Health System faces some significant challenges whilst ensuring financial sustainability of the system during a demographic transition. Although Japan was characterized as high health outcome with relatively low health expenditure, the total expenditure on health accounted for 10.9% of GDP in Japan in 2015, which was about two percentage points above the OECD average of 9% (Although this was partly due to the changes of rules which Japan newly included expenditure on long-term care into health care expenditure). Population ageing and increasing price of new technologies lead to constant increase in expenditure, while decades-long economic stagnation decreased premium and tax revenue for universal health insurance scheme, resulting in an ever-increasing rate of health expenditure per GDP. However, direct OOP payments contributed only 11.7% of total health financing in 2014. The health insurance coverage rate was in principle 100% in Japan, and the share of household consumption spent on OOP payments was only 2.2%, which is less than the OECD average (2.8%).

The health insurance premiums were based on income, place of residence and ability to pay. There are two major types of insurance schemes in Japan; Employee's Health Insurance and National Health Insurance (NHI). Employee's Health Insurance covers those who are public servants or work at companies, while NHI covers the self-employed and unemployed. The Employee's health insurance covered

the major proportion of population (58.7%) followed by National Health Insurance (28.3%), and late-stage medical care system for the elderly (12.4%). There has been a rapid increase in the proportion of the population covered by NHI in past decades due to an increase in the unemployed (mainly attributed to the elderly after retirement). This caused a significant financial burden on the NHI. In order to solve financial inequity between Employee's Health Insurance and NHI, the government introduced the late-stage medical care system for the elderly (75 years old and over) in 2008.

Japan is facing super ageing problem; the number of elderly population is expected to grow from the current 16 million to 20 million by 2020, and the working population will be expected to decline from 109 million to 100 million during the same period. People aged 65 or older reached 27.3% of population in 2016, are expected to reach 39.4% by 2055 while the over 75 year old population will peak by 2025. This demographic change will require drastic reform of healthcare and long-term care systems. Unless tackled, the rapid increase in aging population can impose a large burden on the health care system including universal health insurance system. More than 50% of medical care expenditure was spend on elderly population (aged 65 years or over), while that of younger population (aged 0–14 years) was only 8%.

In order to meet the challenges posed by an ageing population, several reforms have been adopted. The Japanese government introduced long-term care insurance system in 2000 as well as Integrated Community Care System (ICCS) in 2006, which remains the central tenet of Japanese long-term care strategy. The *Comprehensive Reform of Social Security and Tax* was passed by the Cabinet decision in December 2010, which was the joint reform for the social security system and taxation system that enabled broader popular support for the social security system in Japan. Priority areas for this reform were decided by the cabinet office as follow:

- measures for the support of children and child raising and employment of young people,
- reform of medical and long-term care services,
- pension reform,
- measures against poverty and income inequality, and
- measures for low-income earners as cross-system issue.

Seven years have already passed since the adoption of this reform plan. It was planned that increase in marginal revenue of taxation were

specifically earmarked for social security expenditures. The consumption tax rate was raised from 5% to 8% in April 2014 and was originally supposed to reach 10% in October 2015 to make financial space for reform, but the timeline was extended to October 2019 due to political tensions between LDP and the opposition party. Comprehensive Reform of Social Security and Tax is still the central policy for healthcare and long-term care in Japan and several related laws have successfully been enacted or amended under this reform plan.

In this report, a comprehensive analysis of health care system under recent reforms in terms of financial protection and equity in financing, user experience and equity of access to health care, health outcomes, health service outcomes and quality of care, health system efficiency, transparency and accountability has been performed. Although overall health system performance has been improving, we concluded that there are still many challenges remain: sustainability of health care financing, increasing inequity within population and multiple challenges mainly due to aging society.

Japan needs a paradigm shift to the new system as proposed in *Japan Vision: Health Care 2035*, a report for the Health Minister by young Japanese health leaders in June 2015 under the former Health Minister, Yasuhisa Shiozaki's leadership. The goal of *Japan Vision: Health Care 2035* is to build a sustainable health care system that delivers better health outcomes through care that is responsive and equitable to each member of the society and that contributes to prosperity in Japan and the world. To attain this goal, the panel proposed three main pillars of reform: lean healthcare (implement value-based healthcare), life design (empower society and support personal choice) and global health leader (lead and contribute to global health). Bearing in mind these transformations by 2035, reforms to the financing system and greater efficiencies, with focus on outcomes, quality and efficiency, care and integrated approaches across sectors, will be necessary to maintain a low-cost, equitable health system in the future.

9 Appendices

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9.2 Useful web sites

- Cabinet Office, Government of Japan <http://www.cao.go.jp/index-e.html>
- Ministry of Economy, Trade and Industry <http://www.meti.go.jp/english/>
- Ministry of Education, Culture, Sports, Science and Technology <http://www.mext.go.jp/en/>
- Ministry of Finance <http://www.mof.go.jp/english/>
- Ministry of Foreign Affairs <http://www.mofa.go.jp/>
- Ministry of Health, Labour and Welfare <http://www.mhlw.go.jp/english/>
- Japan vision: Health care 2035 <http://www.mhlw.go.jp/seisakunitsuite/bunya/hokabunya/shakaihoshou/hokeniryou2035/future/en/>
- Ministry of Internal Affairs and Communications <http://www.soumu.go.jp/english/index.html>
- Statistics bureau, Ministry of International Affairs and Communications <http://www.stat.go.jp/english/>
- Ministry of the Environment <http://www.env.go.jp/en/index.html>
- Fire and Disaster Management Agency, Ministry of International Affairs and Communications <http://www.fdma.go.jp/en/>
- Japan Agency for Medical Research and Development (AMED) <https://www.amed.go.jp/en/index.html>
- National Cancer Center Japan <https://www.ncc.go.jp/en/>
- Bureau of International Health Cooperation, National Center for Global Health and Medicine <http://kyokuhp.ncgm.go.jp/eng/index.html>
- National Institute of Infectious Diseases <https://www.niid.go.jp/niid/ja/>
- Institute for Global Health Policy Research (iGHP) <http://www.ighp.ncgm.go.jp/en/>
- Japan International Cooperation Agency (JICA) <https://www.jica.go.jp/english/>
- Japan Medical Association (JMA) <https://www.med.or.jp/english/>
- Japanese Nursing Association (JNA) <https://www.nurse.or.jp/jna/english/>
- Pharmaceutical and Medical Devices Agency (PMDA) <https://www.pmda.go.jp/english/index.html>
- OECD Japan <http://www.oecd.org/japan/>
- World Bank Japan <http://www.worldbank.org/en/country/japan>
- World Health Organization, Japan <http://www.who.int/countries/jpn/en/>

9.3 HiT methodology and production process

HiTs are produced by country experts in collaboration with an external editor and the Secretariat of the Asia Pacific Observatory based in the WHO Regional Office for South-East Asia in New Delhi, India.

HiTs are based on a template developed by the European Observatory on Health Systems and Policies that, revised periodically, provides detailed guidelines and specific questions, definitions, suggestions for data sources and examples needed to compile reviews. While the template offers a comprehensive set of questions, it is intended to be used in a flexible way to allow authors and editors to adapt it to their particular national context. The template has been adapted for use in the Asia Pacific region and is available online at: http://apps.who.int/iris/bitstream/10665/208276/1/9789290617570_eng.pdf?ua=1

Authors draw on multiple data sources for the compilation of HiTs, ranging from national statistics, national and regional policy documents to published literature. Data are drawn from information collected by national statistical bureaux and health ministries. Furthermore, international data sources may be incorporated, such as the World Development Indicators of the World Bank. In addition to the information and data provided by the country experts, WHO supplies quantitative data in the form of a set of standard comparative figures for each country, drawing on the Global Health Observatory (GHO) data and Global Health Expenditure Database. HiT authors are encouraged to discuss the data in the text in detail, including the standard figures prepared by the Observatory staff, especially if there are concerns about discrepancies between the data available from different sources.

The quality of HiTs is of real importance since they inform policy-making and meta-analysis. HiTs are subject to wide consultation throughout the writing and editing process, which involves multiple iterations. They are then subject to the following.

- A rigorous review process consisting of three stages. Initially, the text of the HiT is checked, reviewed and approved by the Asia Pacific Observatory Secretariat. It is then sent for review to at least three independent experts, and their comments and amendments are incorporated into the text, and modifications are made accordingly. The text is then submitted to the relevant ministry of health, or appropriate authority, and policy-makers within those bodies to check for factual errors.

- There are further efforts to ensure quality while the report is finalized that focus on copy-editing and proofreading.

HiTs are widely disseminated (hard copies, electronic publication, translations and launches). The editor supports the authors throughout the production process and, in close consultation with the authors, ensures that all stages of the process are taken forward as effectively as possible.

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Improving Population Health in the Era of Superaging: Japan's Challenges and Opportunities

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EXECUTIVE SUMMARY

This essay examines the changing characteristics of the burden of disease in Japan and provides recommendations for national and local policymakers to improve public health in a rapidly aging population.

MAIN ARGUMENT

Japan established universal health coverage in 1961. Since then, it has achieved excellent population health at a relatively low cost, while offering universal access to healthcare across regions. Today, Japan is at the forefront of research and policymaking on population aging, confounded by a slowdown in the progress in improving population health, an increase in the burden of age-related morbidity, and growing health inequalities across prefectures. The development of Japan's policies on aging can add perspective to debates that many countries are currently having or are likely to conduct. Now is an opportune time to take steps to ensure the sustainability and equity of Japan's health accomplishments over the past 50 years.

POLICY IMPLICATIONS

- Further progress in improving public health in Japan primarily depends on the prevention of major modifiable risk factors for noncommunicable diseases, such as tobacco smoking, dietary risks, and metabolic risks.
- Promoting local and regional stewardship for integrated healthcare services will help more efficiently allocate resources and ensure that funding is sustainable in different local contexts.
- Enhancing the performance of health systems by using health information and communications technology can help identify current and potential bottlenecks and thereby improve the delivery of services and promote the efficient use of resources.

Japan established universal health coverage in 1961, which has been instrumental in providing the latest breakthroughs in medicine and treatment to the population. Its premier accomplishment in the past 50 years has been the achievement of excellent population health at a low cost and increased equity between different socioeconomic groups.¹ Through a rapid reduction in the mortality rates of communicable diseases among children in the early 1960s, Japan's life expectancy has become world-leading (83.7 years in 2015).² Simultaneously, coupled with a low fertility rate (1.4 births per woman in 2016), Japan is at the forefront of the debate over "superaging." The number of individuals aged 65 and over has nearly quadrupled in the last 40 years, rising to 27% in 2016 as a percentage of the total population. This figure is expected to grow to 40% by 2060.³

Japan is therefore well-positioned to take the lead in exploring the implications of population aging. Its experience can add perspective to the policy debates that are currently underway in many countries confronted with an aging population. As our recent research in the *Lancet* has shown, while Japan has been successful overall in reducing the rates of mortality and disability from most major diseases, progress has slowed and variations in public health between prefectures are growing.⁴ However, substantial opportunities exist to craft more robust policies to support a healthier population in Japan.

This essay examines the changing characteristics of the burden of disease in Japan and provides recommendations for national and local policymakers to improve the health of the country's rapidly aging population. The essay begins by analyzing the key challenges regarding disease burden in Japan. The next section provides an overview of the major policy options the government has developed to address some of these issues. The third section then highlights three specific recommendations that will help guide policy agendas to address Japan's healthcare challenges in an efficient and sustainable manner. The essay concludes with a brief summary of the findings and implications.

The Disease Burden Profile of Japan: Key Issues and Challenges

Japan can claim great success in introducing universal health coverage, which has led to excellent population health for all socioeconomic groups at a low cost. In the era of superaging, however, the country now faces significant challenges that must be addressed in order to ensure the sustainability and equity of Japan's health accomplishments of the past 50-plus years.⁵

First, the progress in population health has slowed down. This is largely a result of the leveling off of mortality reduction since around 2005 (see **Table 1**), primarily from cardiovascular disease

¹ Nayu Ikeda et al., "What Has Made the Population of Japan Healthy?" *Lancet* 378, no. 9796 (2011): 1094–105.

² World Health Organization (WHO), *World Health Statistics 2017: Monitoring Health for the SDGs* (Geneva: WHO, 2017), <http://apps.who.int/iris/bitstream/10665/255336/1/9789241565486-eng.pdf>.

³ Ministry of Health, Labour and Welfare (Japan), "Jinkoudoutaitoukei no gaikyou" [Overview of Vital Statistics in 2015], 2016, <http://www.mhlw.go.jp/toukei/saikin/hw/jinkou/kakutei15/index.html>; Ministry of Internal Affairs and Communications (Japan), Statistics Bureau, "Population Estimates by Age (5-Year Age Group) and Sex," 2016, <http://www.stat.go.jp/english/data/jinsui/tsuki/index.htm>; and Ministry of Internal Affairs and Communications (Japan), Statistics Bureau, "Population and Households," in *Japan Statistical Yearbook 2017* (Tokyo, 2017), chap. 2, <http://www.stat.go.jp/english/data/nenkan/66nenkan/1431-02.htm>.

⁴ Shuhei Nomura et al., "Population Health and Regional Variations of Disease Burden in Japan, 1990–2015: A Systematic Subnational Analysis for the Global Burden of Disease Study 2015," *Lancet* 390, no. 10101 (2017): 1521–38.

⁵ *Ibid.*

TABLE 1 Five-year reduction rates of age-standardized mortality (% , measured in five-year periods)

| Year | Both sexes | Male | Female |
|------|------------|------|--------|
| 1995 | 6.9 | 4.5 | 9.4 |
| 2000 | 9.7 | 8.3 | 11.6 |
| 2005 | 7.1 | 7.3 | 7.7 |
| 2010 | 6.2 | 7.7 | 5.4 |
| 2015 | 3.1 | 5.4 | 1.0 |

SOURCE: Institute for Health Metrics and Evaluation, “Global Burden of Disease Study 2015,” 2016.

and cancer. The increasing burden from degenerative disorders such as Alzheimer’s disease also hampers Japan’s progress in improving population health (as will be further elaborated below).⁶

Second, as a consequence of the growing phenomenon of survivorship, the Japanese population suffers from more chronic and age-related morbidity. **Table 2** shows the 2015 ranking of causes of disability-adjusted life years (DALYs)—an indicator that combines mortality and morbidity. Alzheimer’s disease (including other forms of dementia) was a distinctive cause of DALYs, increasing almost 50% from 2005 to 2015. Another key metric for monitoring the shift of the burden of disease is age-standardized DALYs, which assess the impact of a disease by comparing populations with different age structures to minimize over- or under-representation of the impact of certain diseases on different age groups. While the age-standardized rates of DALYs from many leading causes have declined since 2005, the rates due to musculoskeletal disorders (e.g., lower back and neck pain) and sense organ diseases (e.g., hearing loss and vision loss) have remained static. More importantly, Alzheimer’s disease was the only one of the ten leading causes that increased age-standardized DALY rates significantly over the same period (by 3.3%). The increasing burden from Alzheimer’s disease may lead to higher demand for long-term and special care, putting constraints on healthcare expenditure and resource utilization and thus threatening the sustainability of the Japanese health system.⁷

Third, Japan is experiencing rising prefectural variations in the burden of disease.⁸ For example, our study from 2017 found that Shiga Prefecture, located in the western region of Japan’s main island of Honshu, had the highest number of diseases with mortality and DALY rates that are significantly lower than the national mean (sixteen for mortality and twelve for DALYs out of the

⁶ Nomura et al., “Population Health and Regional Variations of Disease Burden in Japan.”

⁷ Naoki Ikegami et al., “Japanese Universal Health Coverage: Evolution, Achievements, and Challenges,” *Lancet* 378, no. 9796 (2011): 1106–15.

⁸ Nomura et al., “Population Health and Regional Variations of Disease Burden in Japan”; and Yoshiharu Fukuda, Hiroyuki Nakao, Yuichiro Yahata, and Hirohisa Imai, “Are Health Inequalities Increasing in Japan? The Trends of 1955 to 2000,” *BioScience Trends* 1, no. 1 (2007): 38–42.

TABLE 2 Top ten causes of DALYs in Japan

| Rank in 2015 | Cause | Type of cause | Change in number of DALYs from 2005 (%) | Change in age-standardized DALY rate from 2005 (%) |
|--------------|------------------------------|--------------------|---|--|
| 1 | Ischemic heart disease | Chronic disease | 7.6 | -14.5 |
| 2 | Lower back and neck pain | Chronic disease | 6.7 | -0.1 |
| 3 | Sense organ diseases | Chronic disease | 22.7 | 0.8 |
| 4 | Cerebrovascular disease | Chronic disease | -0.7 | -21.4 |
| 5 | Alzheimer's disease | Chronic disease | 49.6 | 3.3 |
| 6 | Lower respiratory infections | Infectious disease | 22.4 | -10.8 |
| 7 | Lung cancer | Chronic disease | 8 | -11.1 |
| 8 | Self-harm (mostly suicide) | Injury | -8.8 | -5.3 |
| 9 | Stomach cancer | Chronic disease | -4.5 | -20.6 |
| 10 | Colorectal cancer | Chronic disease | 11.4 | -6.4 |

SOURCE: Institute for Health Metrics and Evaluation, "Global Burden of Disease Study 2015."

NOTE: DALYs represent disability-adjusted life years; ranking is based on the number of DALYs from each cause.

twenty leading causes).⁹ Hence, Shiga had the highest life expectancy at birth in 2015 (84.7 years). By contrast, Aomori Prefecture in the northernmost part of Honshu recorded the lowest life expectancy at birth in 2015 (81.6 years) and had the highest number of diseases. At the same time, Aomori had mortality and DALY rates that were significantly higher than the national mean (thirteen for mortality and eleven for DALYs out of the twenty leading causes).

The reason for the health inequalities across prefectures is still little understood. In our article for the *Lancet*, we found no significant correlations between the age-standardized mortality or DALY rate in 2015 and health expenditure per capita in 2015 and health workforce density in 2014.¹⁰ Known risk factors (behavioral, metabolic, and environmental and occupational risks) were also homogeneously distributed across prefectures. However, variations in lifestyle, socioeconomic status, and poverty trends in each prefecture have not been fully analyzed. Here, health system performance, which varies across the country, is often a greater contributor than other factors in addressing health inequalities.¹¹

⁹ Nomura et al., "Population Health and Regional Variations of Disease Burden in Japan."

¹⁰ Ibid.

¹¹ The WHO defines a health system to include all the activities whose primary purpose is to promote, restore, or maintain health. The assessment goals of health system performance should be expressed in terms of outputs (readiness/quality of program activities), outcomes (program results), and impacts (program effects), which will likely relate to health status, rather than inputs and processes (program infrastructure). See WHO, *World Health Report 2020—Health Systems: Improving Performance* (Geneva: WHO, 2000).

Visions for Japan's Healthcare Policy

Efforts to reform Japan's health system are guided by several underlying values and principles. Yasuhisa Shiozaki, the former minister of health, labour and welfare, established the Health Care 2035 Advisory Panel in June 2015, which brought together young leaders on health policy from within and outside the ministry to develop a long-term strategy for the next twenty years.

Their report—*The Japan Vision: Health Care 2035*—proposes a paradigm shift that would transform Japan's current health system into a multidisciplinary system in the era of superaging.¹² The core principles would shift from the provision of identical services uniformly across whole populations toward services that target individual needs and continuously value equality and solidarity. The focus of this new system would shift from hospital-centered care toward patient-centered long-term care within communities as well as proactive interventions to improve patients' lifestyles and behavior, workplace environment, and housing conditions, among other factors. The report also recommends that the principles of Japan's health system shift from curative care toward care that improves quality of life, including mental and social well-being, especially for those living with long-term or chronic illness.¹³ The pillars of this vision include healthcare professionals, information sharing, and sustainable financing.

Healthcare professionals. In the next twenty years, Japan will likely face healthcare workforce shortages. In an aging society, people are expected to experience more chronic diseases and multimorbidity, which often require care by professionals from both the healthcare and social care sectors. Thus, Japan must promote educating and training its workforce to be capable of performing multiple functions in both service sectors. Other endeavors include shifting and sharing tasks among health workers, which increases service delivery capacity by delegating some tasks from higher-level to less-specialized workers. These will concurrently support the growth of an integrated community care system (ICCS).

Information sharing. With regard to healthcare governance at lower levels, it is necessary to help prefectures better use comparative health data to analyze and understand population needs and appropriately allocate resources through cutting-edge information and communications technology (ICT). These efforts will lead to improved quality of healthcare and support further reorganization of the healthcare system through adjustments to key elements, including hospital functions and the number of inpatient beds.

Sustainable financing. Progressive population aging also could put the future of the Japanese healthcare system in a dire financial situation. It is therefore critical that Japan adopt measures to make the system financially sustainable. To ensure the sustainability of public funding, various strategies should be considered, including increasing existing taxes and imposing new taxes on products that are known to adversely affect health, such as tobacco, alcohol, and sugar. Implementing policies that tax pollution and other actions that are harmful to the environment could also play a positive role.

¹² Ministry of Health, Labour and Welfare (Japan), *The Japan Vision: Health Care 2035* (Tokyo, 2015). See also Hiroaki Miyata et al., "Japan's Vision for Health Care in 2035," *Lancet* 385, no. 9987 (2015): 2549–50; and Michael R. Reich and Kenji Shibuya, "The Future of Japan's Health System—Sustaining Good Health with Equity at Low Cost," *New England Journal of Medicine* 373, no. 19 (2015): 1793–97.

¹³ Miyata et al., "Japan's Vision for Health Care in 2035."

Recommendations

Despite the challenges discussed above (e.g., morbidity expansion due to health transitions and growing health variations between prefectures), Japan—a front runner in the era of superaging—has great potential to improve the health of its population. We propose the following three major recommendations to help guide policy agendas, including *The Japan Vision: Health Care 2035*, and prioritize policies for promoting population health in Japan in a sustainable manner.

Strengthen the Prevention of Risk Factors

Further progress in improving public health primarily depends on the prevention of major risk factors for noncommunicable diseases, such as smoking, dietary risks, and metabolic risks—the leading risks of death and DALYs in the Japanese population in 2015 (see **Table 3**). A comprehensive package of preventative measures should be encouraged in order to lower the effect of risk factors of metabolic syndrome, including by improving unhealthy lifestyles and diet (mostly due to high sodium levels) and increasing the coverage of antihypertensive drugs. This package would be

TABLE 3 Top five risk factors for deaths and DALYs in Japan with proportion of total deaths/DALYs attributable to each risk factor

| | Rank in 2015 | Risk factor for deaths (%) | Risk factor for DALYs | Type of risk factor |
|-------|--------------|-------------------------------------|-------------------------------------|---------------------|
| Men | 1 | Smoking (18.9) | Dietary risks (13.8) | Behavioral |
| | 2 | Dietary risks (18.8) | Smoking (12.5) | Behavioral |
| | 3 | High systolic blood pressure (15.0) | High systolic blood pressure (10.1) | Metabolic |
| | 4 | High fasting plasma glucose (7.1) | High fasting plasma glucose (6.7) | Metabolic |
| | 5 | Alcohol and drug use (5.5) | Alcohol and drug use (6.1) | Behavioral |
| Women | 1 | Dietary risks (18.0) | Dietary risks (9.5) | Behavioral |
| | 2 | High systolic blood pressure (17.4) | High systolic blood pressure (7.9) | Metabolic |
| | 3 | High fasting plasma glucose (7.6) | High fasting plasma glucose (5.5) | Metabolic |
| | 4 | High total cholesterol (6.6) | Impaired kidney function (3.2) | Metabolic |
| | 5 | Impaired kidney function (5.8) | Smoking (2.8) | Behavioral |

SOURCE: Institute for Health Metrics and Evaluation, “Global Burden of Disease Study 2015.”

NOTE: DALYs represents disability-adjusted life years; ranking is based on the proportion of total deaths or DALYs attributable to each risk factor.

particularly relevant given evidence suggesting that Japanese might be genetically susceptible to being overweight or to developing diabetes mellitus.¹⁴ In April 2008 the government commenced a screening and intervention program specifically targeting metabolic syndrome. People aged 40–74 years are eligible to have an annual health checkup and a health education intervention, although the program’s effectiveness is not yet well-evaluated.¹⁵

Importantly, tobacco smoking has a striking effect on population health. Despite its well-known harmful effects, smoking is still commonplace in Japan, where 30% of men and 10% of women smoke today.¹⁶ The country should adopt more drastic measures to discourage the consumption of tobacco products. In 2017 the Ministry of Health, Labour and Welfare attempted to introduce its strictest smoking policy to date. The law would have banned smoking on the premises of public facilities, such as restaurants and bars, hospitals, and municipal offices, with the long-term goal of making the 2020 Tokyo Olympics smoke-free. The policy was strongly supported by the general public, patient groups, researchers, and practicing health professionals, including the Japan Medical Association.¹⁷ However, it was fiercely opposed by pro-tobacco policymakers, the tobacco industry (led by Japan Tobacco Inc.), and bar and restaurant owners concerned about the effect the ban would have on revenue.¹⁸

One of the prevailing arguments in opposition to a ban is the assertion that prohibiting smoking in public places may harm restaurants and other businesses. However, this assertion has been disproved by a number of studies. In New York City, for example, one year after the 2003 Smoke Free Air Act banning smoking in all workplaces went into effect, restaurant and bar tax receipts increased by 8.7%, and employment subsequently grew by 10,600 jobs.¹⁹ In response to the Ministry of Health, Labour and Welfare’s proposed smoking ban, pro-tobacco lawmakers suggested that Japan should instead focus on policies that segregate smoking and nonsmoking areas in public places (i.e., the creation of designated smoking rooms).²⁰ However, such an unrestrictive ban is likely to be ineffective in preventing “passive smoking” among children and nonsmoking adults through the inhalation of secondhand smoke.

Promote Local Governments’ Stewardship of Integrated Services

As an aging society, Japan experiences higher rates of chronic disease and multimorbidity. To allocate healthcare resources more efficiently and ensure that funding is sustainable in different

¹⁴ Naoki Sakane et al., “Beta 3-Adrenergic-Receptor Polymorphism: A Genetic Marker for Visceral Fat Obesity and the Insulin Resistance Syndrome,” *Diabetologia* 40, no. 2 (1997): 200–204; and Toshihide Yoshida et al., “Mutation of Beta 3-Adrenergic-Receptor Gene and Response to Treatment of Obesity,” *Lancet* 346, no. 8987 (1995): 1433–34.

¹⁵ Ministry of Health, Labour and Welfare (Japan), “Tokuteikenshin Tokuteihokenshidou ni tsuite” [Standard Health Examination and Guidance Program], 2008, <http://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000161103.html>.

¹⁶ Japan Tobacco Inc., “Kitsuensharitsu” [Smoking Rates], 2016, <https://www.jti.co.jp/corporate/enterprise/tobacco/data/smokers/index.html>.

¹⁷ Yusuke Tsugawa, Ken Hashimoto, Takahiro Tabuchi, and Kenji Shibuya, “What Can Japan Learn from Tobacco Control in the UK?” *Lancet* 390, no. 10098 (2017): 933–34; and Japan Medical Association, “Jyudokuitsuen wo kyoutka jitsugen surutameno shomeikatsudou shuuryou no gohoukoku to orei” [Petition to Support a Policy That Prevents Secondhand Smoke], 2017, http://www.med.or.jp/people/info/people_info/005096.html.

¹⁸ Justin McCarry, “Japan Urged to Go Smoke-Free by 2020 Tokyo Olympics,” *Guardian*, January 31, 2017, <https://www.theguardian.com/world/2017/jan/31/japan-urged-to-go-smoke-free-by-2020-tokyo-olympics>; and Marissa Payne, “How Would I Live If Smoking Is Banned? Japanese Politicians Decry Calls for Smoke-Free Olympics,” *Washington Post*, May 2, 2017, <https://www.washingtonpost.com/news/early-lead/wp/2017/05/02/how-would-i-live-if-smoking-is-banned-japanese-politicians-decry-calls-for-smoke-free-olympics>.

¹⁹ “The State of Smoke-Free New York City: A One-Year Review,” New York City, 2004, <https://www.tobaccofreekids.org/assets/content/pressoffice/NYCRReport.pdf>.

²⁰ “Japan’s Tobacco Lobby Fires Up as Government Pushes Ahead with Tougher Smoking Laws,” *Japan Times*, March 13, 2017, <http://www.japantimes.co.jp/news/2017/03/13/national/social-issues/japans-tobacco-lobby-fires-government-pushes-ahead-tougher-smoking-laws/#.WQbzgVOGPUI>.

local contexts, the authority and responsibility of local governments in creating and implementing health policy should be clearly defined and strengthened.

As proposed in *The Japan Vision: Health Care 2035*, Japan is striving to establish an ICCS by 2025.²¹ This would be a comprehensive system that provides communities with appropriate living arrangements, healthcare, and social services, such as daily life support that supplements end-of-life care in long-term-care settings. The system would be funded through the long-term-care insurance system.²²

Nurses would play an important role in the ICCS by working on a team alongside social workers and care managers, as well as community volunteers working under the supervision of nurses. The establishment of an ICCS will require strong stewardship by local governments, given that the contexts for healthcare and other social care are locally differentiated. For example, each prefectural government is required under the Medical Service Act (amended in 2014) to develop its own community health vision. Local leaders are expected to present models for ideal healthcare service for their communities.²³ In doing so, the data and information needed to implement this vision will be gathered, analyzed, and shared; healthcare demand will be estimated; and interested bodies and stakeholders in the prefecture will discuss healthcare service provisions.

Because the evaluation of these reforms to establish an ICCS is still in the early stages, more attention and caution should be paid to measuring performance. Also, in order to ensure the successful performance of the ICCS, Japan needs to empower local planning entities that can expand regional autonomy. This should facilitate dialogue and decision-making among groups that have not previously collaborated, including local governments, local medical associations, private industries, and civil society groups.

Enhance Health System Performance and Assessment

Prefectural governments face the challenge of improving the performance of their health systems amid aging demographics, increasing multimorbidity, and growing concerns about financial stability. One of the key measures required to improve health system performance is insurance reform, such as the consolidation of social health insurance plans at the prefectural level.²⁴ This would not only improve the fairness of premium contributions and copayment settings but also boost the authority of the prefectural governments.²⁵ They would then have a mandate to exert tighter supervision and control over the provision of healthcare to more efficiently allocate resources in the prefecture.

²¹ Ministry of Health, Labour and Welfare (Japan), “Chiikihoukatsu kea sisutemu” [Integrated Community Care System], http://www.mhlw.go.jp/stf/seisakunitsuite/bunya/hukushi_kaigo/kaigo_koureisha/chiiki-houkatsu.

²² The long-term-care insurance system was introduced in 2000 to meet the challenges of Japan’s aging society and to contain health expenditures. Its beneficiaries are those requiring long-term care or support services, including nursing care and day service. The insured must be certified as being in the condition requiring such services due to having dementia or being bedridden. This system is primarily funded through compulsory contributions by those over 40, general taxation, and copayments by the insured of 10% of the cost of services. The managing entities (insurers) of the long-term-care insurance system are the municipalities.

²³ Yohsuke Takasaki et al., “Health Care Reform through Demographic Transition—The Case of Japan: Integrated Community Care System for Sustainable UHC and Society,” Japan Center for International Exchange, 2016.

²⁴ Kenji Shibuya et al., “Future of Japan’s System of Good Health at Low Cost with Equity: Beyond Universal Coverage,” *Lancet* 378, no. 9798 (2011): 1265–73. In addition to long-term-care insurance, there are three main types of health insurance in Japan: employee’s health insurance (EHI), national health insurance (NHI), and late elders’ health insurance (LEHI). EHI is provided to employed workers (company employees) and their dependents and is insured by several insurers, mostly depending on the size of the company. Meanwhile, NHI is designed for people who are not employed and are under 75, and it is insured by municipal governments. The people who are not eligible for either EHI or NHI, including self-employed persons over 75, are enrolled in LEHI, which is insured by prefectures.

²⁵ Ikegami et al., “Japanese Universal Health Coverage.”

This option recently became more realistic after the Ministry of Health, Labour and Welfare announced its intention to consolidate citizens' health insurance (for the unemployed, self-employed, and retirees) within all prefectures. Under this reform, prefectural governments will assume fiscal responsibility from municipal governments for citizens' health insurance by 2018 in order to stabilize management and equalize services and premium contributions among different municipalities within a prefecture.²⁶

The performance of the health system must be monitored and assessed to ensure accountability and to enhance quality through peer competition. As emphasized in *The Japan Vision: Health Care 2035*, national and prefectural governments should invest in health ICT to exploit the potential for big data to assist in identifying the bottlenecks of the current health system, improve the delivery of health services, and promote efficient use of health resources. For example, a new platform called the Person-centered Open PLatform for wellbeing (PeOPLE) is an endeavor to make the best use of data on population health and health system performance. This initiative was proposed by the Ministry of Health, Labour and Welfare in October 2016 and is expected to be implemented by 2020.²⁷ This is an open-data platform that integrates personal data from electronic medical records, including on insurance claims, immunizations, and checkups.

Conclusion

Japan is at the forefront of developing policy solutions to deal with the challenges of population aging. The country faces an increase in the burden of age-related morbidity and growing health inequalities across prefectures, among other public health issues. Moving forward, it will be important for Japanese policymakers to strengthen the prevention of key risk factors, promote local and regional stewardship for integrated services, and enhance health system performance and assessment in order to further improve population health and reduce inequity. Given the position of Japan as a global leader that has previously achieved excellent population health at a relatively low cost, its development of policies on population aging will likely add perspective to debates in other countries. With these factors in mind, now is an opportune time for Japan to work to ensure the sustainability of its public health achievements over the past 50-plus years.

²⁶ Takasaki et al., "Health Care Reform through Demographic Transition."

²⁷ Ministry of Health, Labour and Welfare (Japan), "ICT wo katsuyou shita jisedaigata hokeniryōu sisutemu no kouchiku ni mukete" [Toward the Construction of a Next Generation Health Care System Utilizing ICT], 2016.

Trends in, and projections of, indicators of universal health coverage in Bangladesh, 1995–2030: a Bayesian analysis of population-based household data



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Summary

Background Many countries are implementing health system reforms to achieve universal health coverage (UHC) by 2030. To understand the progress towards UHC in Bangladesh, we estimated trends in indicators of the health service and of financial risk protection. We also estimated the probability of Bangladesh's achieving of UHC targets of 80% essential health-service coverage and 100% financial risk protection by 2030.

Methods We estimated the coverage of UHC indicators—13 prevention indicators and four treatment indicators—from 19 nationally representative population-based household surveys done in Bangladesh from Jan 1, 1991, to Dec 31, 2014. We used a Bayesian regression model to estimate the trend and to predict the coverage of UHC indicators along with the probabilities of achieving UHC targets of 80% coverage of health services and 100% coverage of financial risk protection from catastrophic and impoverishing health payments by 2030. We used the concentration index and relative index of inequality to assess wealth-based inequality in UHC indicators.

Findings If the current trends remain unchanged, we estimated that coverage of childhood vaccinations, improved water, oral rehydration treatment, satisfaction with family planning, and non-use of tobacco will achieve the 80% target by 2030. However, coverage of four antenatal care visits, facility-based delivery, skilled birth attendance, postnatal checkups, care seeking for pneumonia, exclusive breastfeeding, non-overweight, and adequate sanitation were not projected to achieve the target. Quintile-specific projections showed wide wealth-based inequality in access to antenatal care, postnatal care, delivery care, adequate sanitation, and care seeking for pneumonia, and this inequality was projected to continue for all indicators. The incidence of catastrophic health expenditure and impoverishment were projected to increase from 17% and 4%, respectively, in 2015, to 20% and 9%, respectively, by 2030. Inequality analysis suggested that wealthiest households would disproportionately face more financial catastrophe than the most disadvantaged households.

Interpretation Despite progress, Bangladesh will not achieve the 2030 UHC targets unless the country scales up interventions related to maternal and child health services, and reforms health financing systems to avoid high dependency on out-of-pocket payments. The introduction of a national health insurance system, increased public funding for health care, and expansion of community-based clinics in rural areas could help to move the country towards UHC.

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Introduction

Universal health coverage (UHC) is a global health priority and one of the major targets of the Sustainable Development Goals (SDGs).¹ UHC ensures that all citizens have access to high-quality health services when needed without financial risk.^{1,2} Under SDG3, WHO has defined a set of UHC targets that member countries need to achieve by 2030 as part of their progress towards health financing reform,^{3,4} and every UN member state has committed to these goals.^{1,5} The targets are to achieve at least 80% essential health-service coverage for the entire population of the country irrespective of their economic status, gender, or place of residence, and 100% protection from catastrophic and impoverishing payment for health services by 2030.^{2,3}

South Asian countries, especially Bangladesh, have made progress towards reductions in mortality and increases in life expectancy, but face many barriers to continuing this progress. Inequity in access to health care,⁶ a growing burden of non-communicable diseases,⁷ high dependency on out-of-pocket (OOP) health payments,⁸ and the absence of risk-pooling mechanisms (health insurance schemes used to minimise financial burden due to health-care expenditure, such as state-funded national health insurance systems) in the health financing system⁹ could hinder progress towards UHC in resource-limited countries such as Bangladesh. The Bangladeshi Government has committed to achievement of UHC, and took an initial step in 2012 by developing health-financing strategies to raise funds through taxation

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Research in context

Evidence before this study

We systematically searched PubMed, CINAHL, and the Web of Science database with a combination of MeSH heading terms and the keywords “universal health coverage”, “progress”, “movement”, “assessment”, “catastrophic”, “out-of-pocket”, “impoverish”, “financial risk”, “cost of illness”, “expenditure”, “household financial”, “household economic”, “economic impact”, “health insurance”, and “Bangladesh” for articles published in any language before Nov 1, 2016, to identify work about assessment of progress towards universal health coverage (UHC) in Bangladesh. Of the 307 records identified by our search, we established—after screening of titles, abstracts, and full texts—that five studies assessed UHC in Bangladesh. None of the previous studies assessed the progress of Bangladesh towards UHC in terms of WHO-recommended dimensions (ie, health-service coverage, financial risk protection, and equity) and indicators. In the previous studies, only specific health indicators were assessed, or equity or financial risk protection were not considered. None provided trends and projections of UHC indicators in the past 10 years.

Added value of this study

To our knowledge, this study is the first comprehensive assessment of UHC in Bangladesh. We used the most up-to-date data sources, a wide range of indicators, and Bayesian analysis to provide model-based estimates of trends in, and projections

of, UHC, health-service coverage, and financial risk protection indicators, with a focus on equity. The projections of indicators helped us to assess the likelihood of achievement of UHC through a probabilistic approach. This process also enabled us to quantify the probability of achieving UHC targets for each indicator. Our results showed that, although overall prevention and treatment coverage are increasing nationally and across wealth quintiles, financial risk protection is decreasing. Several indicators related to maternal and child health services are not on track to meet 2030 targets. Projections to 2030 also suggest continued wealth-based inequality in health indicators and access to health services, except for exclusive breastfeeding and non-overweight. By using Bayesian models, we estimated that 23% of households would incur financial hardship by 2030.

Implications of all the available evidence

By use of a probabilistic Bayesian models, we provided projections of selected UHC indicators up to 2030. These projections showed that Bangladesh is unlikely to reach the targets of 80% health-service coverage and 100% financial risk protection. The low coverage of specific health services, existing pro-rich inequality in the health service, and increasing trends of financial burden as a result of health-care expenses emphasise the need for stable policies, cost-effective interventions, and urgent implementation of risk pooling mechanisms in Bangladesh.

and donor contributions.¹⁰ Therefore, assessment of the country's progress towards UHC goals is necessary through a broad range of UHC indicators that provide an assessment of the practical effect of the strategy on ordinary users of health services.¹¹ Projections for these indicators to inform future planning are also needed.

Although trends and projections are very useful for policy makers to identify areas in which further policies and interventions are required, none of the previous studies in Bangladesh included projections of the coverage of UHC indicators to quantify the probability of achieving targets by 2030.^{8,12–15} We aimed to investigate trends in the coverage of health services and financial risk protection in Bangladesh with a focus on equity, and to obtain projections of coverage of health services and financial risk protection by 2030. We also aimed to estimate the probability of achieving the UHC targets of 80% coverage of health services and 100% financial risk protection from catastrophic and impoverishing health payments by 2030.

Methods

Study design and data sources

We used data from nationally representative cross-sectional household surveys in Bangladesh to estimate trends in, and projections of, UHC coverage. Study data came from surveys, which we obtained from the Bangladesh

Demographic Health Survey and Bangladesh Bureau of Statistics. Surveys were included if they were done nationally, sampled on the basis of a defined framework, and had high response rates. We identified 19 surveys that were done from Jan 1, 1991, to Dec 31, 2014, in all of which multistage cluster sampling methods were used to gather data from nationally representative probability samples of households (appendix p 3). Ethical approval was not required for this study, because we used publicly available secondary datasets.

Measurement of UHC indicators

We followed the joint WHO and World Bank framework for assessment of progress towards UHC.³ We measured both coverage of essential health services and protection from financial risk due to health-care costs. To establish whether these components provided benefits to the whole population irrespective of socioeconomic status,³ we measured them both nationally and by household consumption quintiles.

Health-service interventions are classified into two broad categories: prevention services and treatment services.¹¹ Because various prevention and treatment indicators are used to monitor progress towards UHC, the selection of indicators depends on a country's health system, epidemiology, and availability of data sources.¹¹ On the basis of these selection criteria and previous studies,^{8,11,16} we

See Online for appendix

| | Definition* | Data sources |
|--|--|--|
| Prevention indicators | | |
| At least four antenatal care visits | The proportion of women aged 15–49 years in the 3 years preceding the survey who received at least four visits from a skilled health provider (ie, doctor, nurse, or midwife) during their last pregnancy | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014; MICS 2012–13 |
| At least one antenatal care visit | The proportion of women aged 15–49 years in the 3 years preceding the survey who received at least one visit from a skilled health provider during their last pregnancy | BDHS 1993–94, 1995–96, 1999–2000, 2004, 2007, 2011, 2014; MICS 2012–13 |
| Postnatal care of mother | The proportion of women giving birth in the 3 years preceding the survey who received their first postnatal checkup in the first 2 days after birth by a medically trained provider (ie, doctor, nurse, midwife, paramedic, family welfare visitor, community skilled birth attendant) | BDHS 2004, 2007, 2011, 2014 |
| Postnatal care of newborn infant | The proportion of last births in the 3 years preceding the survey who received their first postnatal checkup in the first 2 days after birth by a medically trained provider | BDHS 2004, 2007, 2011, 2014 |
| Exclusive breastfeeding | The proportion of youngest children younger than 6 months living with their mother who are exclusively breastfed (based on a 24 h recall period) | BDHS 1993–94, 1996–97, 1999–2000, 2007, 2011, 2014 |
| Needs for family planning satisfied | The proportion of married women aged 15–49 who do not want any more children or want to wait 2 or more years before having another child and are using modern contraception | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014 |
| BCG immunisation | The proportion of children aged 12–23 months who received one dose of the BCG vaccine | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014 |
| DPT3 immunisation | The proportion of children aged 12–23 months who received three doses of the DPT vaccine | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014 |
| Polio3 immunisation | The proportion of children aged 12–23 months who received three doses of polio vaccine | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014 |
| Measles immunisation | The proportion of children aged 12–23 months vaccinated against measles | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014 |
| Non-use of tobacco | The proportion of men and boys aged 15 years or older who do not use tobacco | BDHS 2007, GATS 2009; HMSS 2012, 2014 |
| Non-overweight | The proportion of women and girls aged 15–49 years who are not overweight (ie, body-mass index <25.0 kg/m ²) | BDHS 1996–97, 1999–2000, 2004, 2007, 2011, 2014 |
| Improved or safe water | The proportion of households whose main source of drinking water is an improved source (which includes tube well, piped water, rain water, protected well, and bottled water) | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014; MICS 2012–13 |
| Adequate sanitation | The proportion of households with improved toilet facilities (which includes flush toilets piped to sewer system, septic tank, or pit latrines, ventilated improved pit latrines, and pit latrine with slabs) | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014 |
| Treatment indicators | | |
| Institutional delivery | The proportion of livebirths delivered at a health facility in the 3 years preceding the survey | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014; MICS 2006, 2012–13 |
| Skilled birth attendance | The proportion of livebirths assisted by a skilled health provider (ie, a doctor, nurse, midwife, or auxiliary nurse or midwife) in the 3 years preceding the survey | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014; MICS 2006, 2012–13 |
| Oral rehydration therapy | The proportion of children younger than 5 years with diarrhoea who received oral rehydration therapy (ie, oral rehydration salts, recommended home solution, or increased fluids) in the previous 2 weeks | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014 |
| Care seeking for pneumonia | The proportion of children younger than 5 years with suspected pneumonia who sought care from an appropriate health provider in the previous 2 weeks | BDHS 1993–94, 1996–97, 1999–2000, 2004, 2007, 2011, 2014; MICS 2006, 2012–13 |
| Treatment of diabetes† | The proportion of patients with diabetes taking drugs to control the disease | BDHS 2011 |
| Treatment of hypertension† | The proportion of patients with hypertension taking drugs to control the disease | BDHS 2011 |
| Financial risk protection indicators | | |
| Catastrophic health expenditure | The proportion of households for which out-of-pocket payments for health care exceed 10% of the household's total consumption | HES 1991–92, 1995–96; HIES 2000, 2005, 2010; UHES 2011; BIHS 2011–12 |
| Impoverishing health expenditure | The proportion of households for which total household expenditure was greater than household subsistence expenditure, but household expenditure without out-of-pocket health payment was lower than subsistence expenditure | HES 1991–92, 1995–96; HIES 2000, 2005, 2010; UHES 2011; BIHS 2011–12 |
| <p>BDHS=Bangladesh Demographic and Health Survey. MICS=Bangladesh Multiple Indicator Cluster Survey. DPT=three doses of diphtheria, pertussis, and tetanus vaccine. Polio3=three doses of polio vaccine. GATS=Global Adult Tobacco Survey—Bangladesh. HMSS=Bangladesh Health and Morbidity Status Survey. HES=Household Expenditure Survey. HIES=Household Income and Expenditure Survey. UHES=Urban Health Expenditure Survey. BIHS=Bangladesh Integrated Household Survey. * Adapted from the global monitoring report on universal health coverage.^{8,11,16} † Not projected for the year 2030 because data were insufficient.</p> | | |
| Table 1: Indicators of universal health coverage | | |

chose 13 prevention indicators and four treatment indicators (table 1). These interventions help to improve population health and prevent premature death and disability.¹⁷ We estimated a composite prevention index and a composite treatment index as the weighted mean of prevention and treatment indicators, respectively, to trace the progress of overall prevention and treatment coverage.

Because the composite prevention index was estimated from survey data and information for all 13 prevention indicators was not available for the same survey year, only nine prevention indicators (four antenatal care visits; exclusive breastfeeding; family planning demand satisfaction; improved water; adequate sanitation; BCG immunisation; measles immunisation; three doses of diphtheria, pertussis, and tetanus immunisation (DPT3); and three polio immunisations) were included to estimate the composite prevention index. Additionally, we estimated a composite coverage index—a weighted mean of eight reproductive, maternal, and child health services indicators from four intervention areas—on the basis of the formula developed by Boerma and colleagues.¹⁶

Incidence of catastrophic health expenditure and impoverishment due to OOP health payments were used for assessment of financial hardship.³ We used a 10% threshold of household total consumption to define catastrophic health payment.¹⁸ Health expenditure was defined as impoverishing when a non-poor household became poor because of OOP payments for health care¹⁸—ie, health expenditure was deemed impoverishing when total household expenditure (including OOP payment) was greater than household subsistence expenditure, but household expenditure without OOP payment was lower than the subsistence expenditure. A poverty line based on food share was used for the estimation of household subsistence expenditure. We defined financial hardship as the incidence of either catastrophic health expenditure or impoverishment, or both. Details of the measurement procedure for catastrophic and impoverishing health expenditure are in the appendix (pp 5–6).

Statistical analysis

Coverage of prevention, treatment, and financial hardship indicators were estimated as proportions with 95% CIs from the original survey data. The socioeconomic status of households was determined either according to the asset-based wealth index or on the basis of total consumption (appendix p 6). Because the included health surveys had no information about the income or expenditure of sampled households, we used the wealth index as a proxy measure of household socioeconomic status.¹⁹ Household wealth index was constructed on the basis of household characteristics and ownership of assets by principal component analysis with the standard method from the Demographic and Health Surveys.²⁰ We then ranked households on the basis of wealth scores and divided them into quintiles, from poorest quintile (lowest 20%

of the index) to the richest quintile (highest 20% of the index). Consistent with previous studies,^{21,22} household consumption expenditure quintiles were used to measure socioeconomic status of households for household health expenditure survey data (appendix p 6).

We used a regression-based relative index of inequality to measure the relative socioeconomic inequalities between poor and rich households for the included indicators for the years 2007, 2011, and 2014 to see changes in inequalities in recent years. The regression approach takes into account the whole population distribution of wealth and quantifies the degree of inequity between the top and bottom quintiles. The value of the relative index of inequality indicates the increased risk of experiencing an outcome among the rich quintile compared to the poor quintile. Additionally, we constructed a concentration curve to show the socioeconomic inequality in the indicators graphically and calculated a concentration index to measure the extent of socioeconomic inequality in each of the indicators (appendix p 6).¹⁸

Composite prevention and treatment indices were developed based on random-effects meta-analysis by use of the Freeman-Tukey transformation method.²³ Because the proportion of some of the indicators in our study was close to the boundary values (such as 0 or 1) we preferred to apply meta-analysis on the basis of the Freeman-Tukey method. The Freeman-Tukey method applies a double arcsine transformation to the proportions. We applied the meta-analysis to the transformed values and their variance, and then transformed the values and their confidence intervals back to the original proportion scale to obtain accurate estimates of the pooled means.

We used a Bayesian linear regression model with non-informative prior to estimate the trends in indicators with time and the posterior predictive distribution of the indicators. We used Bayesian regression models because we were interested in computation of target achievement probability. Bayesian linear regression specifies a sampling distribution of the data with specification of a prior distribution of the regression coefficients. Time was a covariate in each model (appendix p 29).

All the proportions were logit transformed before the analysis, and all calculations were done in the logit-transformed variables and then transformed back to probabilities to ensure all predicted and projected probabilities lay between 0 and 1. A Markov chain Monte Carlo (MCMC) algorithm was used to obtain 1000 samples from the posterior distributions of the parameter of interest with two chains. For each model, the first 5000 iterations were discarded as burn-in and the number of iterations was increased until the output diagnosed as converged. These posterior predictive distributions were used to obtain projections and credible intervals (CrI) up to the year 2030. They were also used to calculate the annual rate of change, and the probability of achieving the target for all included indicators.

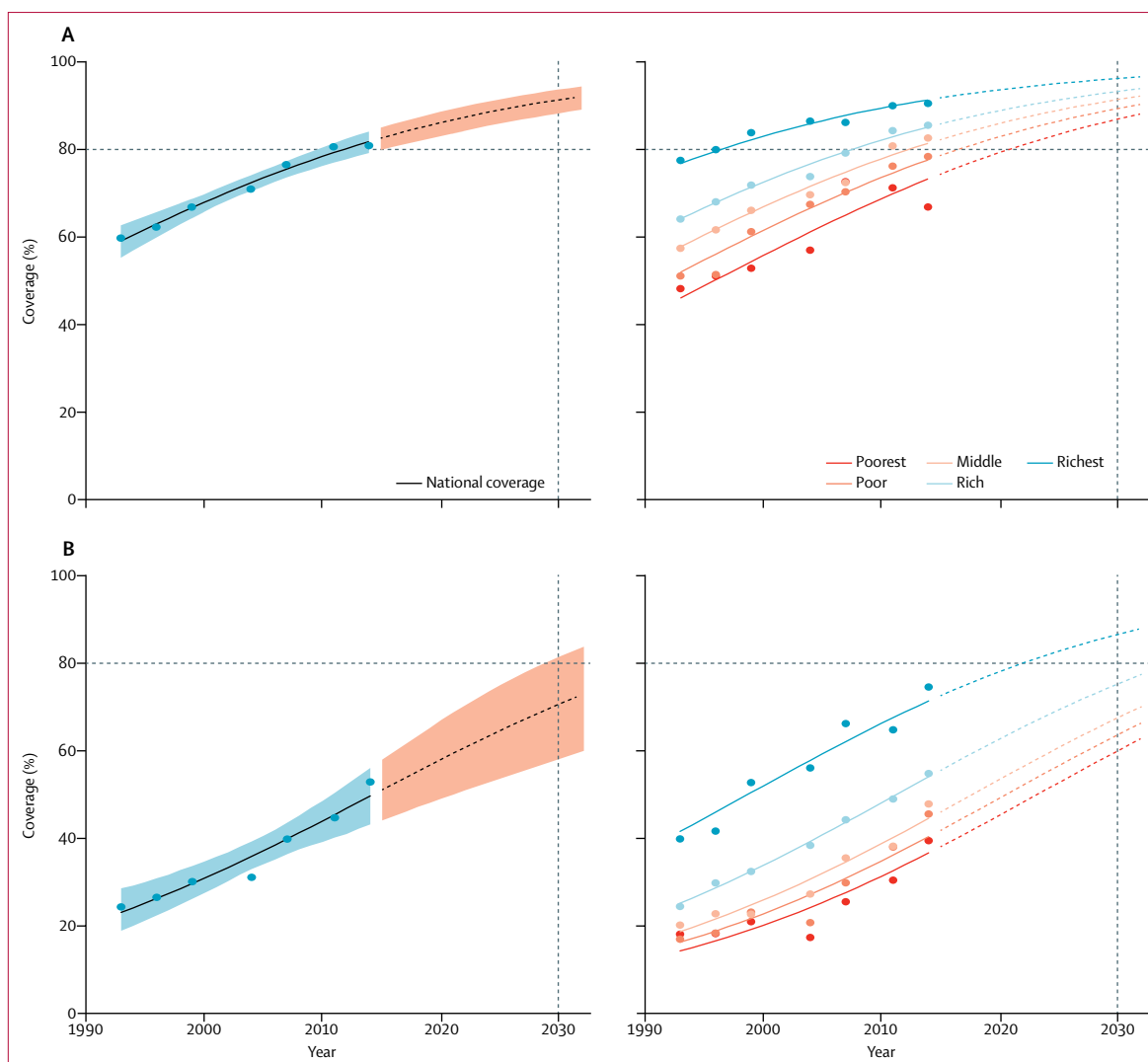


Figure 1: Trends in, and projections of, composite indices nationally (left) and by wealth quintile (right), in Bangladesh, 1993-2030

Dots represented recorded mean estimates. Lines show the posterior mean estimates (dashed lines represent projected future values). The shaded area represents the 95% credible intervals. The dotted line represents the 80% coverage target for universal health coverage indicators.

We considered an indicator to have met the UHC target by 2030 if the target achievement probability was 90% or above. We used trends for 1993–2014 to obtain projections of health service indicators. For financial risk protection indicators, Bayesian models included survey data from the year 2000 and later because of differences in data collection before 2000. Additionally, for the quintile-specific models, we included quintile as a categorical covariate and tested for an interaction between quintile and year in every model with the deviance information criterion (appendix p 7). Finally, we did sensitivity analyses for indicators with trends from 2000 and later whenever possible. Trace plots were checked visually to assess convergence of MCMC output for each of the models. When the outputs from two chains become alike, posterior samples were considered to have converged.²⁴ Additionally,

Gelman-Rubin diagnostic statistics were used as a quantitative measure of convergence. A potential scale reduction factor is used in this diagnostic, in which a value close to 1 diagnosed convergence, and a value less than 1.02 identified convergence failure.²⁴ Bayesian models were developed in JAGS (version 4.2.0) and implemented in R (version 3.2.4). Example JAGS and R codes for the antenatal care visit indicator, and the final data set used for analysis, are in the appendix (pp 30–34).

Role of the funding source

The funder had no role in the study design; data collection, analysis, or interpretation; or writing of the report. The corresponding author had access to all study data and final responsibility for the decision to submit the report for publication.

| | Predicted coverage in year (95% credible interval) | | | | Annual % change 1993-2030 (95% credible interval) | Probability of reaching target | Relative index of inequality (95% CI), 2014 |
|-------------------------------------|--|---------------------|---------------------|---------------------|---|--------------------------------|---|
| | 1995 | 2005 | 2015 | 2030 | | | |
| Prevention indicators | | | | | | | |
| At least four antenatal care visits | 6.9 (5.4 to 9.0) | 14.4 (12.5 to 16.7) | 27.9 (22.1 to 34.1) | 57.1 (41.8 to 70.9) | 6.2 (4.7 to 7.5) | 0% | 10.84 (7.30 to 14.38) |
| Postnatal care of mother | 5.8 (2.8 to 10.7) | 16.1 (12.7 to 20.4) | 38.6 (31.0 to 47.4) | 77.9 (56.5 to 91.8) | 7.9 (5.0 to 10.5) | 39.3% | 6.56 (5.12 to 8.05) |
| Postnatal care of newborn infant | 5.4 (1.8 to 12.8) | 15.0 (10.5 to 20.8) | 37.5 (26.4 to 50.6) | 76.8 (44.4 to 94.8) | 8.2 (3.6 to 12.0) | 46.4% | 7.82 (5.90 to 9.73) |
| Exclusive breastfeeding | 44.9 (36.1 to 54.1) | 51.2 (45.0 to 57.7) | 57.4 (46.5 to 67.6) | 65.7 (44.5 to 82.3) | 1.1 (-0.3 to 2.3) | 5.3% | 1.05 (0.69 to 1.42) |
| Needs for family planning satisfied | 57.7 (54.9 to 60.3) | 65.4 (63.7 to 67.3) | 72.5 (69.5 to 75.6) | 81.1 (76.2 to 85.5) | 1.0 (0.7 to 1.2) | 73.3% | 1.02 (0.93 to 1.10) |
| BCG immunisation | 86.4 (82.9 to 89.1) | 95.2 (94.2 to 96.0) | 98.4 (97.8 to 98.9) | 99.7 (99.4 to 99.9) | 0.5 (0.3 to 0.6) | 100% | 1.04 (1.01 to 1.07) |
| DPT3 immunisation | 67.9 (59.9 to 75.4) | 85.3 (82.1 to 88.1) | 94.0 (90.9 to 96.2) | 98.5 (96.7 to 99.4) | 1.2 (0.8 to 1.7) | 100% | 1.22 (1.08 to 1.36) |
| Polio3 immunisation | 65.9 (56.9 to 74.1) | 84.9 (81.9 to 88.0) | 94.1 (91.0 to 96.3) | 98.7 (96.9 to 99.5) | 1.3 (0.9 to 1.8) | 100% | 1.19 (1.06 to 1.32) |
| Measles immunisation | 68.8 (63.2 to 74.5) | 80.0 (76.9 to 82.9) | 87.7 (83.9 to 90.9) | 94.9 (90.0 to 97.0) | 0.9 (0.6 to 1.3) | 100% | 1.35 (1.18 to 1.51) |
| Non-use of tobacco | 8.8 (1.5 to 26.6) | 26.4 (15.8 to 40.4) | 61.9 (49.4 to 4.5) | 91.9 (69.8 to 99.2) | 7.9 (2.8 to 13.1) | 93.9% | 1.01 (0.96 to 1.05) |
| Non-overweight | 97.3 (96.5 to 98.0) | 91.0 (89.6 to 92.0) | 75.9 (71.2 to 79.9) | 28.8 (18.7 to 40.8) | -3.2 (-4.3 to -2.2) | 0% | 0.52 (0.49 to 0.55) |
| Improved or safe water | 94.5 (92.7 to 96.0) | 97.0 (96.4 to 97.6) | 98.4 (97.6 to 99.0) | 99.3 (98.5 to 99.8) | 0.2 (0.1 to 0.2) | 100% | 1.07 (0.99 to 1.14) |
| Adequate sanitation | 25.6 (18.3 to 34.5) | 41.7 (34.7 to 48.8) | 59.7 (45.1 to 71.4) | 80.5 (58.9 to 92.8) | 1.0 (1.0 to 1.0) | 58.4% | 3.20 (2.67 to 3.72) |
| Composite prevention index | 58.8 (54.6 to 63.0) | 71.5 (69.3 to 74.0) | 81.5 (78.5 to 84.4) | 91.1 (87.4 to 93.8) | 1.3 (1.0 to 1.6) | 100% | .. |
| Treatment indicators | | | | | | | |
| Institutional delivery | 4.4 (3.7 to 5.2) | 14.6 (13.4 to 16.1) | 38.8 (34.6 to 43.6) | 81.6 (75.0 to 86.8) | 8.9 (8.0 to 9.4) | 73.8% | 6.76 (5.17 to 8.34) |
| Skilled birth attendance | 8.8 (6.7 to 11.4) | 20.8 (18.0 to 24.0) | 41.9 (35.0 to 49.9) | 76.1 (63.3 to 86.4) | 6.4 (5.1 to 7.5) | 25.1% | 5.63 (4.45 to 6.82) |
| Oral rehydration therapy | 75.6 (70.4 to 80.4) | 82.1 (79.7 to 84.5) | 87.0 (82.9 to 90.3) | 92.0 (85.8 to 95.8) | 0.5 (0.2 to 0.9) | 99.9% | 0.99 (0.84 to 1.15) |
| Care seeking for pneumonia | 27.0 (20.2 to 34.0) | 31.6 (27.4 to 36.2) | 36.7 (28.4 to 45.7) | 44.8 (27.3 to 63.9) | 1.4 (-0.5 to 3.2) | 0.0% | 1.36 (0.44 to 2.27) |
| Composite treatment index | 25.1 (21.1 to 29.9) | 37.1 (34.0 to 40.5) | 51.0 (44.0 to 57.9) | 70.7 (58.1 to 81.5) | 3.0 (2.0 to 3.8) | 3.9% | .. |
| Composite coverage index | 50.1 (47.8 to 52.8) | 60.7 (59.1 to 62.4) | 70.4 (68.0 to 72.9) | 81.9 (78.1 to 85.2) | 1.4 (1.2 to 1.7) | 90.0% | .. |

WHO's universal health coverage target is to have at least 80% health-services coverage by 2030 for the entire population of the country, irrespective of economic status, gender, or place of residence. Predicted coverage of all indicators were estimated from Bayesian models. Quintile specific values (pp 8-12), the observed coverage of health services during 1993-2014 (pp 13-14), and predicted coverage of health services nationally and by wealth quintiles during 1995-2030 (pp 18-27) are presented in the appendix. DPT3=three doses of diphtheria, pertussis, and tetanus vaccine. Polio3=three doses of polio vaccine.

Table 2: Health-service coverage 1995-2030, and probability of achieving the target of 80% coverage in Bangladesh by 2030

Results

12 nationwide population-based surveys of 276 608 households were included in our study to estimate health-service coverage. Figure 1 shows the trend in UHC composite indices from 1993, and projection to 2030. Overall, we projected that prevention coverage both at the national level and across wealth quintiles will meet targets by 2020 if current trends continue (figure 1). Overall, treatment coverage is increasing but was projected to fail to meet the target, with only the richest quintile on track to meet the target (figure 1). The composite coverage index was projected to be more than 80% by 2030 at the national level and among the three wealthiest quintiles but not among the two poorest quintiles (appendix p 8).

Among prevention indicators, national coverage of four childhood vaccinations (ie, the BCG, DPT3, polio, and measles) and access to improved water had already reached the target by 2015 (table 2). Even though coverage of at least four antenatal care visits and postnatal checkups are increasing with a high annual rate of change (more than 6% per year), these indicators were not projected to meet the target by 2030 if present trends continue (table 2). The target achievement probability for at least four

antenatal care visits was 0% (table 2), suggesting that there is zero probability of achieving at least 80% coverage of at least four antenatal care visits by 2030. The proportion of non-overweight women was projected to decrease from 75.9% (95% CrI 71.2-79.9) in 2015, to 28.8% (18.7 to 40.8) by 2030, but the proportion of non-tobacco users was projected to achieve the target before 2030 (table 2). Of the four treatment indicators, coverage of oral rehydration therapy only was projected to meet the target by 2030 with a high (ie, ≥90%) probability (table 2). The proportion of care seeking for treatment of pneumonia was projected to increase to 44.8% (95% CrI 27.3-63.9), the lowest proportion of the treatment indicators (table 2). The coverage of institutional delivery was projected to increase from 38.8% (95% CrI 34.6-43.6) in 2015, to 81.6% (75.0-86.8) in 2030 at the national level (table 2), but some quintiles will not achieve the target (appendix p 12). Coverage of treatment for non-communicable diseases was quite low in Bangladesh: only 38% of patients with diabetes and 42% of patients with hypertension received treatment in 2011 (appendix p 17).

Sensitivity analysis of health-service indicators produced similar results for all but a few indicators (appendix

p 4). In these analyses, coverage of at least four antenatal care visits was projected to increase to only 48·0% (CrI 31·0–65·6) by 2030 if the trends from 2000 and later continue, whereas the estimated coverages of adequate sanitation, skilled birth attendance, and care seeking for pneumonia treatment were higher than those in the standard analysis (appendix p 4).

By 2030, the predicted coverage of postnatal checkups, institutional delivery, and skilled birth attendance among the richest quintile was projected to be more than the 80% target; coverage of such health services was projected to be much lower than the target among the poorest quintile (appendix pp 9–12). Coverage of child vaccinations, oral rehydration therapy, access to improved water, proportion of non-tobacco users, and family planning satisfaction will be above 80% by 2030 across all the quintiles, but coverage of exclusive breastfeeding, non-overweight, and care seeking for treatment of pneumonia will be far from the target among all wealth quintiles (appendix pp 9–12).

The results of inequality analyses for health-service coverage across different years are in the appendix (p 16). The concentration index suggested that most included health services were more concentrated among the wealthier than among the poorer households, whereas exclusive breastfeeding and non-overweight were more concentrated among the poor households (figure 2). The least equitable indicators were four antenatal visits, postnatal checkups, institutional delivery, skilled birth attendance, and access to adequate sanitation (figure 2). The relative index of inequality suggested that women in the richest group were about six times more likely to have four antenatal visits, institutional delivery, deliver babies with the assistance of a skilled birth attendant, and receive a postnatal checkup than were their counterparts in the poorest group in 2014 (table 1). The wealthiest households had 3·2 times higher access to adequate sanitation than did the poorest households (table 1). Treatment of diabetes and hypertension was also more concentrated among the wealthiest than the poorest groups (appendix p 17).

Expenditure data from 49 606 households from seven nationwide population-based surveys showed that the incidence of catastrophic health expenditure and impoverishment as a result of OOP health expenditure increased over time, and was projected to continue to increase (table 3). About 23% of households were projected to incur financial hardship due to OOP by 2030 (table 3). Bangladesh will not achieve the target of financial protection from catastrophic payment or impoverishment, or both, by 2030.

If post-2000 trends continue, around 12% of the poorest and 29% of the richest households were projected to incur financial catastrophe by 2030 (table 4). The concentration curves for each year are below the line of equality, suggesting that the wealthiest households were facing disproportionately more financial catastrophe compared with the poorest households (figure 3).

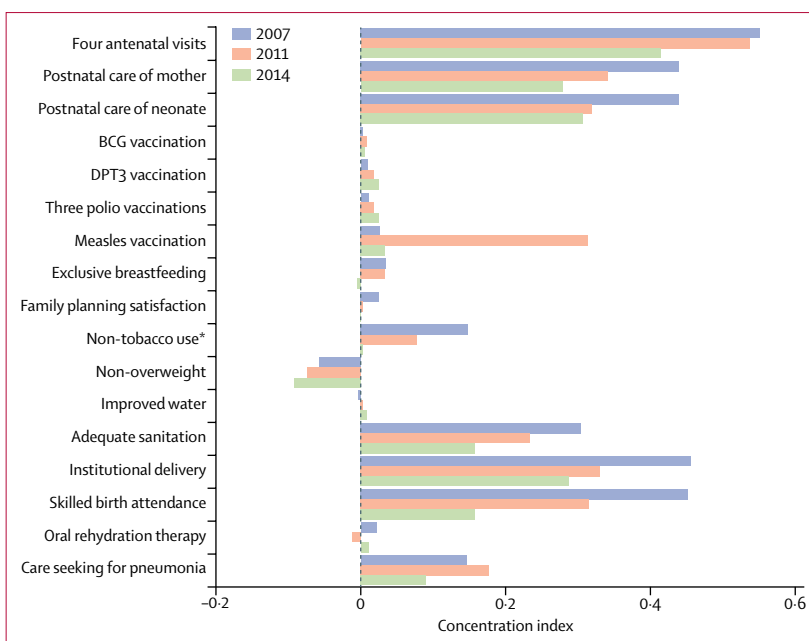


Figure 2: Concentration index for the coverage of preventive and treatment services in 2007, 2011, and 2014. Concentration indices with 95% CIs for all included indicators are in the appendix (p 16). DPT3=three doses of diphtheria, pertussis, and tetanus immunisation. *The concentration index for non-tobacco use is presented for the year 2012 instead of 2011.

| | Catastrophic health expenditure (95% credible interval) | Impoverishment (95% credible interval) | Financial hardship (95% credible interval) |
|---------------------------------|---|--|--|
| 1991 | 4·2% (3·7 to 4·8)* | 1·8% (1·5 to 2·2)* | 5·5% (4·9 to 6·1)* |
| 1995 | 3·6% (3·2 to 4·0)* | 1·5% (1·3 to 1·8)* | 4·7% (4·2 to 5·2)* |
| 2000 | 14·8% (11·0 to 19·2) | 2·2% (1·2 to 3·6) | 15·7% (13·3 to 17·8) |
| 2005 | 15·4% (13·3 to 18·0) | 2·6% (1·9 to 3·6) | 16·7% (15·2 to 18·4) |
| 2010 | 16·2% (13·3 to 19·3) | 3·3% (2·1 to 4·8) | 17·8% (16·1 to 19·7) |
| 2015 | 17·0% (12·4 to 22·8) | 4·2% (2·0 to 7·9) | 18·9% (16·4 to 22·5) |
| 2020 | 17·9% (11·1 to 26·9) | 5·4% (1·8 to 13·0) | 20·1% (16·4 to 26·0) |
| 2030 | 20·0% (8·8 to 36·3) | 9·4% (1·3 to 32·3) | 22·8% (16·3 to 34·8) |
| Annual rate of change 2000–30 | 0·82% (–2·6 to 3·7) | 4·0% (–2·9 to 10·6) | 1·2% (–0·1 to 3·0) |
| Probability of reaching target† | 0·6% | 29·4% | 0·1% |

Catastrophic health expenditure was calculated on the basis of the 10% threshold of household total consumption. Predicted incidences of all the indicators were estimated from Bayesian models unless mentioned. Observed incidences of catastrophic health expenditure (based on different thresholds) and impoverishment are presented in the appendix (p 28). *Observed estimates from survey data; numbers in parentheses are 95% CIs. †Target is 95% protection by 2030 (the universal health coverage target is 100%, but by design, the logit-transformation model does not predict 100%).

Table 3: Incidence of catastrophic health expenditure and impoverishment in Bangladesh, 1991–2030

Discussion

In this study, we estimated trends, projections, and the probability of target achievement for each of the included UHC indicators by 2030. Of the 17 included health-service indicators, targets for national coverage of child vaccinations and access to improved water have already been met. Three other health-service indicators—oral rehydration therapy, family planning, and non-use of tobacco—are on track to meet the UHC target by 2030,

| | Catastrophic health expenditure (95% credible interval) | | Inequality in catastrophic health expenditure | |
|------|---|---------------------|---|------------------------------|
| | Poorest quintile | Richest quintile | Relative index of inequality (95% CI) | Concentration index (95% CI) |
| 1991 | 3.1 (2.1 to 4.1)* | 5.2 (3.9 to 6.5)* | 1.6 (1.0 to 2.3) | 0.29 (0.22 to 0.37) |
| 1995 | 2.3 (1.5 to 3.1)* | 4.9 (3.8 to 6.0)* | 1.7 (1.2 to 2.3) | 0.11 (0.04 to 0.18) |
| 2000 | 8.6 (7.7 to 9.6) | 22.4 (20.5 to 24.9) | 3.9 (3.0 to 4.9) | 0.22 (0.19 to 0.27) |
| 2005 | 9.1 (8.3 to 9.9) | 23.5 (21.6 to 25.4) | 0.8 (0.7 to 0.9) | -0.05 (-0.07 to -0.02) |
| 2010 | 9.6 (8.7 to 10.5) | 24.6 (22.7 to 26.6) | 2.5 (1.9 to 3.0) | 0.15 (0.12 to 0.18) |
| 2015 | 10.1 (9.0 to 11.3) | 25.7 (23.3 to 28.2) | .. | .. |
| 2020 | 10.7 (9.2 to 12.3) | 26.9 (23.6 to 30.1) | .. | .. |
| 2030 | 12.0 (9.3 to 14.8) | 29.4 (24.3 to 34.7) | .. | .. |

Catastrophic health expenditure was calculated on the basis of the 10% threshold of total consumption. Predicted incidences of all the indicators were estimated from Bayesian models, unless mentioned. The probability of meeting the target of 95% protection from catastrophic health expenditure by 2030 is 0% in both the richest and the poorest quintile. *Observed estimates from survey data; numbers in parentheses are 95% CIs.

Table 4: Inequality in catastrophic health expenditure in Bangladesh, 1991–2030

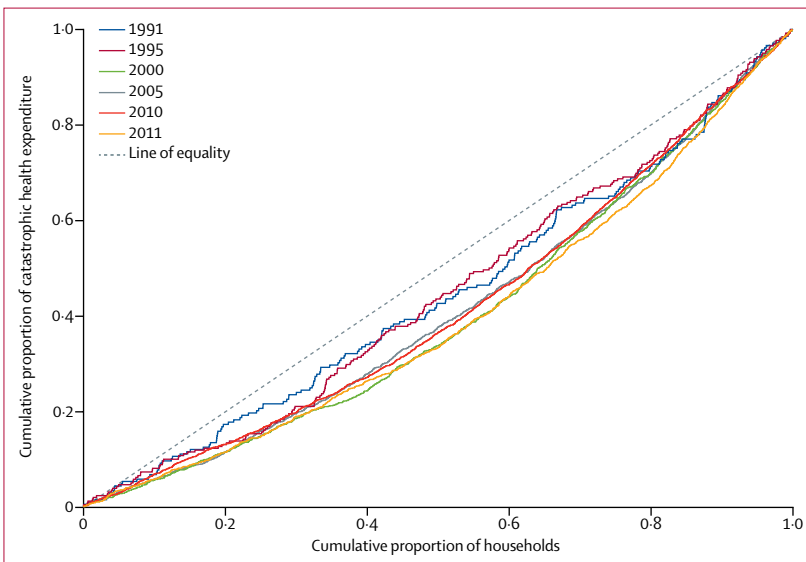


Figure 3: Concentration curves for the proportion of households experiencing catastrophic health expenditure in Bangladesh, 1991–2010

Catastrophic health expenditure was calculated on the basis of a 10% threshold of household total consumption.

whereas indicators related to maternal pregnancy care, pneumonia treatment, nutrition, and sanitation were projected not to achieve the target. Although overall prevention coverage was projected to reach the target by 2030, the progress of overall treatment coverage is slow and will be far below the 80% coverage target by 2030, especially among the poorest quintile.

Bangladesh has made impressive gains in the coverage of maternal health interventions, including antenatal care, institutional delivery, skilled birth attendance, and postnatal checkups at the national level, but progress was still projected to be insufficient to achieve the target of 80% coverage for all people by 2030. The pluralistic health system,²⁵ community-based approaches,²⁶ establishment of

community clinics, and implementation of sector-wide approaches might have helped to improve coverage of reproductive, maternal, and child health interventions, and especially of child vaccination, during the past two decades.²⁷ Additionally, with the help of donor agencies, the Government of Bangladesh has been implementing a demand-side financing scheme since 2007, which includes free antenatal care, delivery care, postnatal checkups, and treatment of pregnancy complications (including caesarean delivery), and covers costs for laboratory tests and transportation to the health facility from home.²⁸ Despite these reforms, the coverage of these interventions still unequally favours rich people, and these socioeconomic disparities are likely to continue in the future. Even though public health facilities are accessible to everyone, lack of awareness, unavailability of specific services, and high OOP payment related to health care could be the main barriers to improvement of access to maternal health services among disadvantaged populations in Bangladesh.²⁹

Bangladesh has made significant progress in the coverage of child vaccinations. Our projections suggest that national and quintile-specific coverage of child vaccinations increased rapidly over the past decades, especially after the nationwide implementation of the Expanded Programme on Immunization. If trends continue, Bangladesh will achieve UHC immunisation targets by 2030. For the management of childhood illnesses, coverage of oral rehydration therapy both nationally and across all wealth quintiles was projected to meet the target with high probability. However, care seeking for pneumonia treatment was projected to fall far short of the target by 2030, and the poorest households were projected to have a much lower chance of receiving care for pneumonia than the richest households. Although exclusive breastfeeding has been identified as a key intervention to improve infant and maternal health³⁰ and is a recognised health inequality reduction strategy,³¹ the coverage of exclusive breastfeeding is low in Bangladesh and was projected not to meet the 80% target. This low level of exclusive breastfeeding could be a result of increasing participation of women in the formal and non-formal employment sectors, inadequate maternal leave, maternal under-nutrition, increasing caesarean deliveries, lack of awareness among mothers, and rapid urbanisation.^{32,33} The national health policy of Bangladesh should be strengthened to increase the coverage of child health indicators and to reduce inequality in access to care, especially access to pneumonia treatment.

In SDG3, prevention and promotion of non-communicable disease are recognised as important.¹ Many studies^{34,35} have shown that the burden of non-communicable diseases could be prevented by decreasing the prevalence of tobacco smoking, high body-mass index, and indoor use of solid fuel. We noted an increasing trend in overweight among Bangladeshi adults, which will increase the burden of non-communicable diseases,

despite projected decreases in the proportion of tobacco users.³⁶ We showed that roughly half of people with hypertension and diabetes in Bangladesh were not taking appropriate medication. This poor treatment coverage might be because of high treatment costs. Another study³⁷ showed that about 12% of households that included someone with hypertension or diabetes implemented distress financing to cope with treatment costs. Another study³⁸ in Bangladesh showed that about 5% of households were pushed into poverty because of the high cost of treatment for non-communicable diseases and chronic diseases. A rising burden of high treatment costs will also increase national health expenditure and put a substantial burden on the health system unless the Bangladeshi Government can incorporate an effective strategy to protect households from such high-cost diseases.³⁹ Funding a cap on the maximum amount of OOP expenditure per individual based on income is a potential strategy. Additionally, welfare programmes and subsidy systems could be incorporated for selected high-cost diseases (eg, cancer).

We projected an upward trend in financial risk indicators, including catastrophic payment and impoverishment. By 2030, more than 9% of non-poor households will become poor as a result of OOP payment for health care in Bangladesh. We also found that rich households are facing more financial catastrophe than poor households, and that this scenario is likely to continue. Poor people have lower coverage of all health services than rich people, which might be because of an inability to pay, and as a result financial risk is also low. Another reason for this counterintuitive finding is that poor people use public facilities, whereas rich people often use private facilities, which increases health expenditure.⁴⁰ This high burden (across wealth strata) could also be due to the lack of formal risk pooling mechanisms in the health financing system,⁴¹ low government spending on health,⁴² and ineffective subsidy programmes in public health facilities in Bangladesh.⁴³ Even though basic medicines are available for free in public facilities, patients often need to buy other medicines from pharmacies, and also need to purchase diagnostic tests from private facilities and make other unofficial payments.⁴⁴

In resource-limited countries such as Bangladesh, where public health expenditure is less than 3% of the gross domestic product and has remained almost stagnant in the past few years,⁴⁵ governments should increase spending on health at a minimum rate of 0·3% of gross domestic product per year to reduce inequalities in health outcomes and avoid financial burdens related to health-care costs.⁴⁶ The Government of Bangladesh developed a 20-year strategy in 2012 to reduce the level of financial risk from health-care payments to achieve UHC. However, the effect of this plan on UHC is unclear.¹⁰ In 2016, a pilot social health scheme, *Shasthyo Shurokhsha Karmasuchi*, has been implemented in three subdistricts of Dhaka division for populations

below the poverty line. Each household receives one health card. The benefits package is restricted to free treatment and medicines for only 50 diseases, and covers up to a maximum of 50 000 Bangladeshi Taka per health card per year, irrespective of the number of household members. The health financing strategy also includes a social health protection scheme to cover both the formal and informal sectors through mandatory social protection schemes and tax-based financing. However, this scheme could be quite a challenge, because a large proportion of the population is engaged in the informal sector, and their inclusion in the tax system will be difficult.

According to a study⁴⁵ published in 2017, per-person health expenditure in Bangladesh is expected to increase from US\$92 in 2014, to \$173 by 2030. The proportion of total health expenditure that OOP payments account for is expected to remain stagnant between 2014 to 2030 (65·6% to 65·3%),⁴⁵ although the aim of the health financing strategy was to halve the proportion of total health expenditure that OOP payments comprise (from 63·3% in 2012) within 20 years through raising funds from taxation and donor contributions.^{47,48} This goal might be challenging to achieve unless the Bangladeshi Government prioritises health in budget allocations. Some Asian countries—eg, Japan, Thailand, Vietnam—increased and maintained their budget allocation for health and introduced health insurance schemes to achieve UHC.⁴⁹ Thailand introduced a tax-financed universal coverage scheme for uninsured people in 2002, and this scheme reduced the level of financial hardship.⁵⁰ To move towards UHC targets for financial risk protection, the Government of Bangladesh could adopt the strategies of other developing countries, including Vietnam and Thailand.⁴⁹ Of course, health financing alone is not sufficient to achieve Bangladesh's health goals, because social determinants of health also have a large effect on the prevalence of disease, especially non-communicable diseases. Although non-communicable diseases were identified as major public health problems in the Health, Population and Nutrition Sector Development Programme (HPNSDP), the implementation of programmes related to prevention of these diseases has been insufficient, and skilled human resources to address them are lacking. The Bangladeshi Government could prioritise prevention programmes for non-communicable diseases by strengthening the capacity of human resources and health facilities to provide prevention and risk reduction services and promoting key interventions, such as reduction of salt intake and adoption of health lifestyles.⁵¹ The effects of social determinants of health are a growing problem associated with the epidemiological transition, and all countries heading to UHC should consider the essential role of social determinants in health.

Our study had several strengths. First, our study provided reliable estimates of trends in the indicators along with the corresponding rate of change in different

periods. Second, because we used a Bayesian regression model to generate credible intervals of projected estimates of future coverage, we could use these credible intervals to estimate target achievement probabilities for each indicator, which would have been impossible with a standard regression model.²⁴ Third, we included WHO-recommended indicators, which were based on available data. Fourth, we used a large amount of high-quality population-based household health and expenditure survey data to estimate trends and projections of UHC indicators, and provided disaggregated estimates for different socioeconomic groups. Finally, the study provided an overview of the progress of Bangladesh towards UHC and will help policy makers to reform policies for indicators with the least coverage and to increase coverage among marginalised and hard-to-reach populations.

Our study also had some limitations. We could not make a projection of control of diabetes and hypertension because of scarce datapoints. We also had fewer data points for some indicators—eg, non-tobacco use, postnatal care of mothers and neonates—which resulted in wide credible intervals for projection of those indicators. Wide credible intervals are normal for projections outside the available data range, and they still enable calculation of realistic probability estimates. All our models were based on current trends and on the assumption that future policy will not change, which might be too strict. However, we aimed to estimate the projected coverage on the basis of recent trends, so that policy makers can develop appropriate policy, and thus the assumption of unchanging policy was important to the study goals.

Overall, coverage of health services is increasing in Bangladesh, but insufficient progress in antenatal, delivery, and postnatal care, and care seeking for pneumonia, coupled with an increased prevalence of overweight and persistent wealth-based inequality will impede progress towards UHC. The country needs to develop stable and effective policies to implement cost-effective interventions to minimise the coverage gap and reduce inequalities in health services. Adequate supplies of drugs for non-communicable diseases, increased human resources for health, improved quality of care, and the establishment of more community clinics and other public health facilities in rural areas could help marginalised people to access health services. Strengthening of the health financing system, increasing public funding for health care, and incorporation of risk pooling mechanisms are necessary for Bangladesh to achieve UHC by 2030.

Contributors

MSR, MMR, SG, and KS conceived the study. MSR did the statistical analysis in consultation with MMR and SG. MSR and KTS managed health expenditure data. MSR wrote the first draft. MMR and SG checked the consistency of the analysis results and data interpretation. MMR, SG, SKA, and KS critically revised the Article for important intellectual content. All authors have reviewed and approved the final draft.

Declaration of interests

We declare no competing interests.

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Progress Toward Universal Health Coverage

A Comparative Analysis in 5 South Asian Countries

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IMPORTANCE Achieving universal health coverage is one of the key targets in the newly adopted Sustainable Development Goals of the United Nations.

OBJECTIVE To investigate progress toward universal health coverage in 5 South Asian countries and assess inequalities in health services and financial risk protection indicators.

DESIGN AND SETTINGS In a population-based study, nationally representative household (335 373 households) survey data from Afghanistan (2014 and 2015), Bangladesh (2010 and 2014), India (2012 and 2014), Nepal (2014 and 2015), and Pakistan (2014) were used to calculate relative indices of health coverage, financial risk protection, and inequality in coverage among wealth quintiles. The study was conducted from June 2012 to February 2016.

MAIN OUTCOMES AND MEASURES Three dimensions of universal health coverage were assessed: access to basic services, financial risk protection, and equity. Composite and indicator-specific coverage rates, stratified by wealth quintiles, were then estimated. Slope and relative index of inequality were used to assess inequalities in service and financial indicators.

RESULTS Access to basic care varied substantially across all South Asian countries, with mean rates of overall prevention coverage and treatment coverage of 53.0% (95% CI, 42.2%-63.6%) and 51.2% (95% CI, 45.2%-57.1%) in Afghanistan, 76.5% (95% CI, 61.0%-89.0%) and 44.8% (95% CI, 37.1%-52.5%) in Bangladesh, 74.2% (95% CI, 57.0%-88.1%) and 83.5% (95% CI, 54.4%-99.1%) in India, 76.8% (95% CI, 66.5%-85.7%) and 57.8% (95% CI, 50.1%-65.4%) in Nepal, and 69.8% (95% CI, 58.3%-80.2%) and 50.4% (95% CI, 37.1%-63.6%) in Pakistan. Financial risk protection was generally low, with 15.3% (95% CI, 14.7%-16.0%) of respondents in Afghanistan, 15.8% (95% CI, 14.9%-16.8%) in Bangladesh, 17.9% (95% CI, 17.7%-18.2%) in India, 11.8% (95% CI, 11.8%-11.9%) in Nepal, and 4.4% (95% CI, 4.0%-4.9%) in Pakistan reporting incurred catastrophic payments due to health care costs. Access to at least 4 antenatal care visits, institutional delivery, and presence of skilled attendant during delivery were at least 3 times higher among the wealthiest mothers in Afghanistan, Bangladesh, Nepal, and Pakistan compared with the rates among poor mothers. Access to institutional delivery was 60 to 65 percentage points higher among wealthy than poor mothers in Afghanistan, Bangladesh, Nepal, and Pakistan compared with 21 percentage points higher in India. Coverage was least equitable among the countries for adequate sanitation, institutional delivery, and the presence of skilled birth attendants.

CONCLUSIONS AND RELEVANCE Health coverage and financial risk protection was low, and inequality in access to health care remains a serious issue for these South Asian countries. Greater progress is needed to improve treatment and preventive services and financial security.

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In the United Nations' newly adopted Sustainable Development Goals, universal health coverage is promoted as an essential precondition for health and human security, particularly in low- and lower middle-income countries.¹ The main goal of universal health coverage is to ensure that everyone who needs health care services is able to gain access to them without incurring financial hardship.² The key targets of universal health coverage are to achieve at least 80% essential health service coverage and 100% protection from catastrophic health payment and impoverishment by 2030.^{2,3} Universal health coverage is now seen as an important component in the response to the global epidemic of noncommunicable diseases (NCDs), managing the epidemiologic transition and ensuring affordable and equitable access to care.^{2,4,5}

All World Health Organization member states have committed to universal health coverage and all developing countries are already pursuing universal health coverage policies with the intention of extending health coverage,⁶⁻¹⁰ but at the present only 20 developing countries have been identified as having made good progress toward universal health coverage.⁶⁻¹¹ Effective and continuous monitoring and tracking are necessary to ensure that policymakers can manage new initiatives efficiently and program development continues in line with Sustainable Development Goal 3-related indicators.

The World Health Organization proposed 3 core dimensions of universal health coverage: the proportion of a population covered by existing health care systems, the range of health care services available to a population, and the extent of financial risk protection available to local populations.² These dimensions are interdependent and can be measured in several ways. Assessing the services' coverage and financial risk protection indicators is the most commonly recommended method by the World Health Organization to track the progress toward universal health coverage, as these indicators help to define where a country may best seek to improve its health care system. Assessment is particularly lacking in the South Asian region, where health systems are typically underfunded and poorly functioning, which can impede data gathering and tracking.

Many South Asian countries are simultaneously facing the double burden of disease^{12,13} and low health service coverage^{14,15}; patients' out-of-pocket payments remain the most common source of funding for health care in these countries.¹⁶ Inequality is another concern in these countries, and disadvantaged populations are often unable to afford health care services.^{15,17} Inadequate public funding for health services, limited access to health insurance plans, and high out-of-pocket payments can trigger asset depletion, indebtedness, and reductions in essential consumption, leading to financial catastrophe, impoverishment, and reduced access to health care services.¹⁸

To measure and track countries' progress toward universal health coverage, we estimated a range of indicators of service coverage and financial risk protection using primary survey data from 5 South Asian countries: Afghanistan,

Key Points

Question What are the progress and challenges toward universal health coverage in Afghanistan, Bangladesh, India, Nepal, and Pakistan?

Findings In a population-based study including 335 373 households, coverage of essential health services and financial risk protection against catastrophic health expenditure and impoverishment was found to be low across all 5 South Asian countries. Inequality in coverage of health services and financial risk protection was common in the South Asian region.

Meaning Reduction of inequality in access to care and expansion of risk-pooling mechanisms are essential in these countries to achieve universal health coverage.

Bangladesh, India, Nepal, and Pakistan. We examined service coverage indicators reflecting health promotion, disease prevention, and specific treatment areas. We assessed the extent of financial risk protection by measuring the incidence of catastrophic and impoverishing health expenditures associated with out-of-pocket payments. We also calculated measures of equity among wealth quintiles in each country, and composite indices were generated for country-level comparisons. The study was conducted from June 2012 to February 2016.

Methods

Data Sources

For each country, we used the most recent country-specific, nationally representative, primary survey data to calculate estimates of health coverage and financial risk protection indicators based on previously described statistical methods of health coverage modeling⁴: Afghanistan (2014 and 2015), Bangladesh (2010 and 2014), India (2012 and 2014), Nepal (2014 and 2015), and Pakistan (2014). The data sources used for intervention coverage and financial hardship estimates are presented in eTable 1 in the [Supplement](#). Data were deidentified. Data were purchased from the selected countries, which had already obtained approval in conducting their surveys. In addition, we obtained data for gross domestic product, health expenditure, life expectancy, total fertility rate, and other demographic statistics from the World Bank.¹⁹

Main Outcome Measures and Analysis

Indicators for each dimension of universal health coverage, along with measures of overall equitability, were calculated from the aforementioned survey database on standard techniques, which are summarized herein.

Health Service Coverage

Health service tracking is typically assessed through coverage of prevention measures and treatment measures.^{4,20} To be consistent with previous studies,^{20,21} we estimated a composite coverage index (CCI) for each

country based on 8 interventions from 4 specialties (family planning, maternity care, child immunization, and case management).

$$CCI = 1/4 \left(FPS + \frac{SBA + ANCS}{2} + \frac{2 \cdot DPT3 + MSL + BCG}{4} + \frac{ORT + CPNM}{2} \right)$$

where ANCS indicates antenatal care with a skilled attendant; BCG, BCG immunization; CPNM, care-seeking for pneumonia; DPT3, 3 doses of diphtheria-tetanus-pertussis immunization; FPS, family planning needs satisfied; MSL, measles immunization; ORT, oral rehydration therapy for children with diarrhea; and SBA, presence of a skilled birth attendant.

Similar to previous studies,^{20,22-25} we used random-effects meta-analysis (Stata command: `metaprop_one`) to estimate the mean proportion for the composite prevention index based on 11 prevention indicators and the composite treatment index based on 4 treatment indicators. We compared this pooled mean proportion from meta-analysis with the arithmetic mean proportion across health-related indicators, which is a commonly used alternative measurement of coverage,^{20,25} and found almost identical results. For comparison purposes, we did not include diabetes and hypertension treatment indicators in the composite treatment index estimation because these 2 indicators were available for only Bangladesh and India. We assessed the diabetes and hypertension treatment indicators separately. Specific definitions, as well as a complete list of these prevention and treatment indicators and data sources, along with details of the calculation method, are presented in eTable 2 and eMethods in the Supplement.

Financial Risk Protection

Financial risk protection was assessed through incidence of catastrophic and impoverishing out-of-pocket health payments.⁴ Household expenditure is treated as catastrophic if it exceeds a threshold of 10% of household total consumption expenditure.²⁶ Health expenditure was defined as impoverishing when a non-poor household became poor due to out-of-pocket payments for health care.²⁶ Impoverishment was estimated using total household consumption expenditure calculated separately with and without out-of-pocket payments for health care.²⁶ A detailed description of the measurement of catastrophic payments and impoverishment can be found in the Supplement (see eMethods in the Supplement).

Measures of Inequality

To summarize wealth-based inequalities in health service coverage and financial risk, we used 2 indices: slope index of inequality (SII) and relative index of inequality (RII). We calculated both indices using logistic regression models that take into account the whole population distribution of wealth.^{21,27,28} The SII and RII were estimated by regressing health service and financial indicators outcomes against an individual's relative rank in the cumulative distribution of wealth. The SII expresses the absolute difference in coverage in per-

centage points between the extremes of the wealth distribution (from top to bottom) and gives an idea of the actual effort that will be needed to close the gap. A positive value of SII indicates that intervention coverage is higher in wealthy households compared with poor ones; for example, measles vaccine coverage among the wealthy population is 60 percentage points higher than among the poor population. By contrast, the RII measures the ratio of intervention coverage for poor and wealthy households and provides an idea about the degree of inequity; for example, polio vaccine coverage in the wealthiest households is 1.3 ($[1.3 - 1] \cdot 100\% = 30\%$) times higher than in the poorest households. A detailed description of these methods is presented in eMethods in the Supplement. We used Stata, version 14.1/MP (StataCorp) for all analyses.

Results

Sociodemographic Context

There were notable differences in wealth, health indicators, and health systems across South Asian countries (Table 1). The 5 included South Asian countries have a population of 1.72 billion, with the largest in India (1.31 billion) and smallest in Nepal (28 million). Poverty rate as a percentage of the population ranged from 21.9% (India) to 35.8% (Afghanistan). Gross domestic product spending on health varies: 8.2% in Afghanistan, 2.8% in Bangladesh, 4.7% in India, 5.8% in Nepal, and 2.6% in Pakistan. Women have a longer life expectancy than men in all 5 South Asian countries, ranging from 61.6 years in Afghanistan to 72.9 years in Bangladesh. A total of 335 373 households were included in this study.

Health Service Coverage

Table 2 presents a set of tracer indicators with summary measures of prevention and treatment intervention coverage in the most recent survey year. Access to basic care varied substantially across all South Asian countries, with mean rates of overall prevention coverage of 53.0% (95% CI, 42.2%-63.6%) in Afghanistan, 76.5% (95% CI, 61.0%-89.0%) in Bangladesh, 74.2% (95% CI, 57.0%-88.1%) in India, 76.8% (95% CI, 66.5%-85.7%) in Nepal, and 69.8% (95% CI, 58.3%-80.2%) in Pakistan. Access to specific prevention services varied similarly, with mean rates of adequate sanitation and measles immunization of 33.7% (95% CI, 33.1%-34.3%) and 60.1% (95% CI, 58.8%-61.4%) in Afghanistan, 68.8% (95% CI, 68.1%-69.5%) and 86.2% (95% CI, 84.5%-87.9%) in Bangladesh, 57.9% (95% CI, 57.5%-58.3%) and 70.7% (95% CI, 70.4%-71.0%) in India, 74.4% (95% CI, 73.6%-75.2%) and 89.7% (95% CI, 87.8%-91.6%) in Nepal, and 74.0% (95% CI, 73.6%-74.3%) and 70.6% (95% CI, 69.6%-71.6%) in Pakistan.

The mean treatment coverage also varied across all 5 South Asian countries, with a coverage rate of 51.2% (95% CI, 45.2%-57.1%) in Afghanistan, 44.8% (95% CI, 37.1%-52.5%) in Bangladesh, 83.5% (95% CI, 54.4%-99.1%) in India, 57.8% (95% CI, 50.1%-65.4%) in Nepal, and 50.4% (95% CI, 37.1%-63.6%) in Pakistan. The national coverage of institutional delivery and skilled birth attendance had rates of 52.0%

Table 1. Key Socioeconomic and Population Characteristics of the Selected South Asian Countries^a

| Indicator | Afghanistan | Bangladesh | India | Nepal | Pakistan |
|--|-------------|------------|---------|-------|----------|
| Socioeconomic | | | | | |
| Total population in 2015, millions, No. | 32.53 | 161.00 | 1311.05 | 28.51 | 188.92 |
| GDP, 2014, US\$ billion | 12.9 | 119.0 | 1600.3 | 12.0 | 151.6 |
| GDP per person, 2014, US\$ | 408.9 | 747.8 | 1235.5 | 425.7 | 819.3 |
| Literacy rate in 2011-2013, % ^b | | | | | |
| Female | 17.6 | 56.2 | 59.3 | 48.8 | 42.0 |
| Male | 45.4 | 63.2 | 78.9 | 71.7 | 67.0 |
| Age dependency ratio in 2014 ^c | 89.8 | 53.7 | 53.1 | 63.7 | 65.8 |
| Poverty in 2011-2012, % of population ^d | 35.8 | 31.5 | 21.9 | 25.2 | NA |
| Health expenditures in 2014 | | | | | |
| Percentage of GDP in THE | 8.2 | 2.8 | 4.7 | 5.8 | 2.6 |
| PHE, % of THE | 35.8 | 27.9 | 30.0 | 40.3 | 35.2 |
| PvtHE, % of THE | 64.2 | 72.1 | 70.0 | 59.7 | 64.8 |
| Out-of-pocket expenditure, % of THE | 63.9 | 67.0 | 62.4 | 47.7 | 56.3 |
| Private insurance, % of PvtHE | NA | NA | 5.0 | NA | 1.0 |
| Life, Birth, and Death | | | | | |
| Mean life expectancy at birth in 2014, y | | | | | |
| Men | 59.2 | 70.4 | 66.6 | 68.2 | 65.3 |
| Women | 61.6 | 72.9 | 69.5 | 71.1 | 67.2 |
| Mean births per woman in 2014, No. | 4.8 | 2.2 | 2.4 | 2.2 | 3.6 |
| NMR per 1000 live births in 2015, % | 35.5 | 23.3 | 27.7 | 22.2 | 45.5 |
| IMR per 1000 live births in 2015, % | 66.3 | 30.7 | 37.9 | 29.4 | 65.8 |
| U5MR per 1000 live births in 2015, % | 91.1 | 37.6 | 47.7 | 35.8 | 81.1 |
| MMR per 100 000 live births in 2013 | 400.0 | 170.0 | 190.0 | 190.0 | 170.0 |

Abbreviations: GDP, gross domestic product; IMR, infant mortality rate; MMR, maternal mortality ratio; NA, not applicable; NMR, neonatal mortality rate; PHE, public health expenditure; PvtHE, private health expenditure; THE, total health expenditure; U5MR, under age 5 years mortality rate.

^a Data are from the World Bank.¹⁹

^b Literacy rate percentage in individuals aged 15 years or older.

^c Age dependency based on working-age population.

^d Poverty headcount ratio at national poverty line.

(95% CI, 51.2%-52.7%) and 54.2% (95% CI, 53.5%-54.9%) in Afghanistan, 37.5% (95% CI, 36.1%-38.8%) and 42.1% (95% CI, 40.7%-43.4%) in Bangladesh, 82.2% (95% CI, 81.7%-82.8%) and 39.6% (95% CI, 38.7-40.4) in India, 55.2% (95% CI, 53.0%-57.3%) and 55.6% (95% CI, 53.4%-57.7%) in Nepal, and 61.9% (95% CI, 61.2%-62.7%) and 65.1% (95% CI, 64.4%-65.8%) in Pakistan, respectively. The composite coverage index related to maternal and child health interventions ranged from 54.2% (95% CI, 51.3%-57.1%) (Afghanistan) to 71.0% (95% CI, 68.9%-73.1%) (Bangladesh).

Financial Risk Protection

In all of the study countries, a large proportion of total health expenditures comes from private sources, and out-of-pocket payments are the main sources of funding for health care in Afghanistan, Bangladesh, and India (Table 1). A total of 15.3% (95% CI, 14.7%-16.0%) of households in Afghanistan, 15.8% (95% CI, 14.9%-16.8%) in Bangladesh, 17.9% (95% CI, 17.7%-18.2%) in India, 11.8% (95% CI, 11.8%-11.9%) in Nepal, and 4.4% (95% CI, 4.0%-4.9%) in Pakistan incurred catastrophic health payments (Table 3). Of nonpoor households in Afghanistan, Bangladesh, India, and Nepal, 2.9% to 4.9% became poor due to health care costs; this occurred in only 1.4% of households in Pakistan (Table 3).

Inequalities in Universal Health Coverage Indicators

The country-specific coverage of prevention and treatment interventions for each quintile in the 5 selected countries is

presented in the **Figure**, and the magnitude of inequality as assessed by the RII for each intervention is presented in **Table 4**. Among the prevention and treatment interventions, the most inequitable interventions in most South Asian countries were adequate sanitation, presence of a skilled birth attendant during delivery, institutional delivery, and at least 4 antenatal care visits (except India). Coverage of at least 4 antenatal care visits among wealthy mothers was approximately 11 times higher in Bangladesh, 9 times higher in Pakistan, and 5 times higher in both Afghanistan and Nepal than that among poor mothers. Access to institutional delivery among wealthy mothers was at least 4 times higher in Bangladesh, Afghanistan, and Nepal than poor mothers. Greater inequalities were also observed for skilled birth attendance coverage, where women in the wealthy population were at least 5 times more likely to have received this service than were women in the poor population in Afghanistan, Bangladesh, and Nepal. The slope index of inequalities of prevention and treatment interventions is presented in more detail in eTable 3 in the **Supplement**. Access to institutional delivery was 60 to 65 percentage points higher among wealthy than poor mothers in Afghanistan, Bangladesh, Nepal, and Pakistan compared with 21 percentage points higher in India.

A greater pro-wealthy inequality was also observed for the composite prevention index, composite treatment index, and composite coverage index in all 5 countries (Figure). The overall mean treatment coverage among wealthy households was higher by 49 percentage points in Nepal, 40 percentage points

Table 2. National Coverage of Health Services in 5 South Asian Countries

| Indicator | Coverage, % (95% CI) | | | | |
|--------------------------------------|----------------------|------------------|-------------------------------|------------------|------------------|
| | Afghanistan | Bangladesh | India | Nepal | Pakistan |
| Prevention | | | | | |
| Improved water | 65.3 (64.7-65.8) | 97.8 (97.5-98.0) | 97.9 (97.8-98.0) | 93.3 (92.8-93.7) | 93.3 (93.1-93.5) |
| Adequate sanitation | 33.7 (33.1-34.3) | 68.8 (68.1-69.5) | 57.9 (57.5-58.3) | 74.4 (73.6-75.2) | 74.0 (73.6-74.3) |
| FP needs satisfied | 47.9 (47.3-48.5) | 83.9 (83.3-84.6) | 38.5 (38.1-38.9) | 66.3 (65.3-67.3) | 65.1 (64.5-65.7) |
| ≥1 ANC visit | 57.6 (56.8-58.4) | 63.8 (62.4-65.1) | 96.5 (96.3-96.8) | 67.9 (65.9-69.9) | 77.9 (77.3-78.5) |
| ≥4 ANC visits | 17.3 (16.7-17.9) | 24.6 (23.4-25.9) | 84.2 (83.6-84.7) ^a | 48.4 (46.2-50.5) | 44.6 (43.9-45.4) |
| DPT3 immunization | 58.3 (57.0-59.6) | 91.3 (89.9-92.6) | 59.9 (59.5-60.2) | 87.1 (85.0-89.1) | 66.6 (65.6-67.6) |
| Measles immunization | 60.1 (58.8-61.4) | 86.2 (84.5-87.9) | 70.7 (70.4-71.0) | 89.7 (87.8-91.6) | 70.6 (69.6-71.6) |
| BCG immunization | 73.8 (72.7-74.9) | 97.9 (97.2-98.6) | 87.0 (86.7-87.2) | 95.4 (94.1-96.7) | 87.2 (86.5-87.9) |
| Polio3 immunization | 65.3 (64.1-66.6) | 91.5 (90.2-92.9) | 87.5 (87.3-87.8) | 90.8 (89.0-92.6) | 78.0 (77.1-78.9) |
| Care-seeking for pneumonia | 61.6 (60.0-63.1) | 42.0 (37.2-46.7) | 96.4 (96.1-96.7) | 50.1 (44.9-55.4) | 75.8 (74.2-77.4) |
| Exclusive breastfeeding | 43.3 (41.6-45.1) | 55.3 (51.5-59.1) | 59.0 (58.7-59.3) | 56.9 (52.3-61.4) | 21.7 (20.4-23.0) |
| Treatment^b | | | | | |
| ARI treatment | 54.4 (52.8-55.9) | 34.3 (29.9-39.0) | 96.1 (95.7-96.4) | 74.9 (70.4-79.4) | 34.4 (32.6-36.1) |
| Oral rehydration therapy | 40.7 (39.7-41.7) | 66.1 (61.6-70.5) | 94.8 (94.2-95.3) | 45.9 (42.0-49.7) | 39.9 (38.9-40.9) |
| Skilled birth attendance | 54.2 (53.5-54.9) | 42.1 (40.7-43.4) | 39.6 (38.7-40.4) | 55.6 (53.4-57.7) | 65.1 (64.4-65.8) |
| Institutional delivery | 52.0 (51.2-52.7) | 37.5 (36.1-38.8) | 82.2 (81.7-82.8) | 55.2 (53.0-57.3) | 61.9 (61.2-62.7) |
| Hypertension treatment | NA | 42.3 (39.4-45.2) | 70.4 (69.8-71.0) | NA | NA |
| Diabetes treatment | NA | 38.3 (34.0-42.8) | 82.4 (81.8-82.9) | NA | NA |
| Composite Indexes^c | | | | | |
| Coverage | 54.2 (51.3-57.1) | 71.0 (68.9-73.1) | 68.9 (68.1-69.8) | 67.5 (65.6-69.4) | 67.7 (66.0-69.4) |
| Prevention | 53.0 (42.2-63.6) | 76.5 (61.0-89.0) | 74.2 (57.0-88.1) | 76.8 (66.5-85.7) | 69.8 (58.3-80.2) |
| Treatment | 51.2 (45.2-57.1) | 44.8 (37.1-52.5) | 83.5 (54.4-99.1) | 57.8 (50.1-65.4) | 50.4 (37.1-63.6) |

Abbreviations: ANC, antenatal care; ARI, acute respiratory infection; DPT3, 3 doses of diphtheria-tetanus-pertussis vaccine; FP, family planning; NA, not applicable; Polio3, 3 doses of polio vaccine.

^a Three or more ANC visits.

^b Diabetes and hypertension were not included to estimate the composite treatment index because these 2 indicators were not available in Afghanistan, Nepal, and Pakistan.

^c Composite prevention index was developed based on 11 prevention indicators,

and composite treatment index was based on 4 treatment indicators by random-effects meta-analysis. Composite coverage index was a weighted mean of 8 interventions (FP needs satisfied, skilled birth attendant, ANC with skilled attendant, DPT3 immunization, measles immunization, BCG immunization, oral rehydration therapy for children with diarrhea, and care-seeking for pneumonia) from 4 specialties (FP, maternity care, child immunization, and case management).

Table 3. Inequality in Catastrophic Health Payments in 5 South Asian Countries

| Country (Year of Survey) | % (95% CI) | | | | |
|--------------------------|------------------------------------|----------------|-------------------------------------|---------------------|------------------------------|
| | Financial Burden | | Inequality in Catastrophic Payments | | Relative Index of Inequality |
| | Catastrophic Payments ^a | Impoverishment | Poorest Quintile | Wealthiest Quintile | |
| Afghanistan (2014) | 15.3 (14.7-16.0) | 2.9 (2.6-3.2) | 13.4 (12.0-14.9) | 17.1 (15.7-18.6) | 1.2 (1.0-1.4) |
| Bangladesh (2010) | 15.8 (14.9-16.8) | 4.9 (4.5-5.4) | 10.9 (9.5-12.5) | 22.0 (19.5-24.7) | 2.5 (2.0-3.0) |
| India (2012) | 17.9 (17.7-18.2) | 3.4 (3.3-3.6) | 13.3 (12.9-13.8) | 24.1 (23.5-24.7) | 2.1 (1.9-2.3) |
| Nepal (2015) | 11.8 (11.8-11.9) | 3.5 (3.5-3.6) | 8.3 (8.3-8.4) | 17.1 (23.5-24.7) | 2.3 (1.6-3.0) |
| Pakistan (2014) | 4.4 (4.0-4.9) | 1.4 (1.0-1.7) | 4.9 (4.0-6.0) | 4.7 (3.9-5.7) | 1.2 (1.0-1.4) |

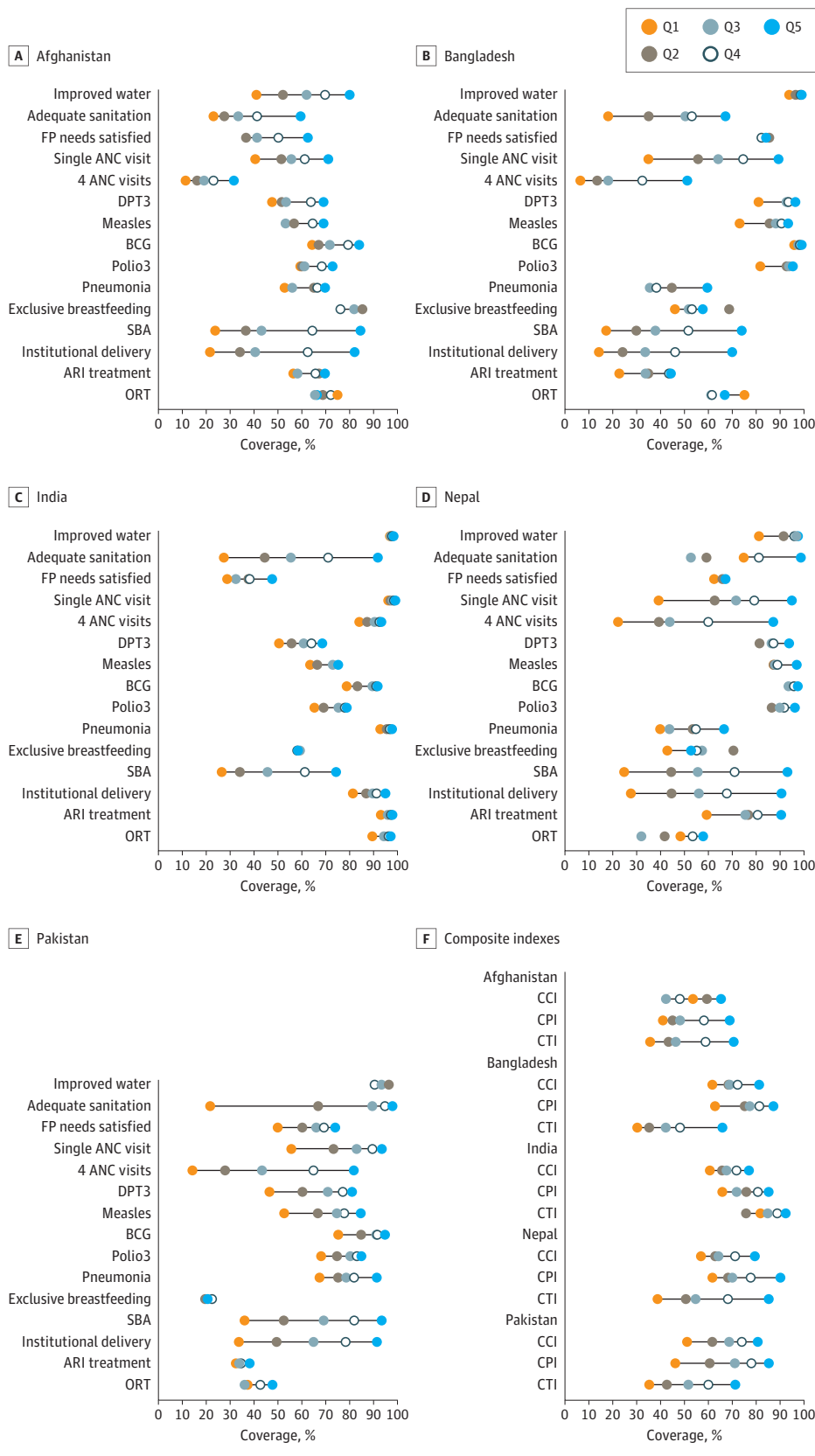
^a Catastrophic payments at 10% threshold of total consumption.

in Pakistan and Afghanistan, 36 points in Bangladesh, and 23 points in India than among poor households (eTable 3 in the Supplement). In the composite prevention index, a greater pro-wealthy inequality was found in Pakistan (37 percentage points), followed by Afghanistan (31 points), Nepal (27 points), Bangladesh (26 points), and India (18 points) (eTable 3 in the Supplement). Wide inequality was observed in the management of NCDs (Table 4 and eTable 3 in the Supplement) among the 2 countries for which data were available. Approximately

42% of persons with hypertension received medication to control their blood pressure in Bangladesh compared with 70% in India. In both countries, the poor population was less likely to receive diabetes and hypertension treatment than the wealthy population.

The proportion of financial catastrophe varied substantially across household socioeconomic profiles. On average, wealthy households were more likely to incur catastrophic health expenditures compared with poor households in all

Figure. Quintile-Specific Health Service Indicators



Noncommunicable disease indicators, especially diabetes and hypertension, were available only for Bangladesh and India, so these indicators were excluded here for comparison. The range of measures was from Q1 (poorest quintile) to Q5 (wealthiest quintile). ANC indicates antenatal care; ARI, acute respiratory infection; CCI, composite coverage index; CPI, prevention coverage index; CTI, treatment coverage index; DPT3, 3 doses of diphtheria-tetanus-pertussis vaccine; FP, family planning; ORT, oral rehydration therapy; Pneumonia, care-seeking for pneumonia; Polio3, 3 doses of polio vaccine; and SBA, skilled birth attendant.

Table 4. Magnitude of Inequalities by Intervention in 5 South Asian Countries

| Indicator | Relative Index of Inequality (95% CI) | | | | |
|--------------------------------------|---------------------------------------|-----------------|----------------------------|---------------|---------------|
| | Afghanistan | Bangladesh | India | Nepal | Pakistan |
| Prevention | | | | | |
| Improved water | 3.2 (2.6-3.8) | 1.1 (1.0-1.1) | 1.0 (1.0-1.0) | 1.2 (1.2-1.3) | 0.9 (0.9-1.0) |
| Adequate sanitation | 15.7 (9.7-21.8) | 3.2 (2.7-3.7) | 4.7 (4.4-5.1) | 1.7 (1.5-1.9) | 6.4 (5.9-6.8) |
| FP needs satisfied | 2.0 (1.5-2.4) | 1.0 (0.9-1.1) | 1.8 (1.7-1.9) | 1.1 (1.0-1.1) | 1.6 (1.2-1.9) |
| ≥1 ANC visit | 1.7 (1.5-1.9) | 3.0 (2.6-3.5) | 1.1 (1.0-1.1) | 3.0 (2.5-3.6) | 2.0 (1.9-2.1) |
| ≥4 ANC visits | 5.1 (3.6-6.6) | 10.8 (7.3-14.4) | 1.2 (1.1-1.3) ^a | 4.8 (3.6-6.1) | 8.7 (7.8-9.5) |
| DPT3 immunization | 1.7 (1.4-1.9) | 1.2 (1.1-1.4) | 1.4 (1.4-1.5) | 1.1 (1.0-1.2) | 1.9 (1.3-2.6) |
| Measles immunization | 1.2 (1.1-1.4) | 1.3 (1.2-1.5) | 1.2 (1.2-1.3) | 1.1 (1.0-1.2) | 1.7 (1.2-2.2) |
| BCG immunization | 1.5 (1.3-1.6) | 1.1 (1.0-1.1) | 1.2 (1.2-1.2) | 1.0 (1.0-1.1) | 1.3 (1.1-1.5) |
| Polio3 immunization | 1.2 (1.1-1.3) | 1.2 (1.1-1.3) | 1.2 (1.3-1.2) | 1.1 (1.0-1.2) | 1.3 (1.1-1.5) |
| Care-seeking for pneumonia | 1.3 (1.0-1.7) | 1.3 (0.5-2.2) | 1.1 (1.0-1.2) | 1.6 (0.8-2.4) | 1.4 (1.2-1.5) |
| Exclusive breastfeeding | 1.1 (0.8-1.4) | 1.0 (0.6-1.5) | 1.0 (1.0-1.0) | 1.0 (0.4-1.6) | 1.0 (0.8-1.3) |
| Treatment^b | | | | | |
| ARI treatment | 1.2 (0.8-1.5) | 0.5 (0.3-0.8) | 1.1 (1.0-1.2) | 1.6 (1.2-2.0) | 1.1 (0.8-1.4) |
| Oral rehydration therapy | 0.9 (0.7-1.2) | 0.9 (0.5-1.2) | 1.1 (1.0-1.1) | 1.2 (0.8-1.6) | 1.3 (1.1-1.5) |
| Skilled birth attendance | 5.1 (4.2-5.9) | 5.5 (4.4-6.7) | 4.4 (3.8-5.0) | 4.7 (3.7-5.8) | 3.4 (3.2-3.7) |
| Institutional delivery | 4.8 (4.0-5.6) | 6.8 (5.2-8.4) | 1.3 (1.2-1.4) | 4.1 (3.1-5.1) | 3.6 (3.3-3.9) |
| Hypertension treatment | NA | 2.2 (1.7-2.6) | 1.3 (1.2-1.3) | NA | NA |
| Diabetes treatment | NA | 5.8 (3.2-8.5) | 1.2 (1.2-1.3) | NA | NA |
| Composite Indexes^c | | | | | |
| Coverage | 1.7 (1.5-2.0) | 1.4 (1.0-1.9) | 1.3 (1.3-1.4) | 1.5 (1.4-1.6) | 1.7 (1.6-1.8) |
| Prevention | 1.8 (1.4-2.3) | 1.4 (1.0-1.9) | 1.3 (1.0-1.6) | 1.5 (1.1-1.8) | 1.8 (1.3-2.3) |
| Treatment | 2.2 (1.1-3.4) | 2.3 (0.5-4.2) | 1.3 (0.7-2.0) | 2.5 (1.3-3.8) | 2.3 (1.1-3.5) |

Abbreviations: ANC, antenatal care; ARI, acute respiratory infection; DPT3, 3 doses of diphtheria-tetanus-pertussis vaccine; FP, family planning; NA, not applicable; Polio3, 3 doses of polio vaccine.

^a Three or more ANC visits.

^b Diabetes and hypertension were not included to estimate the composite treatment index because these 2 indicators were not available in Afghanistan, Nepal, and Pakistan.

^c Composite prevention index was developed based on 11 prevention indicators, and composite treatment index was based on 4 treatment indicators by random-effects meta-analysis. Composite coverage index was a weighted mean of 8 interventions (FP needs satisfied, skilled birth attendant, ANC with skilled attendant, DPT3 immunization, measles immunization, BCG immunization, oral rehydration therapy for children with diarrhea, and care-seeking for pneumonia) from 4 specialties (FP, maternity care, child immunization, and case management).

South Asian countries except Pakistan, where almost equal proportions of poor and wealthy families incurred financial catastrophe (Table 3 and eTable 4 in the Supplement).

Discussion

To our knowledge, this study is the first attempt to assess the progress toward universal health coverage in select South Asian countries through a comprehensive range of indicators. Our findings show that the mean coverage of populations with essential health care services and financial risk protection against catastrophic health expenditure and impoverishment is low. Inequality in coverage of health services, especially maternal health interventions and financial risk protection, is common in all 5 South Asian countries.

The present study showed that indicators with similar levels of overall coverage often have very different degrees of inequality. The overall prevention coverage ranged from 53.0% in Afghanistan to 76.8% in Nepal and 76.5% in Bangladesh, while the mean treatment coverage ranged from 44.8% in Bangladesh to 83.5% in India. A composite coverage index related to reproductive, maternal, and child health interventions was the lowest in Afghanistan and highest in Bangladesh. Greater inequality was seen in both prevention and treatment indicators. Consistent with previous studies,^{14,21} the most inequitable health service indicators in the present study were adequate sanitation, at least 4 antenatal care visits with

skilled health personnel, institutional delivery, and the presence of skilled health personnel at birth in most South Asian countries. In all of these indicators, the mean coverage was substantially lower in the poorest population than the wealthy population.

Among prevention indicators, coverage of all child immunization and access to improved drinking water reached the 80% universal health coverage target both at the national and quintile-specific levels only in Bangladesh and Nepal. Despite the large investment in maternal and child health programs in low- and middle-income countries, coverage of most maternal health interventions among the poor population was still low and far from the 80% threshold across all 5 South Asian countries. Similar to another study,¹⁴ professional antenatal care visits and skilled birth attendance at time of birth in the present study had the lowest coverage in Afghanistan compared with the other South Asian countries. In Sustainable Development Goal 3, health intervention coverage of 80% of targets for the poorest population remains out of reach in the immediate future. Therefore, particular efforts should be made to expand the provision of cost-effective priority services to provide a foundation for future developments of low- and middle-priority services.⁴

In Sustainable Development Goal 3, prevention and promotion of NCDs are also given top priority.²⁹ However, our study found that approximately 58% of the hypertensive patients in Bangladesh and 30% of those in India were not receiving medication to control hypertension. This percentage

contrasts sharply with that in the United States, where 62% of patients with hypertension were receiving antihypertensive treatment and 50% had control of their condition in 2007-2008.³⁰ In the case of diabetes management, approximately 57% of diabetic patients in the United States received oral antidiabetic drugs in 2003-2004 and 57% had controlled glycemic levels.³¹ Our study found that approximately 38% of patients with diabetes in Bangladesh and 82% in India were receiving antidiabetic treatment. However, our study found greater pro-wealthy inequality in diabetes and hypertension management in these 2 countries.

The low coverage of NCD treatment might be due to high treatment costs. One study found that approximately 12% of households with a patient who had hypertension or diabetes were borrowing money or selling household assets to cope with treatment costs.³² The US population also experiences significant out-of-pocket spending on NCDs, and diabetes, heart disease, back pain, and hypertension dominate US health care spending.³³ The most expensive condition, diabetes, accounted for the highest personal health care spending in 2013 in the United States (\$101.4 billion), followed by ischemic heart disease (\$88.1 billion), low back and neck pain (\$87.6 billion), and hypertension (\$83.9 billion) treatment.³³ Therefore, the increasing burden of high treatment cost will also increase national health expenditure and put a substantial burden on the health system unless the health system incorporates an effective strategy to protect households from such high-cost diseases.

On average, more than 1 in 10 households in most of the South Asian region incurred financial catastrophe, and 3% of nonpoor households became poor due to health care costs. Wealthy households in the South Asian countries were more likely to incur catastrophic health payment compared with disadvantaged households. The major reasons for this lower financial risk among the poor population may be due to the low ability to pay and decisions by a significant proportion of poor populations to forego available health care because of financial constraints.³⁴ In India, some health insurance plans target poor populations; however, reimbursements are lacking for outpatient services and medicines, which is the major reason that people incur high out-of-pocket payments in India.⁸ Nepalese community-based health insurance also offers a special subsidized rate to the extremely poor population.³⁵ Despite this special attention, disadvantaged populations in Nepal still face significant financial risk. Similarly, Afghanistan and Bangladesh lack a formal social safety net, and citizens remain financially insecure. Consequently, approximately 15% of households in Afghanistan and Bangladesh were facing financial catastrophe. This level represents a significant challenge for the universal health coverage goal of ensuring 100% financial protection against catastrophic and impoverishing health care payments by 2030.

Although health services coverage is high among wealthy populations in all 5 South Asian countries, the existing health systems fail to ensure equitable access to essential health services and protect households from financial risk associated with health care costs. Health systems reform is therefore essential. Reforms should include strong political commitment, increased government spending on health through budget reallocation, improved service delivery, proper monitoring of subsidized programs, ensuring standardized costs for both official and unofficial fees across all public facilities, and reconsidering both the demand side (committing to proper risk-pooling mechanisms for the whole population, expanding benefits, and reducing cost-sharing) and the supply side (expansion of infrastructure, human resources for health, and health services).^{6,10}

Limitations

Our study has some weaknesses. The first of these is that NCD treatment-related indicators, including diabetes and hypertension, are lacking in Afghanistan, Nepal, and Pakistan. Although NCDs are now the leading cause of the burden of disease,^{12,13} the availability of data to measure access to basic interventions was limited, at least in these surveys, and did not permit accurate characterization of access. Development of ongoing monitoring systems for the prevalence of NCDs, NCD risk factors, access to NCD care, and quality of care is a challenge for measurement of progress toward universal health coverage. It was also not possible to assess the quality or effectiveness of services available in the countries analyzed. Data availability and quality issues resulted in certain countries being excluded from parts of the analysis, which may limit generalizability. However, our study benefited from the use of a wide range of metrics, including treatment indicators as well as typical prevention and promotion indicators, where data permitted.

Conclusions

Universal health coverage is a crucial step forward for South Asian countries seeking to ensure access to essential health services without imposing financial risk upon citizens. Recent improved service provision in certain key areas is encouraging and highlights the increasing enthusiasm and momentum behind the universal health coverage movement. However, the ultimate challenge for policymakers is not merely to improve clinical services but also to ensure equity in service and treatment coverage and protection against health care-related financial hardship. The journey toward universal health coverage is far from complete, but with proper attention to access and equity in health, even the poorest nations in South Asia can make steady progress toward achieving health care for all.

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RESEARCH

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Inequalities in financial risk protection in Bangladesh: an assessment of universal health coverage

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Abstract

Background: Financial risk protection and equity are major components of universal health coverage (UHC), which is defined as ensuring access to health services for all citizens without any undue financial burden. We investigated progress towards UHC financial risk indicators and assessed variability of inequalities in financial risk protection indicators by wealth quintile. We further examined the determinants of different financial hardship indicators related to healthcare costs.

Methods: A cross-sectional, three-stage probability survey was conducted in Bangladesh, which collected information from 1600 households from August to November 2011. Catastrophic health payments, impoverishment, and distress financing (borrowing or selling assets) were treated as financial hardship indicators in UHC. Poisson regression models were used to identify the determinants of catastrophic payment, impoverishment and distress financing separately. Slope, relative and concentration indices of inequalities were used to assess wealth-based inequalities in financial hardship indicators.

Results: The study found that around 9% of households incurred catastrophic payments, 7% faced distress financing, and 6% experienced impoverishing health payments in Bangladesh. Slope index of inequality indicated that the incidence of catastrophic health payment and distress financing among the richest households were 12 and 9 percentage points lower than the poorest households respectively. Multivariable Poisson regression models revealed that all UHC financial hardship indicators were significantly higher among household that had members who received inpatient care or were in the poorest quintile. The presence of a member with chronic illness in a household increased the risk of impoverishment by nearly double.

Conclusion: This study identified a greater inequality in UHC financial hardship indicators. Rich households in Bangladesh were facing disproportionately less financial hardship than the poor ones. Households can be protected from financial hardship associated with healthcare costs by implementing risk pooling mechanism, increasing GDP spending on health, and properly monitoring subsidized programs in public health facilities.

Keywords: OOP payment, Catastrophic expenditure, Impoverishment, Hardship financing, Universal health coverage, Inequalities, Bangladesh

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Background

Achieving universal health coverage (UHC) is one of the key targets in the proposed Sustainable Development Goals (SDGs) [1]. There are two key targets in UHC plan: having at least 80% essential health service coverage, and 100% financial risk protection from catastrophic and impoverishing payment for health services by 2030 [2, 3]. The World Health Organization (WHO) and World Bank (WB) jointly developed a framework for assessing UHC through three dimensions: population, health service coverage, and proportion of health expenditure covered by formal risk pooling mechanisms [2]. Financial risk protection plan is now accepted as a key mechanism to ensure affordable and equitable access to care for all citizens of a country irrespective of their socio-economic statuses [4]. Many countries adopted UHC as a top priority for their national health systems in order to alleviate poverty and improve health outcomes through ensuring equity in access to care [2].

Similar to other South Asian countries, Bangladesh is simultaneously experiencing a double burden of diseases, low health service coverage, and a lack of financial risk protection mechanism in their health system [5, 6]. Bangladesh has a dual healthcare systems, with both public and private health services co-existing in most areas. There are three main levels: primary health care, district, and divisional or tertiary levels [7]. The public sector is largely used for outpatient, inpatient, and preventive care, while the private sector is used mainly for outpatient and inpatient curative care. The main public health provider is the Ministry of Health and Family Welfare (MOHFW), which provides primary, secondary and tertiary care through various types of health facilities (such as general hospitals, district hospitals and health clinics). Public health services are heavily subsidized by the government, and primary care services at health clinics are delivered at almost free of charge, with each patient being charged a nominal fee of Bangladesh Taka13 (equivalent to US\$ 0.17 in 2011) for each outpatient visit [8]. Secondary and tertiary care services provided at hospital facilities are also highly subsidized by the government. Private health providers, complementing the medical services provided by the government, mainly focuses on curative services including general practitioner clinics, medical centers, and private hospitals. Bangladesh currently has neither a national health insurance scheme nor a well-developed private insurance market [9]. There are a number of small scale NGO-based community insurance schemes, often operating in conjunction with micro-financing schemes, but these cover less than 1% of the total population and target mainly poor populations [9].

Health financing is underfunded in Bangladesh; government spend less than one percent of gross domestic

product (GDP) on health which is the lowest among South Asian countries [10].

Health sector is also neglected in terms of country's total budget, only 4.3% of the total budget were allocated for the health sector in financial year 2015–16 [11]. Out-of-pocket (OOP) payment remain the main source of healthcare funding in Bangladesh, making up 63.3% of total healthcare expenditure [9]. Inequality is another concern in countries with fragile health systems like Bangladesh, and disadvantaged populations are often restricted in their financial access to healthcare services. Inadequate public funding for health services, limited access to health insurance plans, and unexpected OOP payments can trigger asset depletion, indebtedness, and reductions in essential consumption, which in turn prevent access to health services and may ultimately lead to financial catastrophe, distress financing, and impoverishment [12–19].

In order to measure and track Bangladesh's progress towards UHC and its financial risk protection indicators, we assessed incidence of catastrophic and impoverishing health expenditure and distress financing associated with OOP payments. We further examined the determinants of different financial hardship indicators related to healthcare costs using representative survey data.

Methods

Study area and design

This study took place in Rajshahi city of Bangladesh, the third largest city located in the north-western part of the country. Rajshahi district has a population of 2.6 million, with an average household size of approximately four people [20], and broadly represent many urban areas in Bangladesh based on demographic distribution [20]. The literacy rate is 71 and 62% for males and females, respectively. This was a cross-sectional study based on a three-stage, cluster-sampling methodology, which collected information from 1600 households from August to November 2011. The overall response rate was 99.6%.

Data collection

Interviewers recorded information on household member's socio-demographic characteristics, and household consumption or expenditure in the past 30 days or past 12 months using a structured questionnaire from household heads after obtaining informed consent. The study used a recall period for all illnesses in the past 30 days and at least 3 months' duration for chronic diseases in the year prior to interview. A condition was considered chronic if it lasted or was expected to last for more than 3 months [21]. Data were collected on the onset or duration of illness, diagnosis, treatment response, and cost

and coping strategies separately. Respondents were asked about their main symptoms and (eventual) diagnoses followed by whether the diagnosis was made by professional medical doctors, i.e. MBBS doctors.

Measurement of outcomes

In line with other studies, financial risk protection coverage was assessed from incidence of catastrophic and impoverishing health payments [22]. Additionally, incidence of distress financing resulting from OOP was estimated to understand the coping strategy. A household's expenditure was treated as catastrophic if it exceeded 40% of household capacity to pay [23, 24]. Household capacity to pay refers to the effective income remaining after meeting basic needs that is non-subsistence spending. Subsistence expenditure for each household was estimated by multiplying poverty line with the equivalent household size. A household's health expenditure was treated as impoverishing when its total per capita consumption spending fell below the poverty line after paying for health care. We estimated the poverty line based on subsistence food expenditure as proposed by World Health Organization [24, 25]. The poverty line was determined based on the average food consumption at the 45th and 55th percentiles of the total household expenditure of the sampled household. Household consumption expenditure was estimated following the standard guidelines [26]. Distress financing involves funding for healthcare costs by borrowing money from relatives or bank and selling household assets [16, 27].

Covariates

In this study, the average number of children and adults per household, presence of household member aged over 65 years, presence of chronic illness in any member of the household, care-seeking behavior, household consumption quintile, household size, and household head educational status were considered as covariates.

Statistical analysis

Descriptive statistics were calculated using the mean (confidence interval) or frequency and proportions as appropriate. Poisson regression was used to identify the determinants of catastrophic health expenditure, impoverishment, and distress financing. For equity analysis, socio-economic status of each household was assessed based on household total consumption expenditure. Households were ranked in ascending order based on per capita total consumption expenditure, and divided into quintiles, with quintile 1 (Q1) as the poorest 20% of households and quintile 5 (Q5) representing the richest. We assessed both absolute and relative measures of equity. The slope index of inequality [SII] was used as an absolute measure of inequality, whereas the relative

index of inequality [RII] and the concentration index were used as relative measures of inequality [28]. The main purpose of absolute index of inequalities is to interpret the difference in coverage between the extreme wealth quintiles (Q5-Q1). The SII reflects the difference in coverage values in percentage points between individuals at the top and bottom of the wealth scales. We calculated the SII and RII by regressing financial hardship indicators against the household's relative rank in the cumulative distribution of wealth position. The concentration index indicates the magnitude of relative inequality [28–30]. This index produced values that ranged from -1 to 1. When the concentration index value is zero there is no inequality i.e. no difference in financial burden between poor and rich populations. A negative value indicates the poor population is incurring more financial burden, while a positive value indicates the rich population is facing more financial burden. All analyses were adjusted for the probability sample design. Data management and analysis was performed in Stata/MP Version 14.0.

Results

Background characteristics

The average household size in the sample of Rajshahi city was 4.6 (95% CI: 4.5–4.7) and the average number of dependent members was 2.0 (95% CI: 2.0–2.1) per household (Additional file 1: Table S1). The average number of illnesses was 2.8 per household (95% CI: 2.6–2.9). About 71.5% (95% CI: 67.4–75.2) of households had at least one chronic illness in the past 12 months prior to interview. Of the 1593 completed households, 92% incurred health expenditure in the past 30 days recall period. The socio-demographic characteristics of our study population are presented in Table 1.

Equity in financial hardship indicators

Around 9.0% (95% CI: 7.2–11.2) of households incurred catastrophic health payment, 5.6% (95% CI: 4.5–7.0) of households experienced impoverishing health expenditure, and 7.0% (95% CI: 5.3–9.2) faced distress financing to pay for health care costs (Fig. 1). Detailed proportion of financial hardship by different socio-demographic characteristics is presented in the Additional file 1 (Table S2). Concentration curves for catastrophic payment and distress financing both lie above the line of equality, indicating a disproportionately higher concentration of catastrophic payment and distress financing in poor households than in rich ones (Fig. 2). Significant differences in catastrophic payment and distress financing among poor and rich households were found in all three measures of inequality indices (Table 2). The SII indicated that incidence of catastrophic health payment and distress financing among the richest households were 12 and 9 percentage points lower than poorest households respectively (Table 2).

Table 1 Descriptive statistics of households and household heads, Bangladesh, 2011

| Household characteristics | Frequency | Percentage | 95% CI |
|--|-----------|------------|-----------|
| Gender of household head | | | |
| Male | 1447 | 90.5 | 88.6–92.1 |
| Female | 146 | 9.5 | 7.9–11.4 |
| Educational status of household head | | | |
| No education | 258 | 17.1 | 13.9–20.8 |
| Primary | 310 | 20.8 | 17.4–24.7 |
| Secondary | 420 | 27.2 | 24.5–30.2 |
| Higher | 605 | 34.9 | 29.2–41.1 |
| Household member over 65 years | | | |
| Yes | 136 | 8.5 | 7.0–10.2 |
| No | 1457 | 91.6 | 89.8–93.1 |
| Presence of illness in the last 30 days | | | |
| Yes | 1501 | 93.7 | 91.4–95.3 |
| No | 92 | 6.3 | 4.8–8.3 |
| Member with chronic disease | | | |
| Yes | 1148 | 71.5 | 67.4–75.2 |
| No | 445 | 28.5 | 24.8–32.6 |
| Utilization of health services | | | |
| Inpatient | 65 | 4.3 | 3.21–5.6 |
| Outpatient public | 253 | 16.1 | 13.6–18.9 |
| Outpatient private | 385 | 22.8 | 19.7–26.2 |
| Outpatient public and private | 105 | 6.3 | 4.7–8.4 |
| Self-medication/traditional healer | 785 | 50.6 | 45.8–55.3 |

CI confidence interval

Determinants of financial hardship

Table 3 presents the results from the Poisson regression model of risk factors for catastrophic health payment, impoverishment, and distress financing. Household consumption quintile was inversely associated with all three

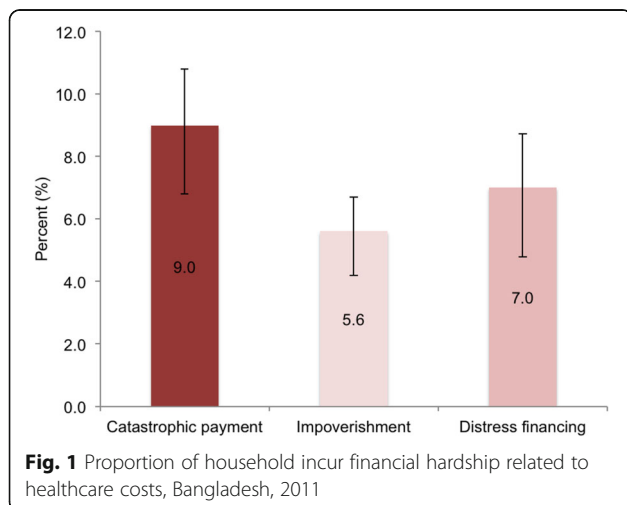


Fig. 1 Proportion of household incur financial hardship related to healthcare costs, Bangladesh, 2011

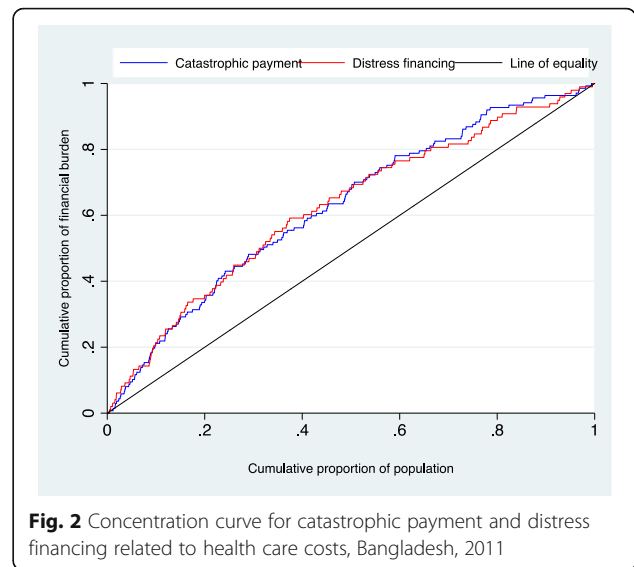


Fig. 2 Concentration curve for catastrophic payment and distress financing related to health care costs, Bangladesh, 2011

financial hardship indicators. Households in the poorest quintile were more likely to incur catastrophic payment, impoverishment and distress financing than the richest quintile. Utilization of health services was also significantly associated with three financial hardship indicators, with those using inpatient care services having the largest relative risk. The presence of a member with chronic illness in a household increased the risk of impoverishment by a factor of 1.9 (95% CI: 1.1–3.4).

Discussion

This study found residents in Bangladesh faced serious problems with healthcare financing. This is the first study in Bangladesh to include evidence in health financing research regarding inequalities in UHC financial risk protection indicators. From this study, we found that around one in ten household incurred financial catastrophe, and one in 20 non-poor households became poor due to healthcare costs. Poor households spent less

Table 2 Inequalities in catastrophic payment and distress financing related to health care costs, Bangladesh, 2011

| | Catastrophic payments | Distress financing |
|--|-----------------------|----------------------|
| Household consumption quintile, % (95% CI) | | |
| Quintile 1 (poorest) | 14.3 (10.3–19.6) | 11.7 (8.3–16.4) |
| Quintile 2 | 9.7 (6.2–15.0) | 7.6 (4.9–11.7) |
| Quintile 3 | 9.2 (5.7–14.5) | 6.1 (3.1–11.8) |
| Quintile 4 | 7.1 (4.3–11.4) | 4.8 (2.6–8.6) |
| Quintile 5 (richest) | 3.4 (1.7–6.4) | 3.9 (2.0–7.7) |
| Inequality index, (95% CI) | | |
| Slope index of inequality (Q5-Q1) | -12.0 (-18.6 to -5.4) | -9.3 (-15.0 to -3.5) |
| Relative index of inequality (Q5:Q1) | 0.3 (0.1–0.5) | 0.3 (0.1–0.5) |
| Concentration index | -0.2 (-0.3 to -0.1) | -0.2 (-0.3 to -0.1) |

CI Confidence interval

Table 3 Multiple Poisson regression model for financial hardship indicators, Bangladesh, 2011

| Variable | Relative risk (95% confidence interval) | | |
|------------------------------------|---|--------------------|----------------------|
| | Catastrophic payment | Impoverishment | Borrowing or selling |
| Average number of children in HH | 1.12 (1.02–1.23) | 1.04 (0.9–1.19) | 1.01 (0.89–1.14) |
| Average number of adult in HH | 1.39 (1.03–1.87) | 1.25 (0.92–1.69) | 1.38 (1.03–1.85) |
| Member with chronic disease | | | |
| Yes | 1.41 (0.87–2.29) | 1.90 (1.08–3.36) | 1.70 (0.87–3.31) |
| No | 1.00 | 1.00 | 1.00 |
| HH member over 65 years | | | |
| Yes | 1.22 (0.79–1.90) | 1.11 (0.53–2.34) | 1.50 (0.81–2.79) |
| No | 1.00 | 1.00 | 1.00 |
| HH consumption quintile | | | |
| Quintile 1 (poorest) | 4.26 (1.67–10.88) | 17.34 (3.73–80.55) | 4.03 (1.72–9.45) |
| Quintile 2 | 2.84 (1.15–7.05) | 5.19 (1.14–23.71) | 2.23 (0.91–5.45) |
| Quintile 3 | 2.65 (1.25–5.59) | 3.11 (0.92–10.49) | 1.57 (0.64–3.83) |
| Quintile 4 | 2.28 (1.12–4.65) | 2.71 (0.98–7.52) | 1.39 (0.62–3.12) |
| Quintile 5 (richest) | 1.00 | 1.00 | 1.00 |
| Household size | 0.98 (0.88–1.09) | 1.03 (0.89–1.19) | 1.07 (0.95–1.21) |
| Care-seeking behavior | | | |
| Inpatient | 6.67 (4.50–9.90) | 7.09 (3.68–13.65) | 3.95 (2.52–6.18) |
| Outpatient public | 0.67 (0.40–1.13) | 0.99 (0.51–1.9) | 0.60 (0.32–1.11) |
| Outpatient private | 1.00 | 1.00 | 1.00 |
| Outpatient public and private | 1.58 (0.93–2.68) | 1.35 (0.63–2.9) | 1.59 (0.78–3.23) |
| Self-medication/traditional healer | 0.24 (0.13–0.44) | 0.35 (0.17–0.69) | 0.23 (0.12–0.44) |
| Household head education | | | |
| No education | 2.46 (1.34–4.53) | 1.40 (0.57–3.45) | 1.60 (0.72–3.53) |
| Primary | 1.71 (0.92–3.17) | 1.14 (0.48–2.7) | 1.78 (0.83–3.82) |
| Secondary | 1.39 (0.81–2.39) | 0.61 (0.25–1.47) | 1.29 (0.62–2.66) |
| Higher | 1.00 | 1.00 | 1.00 |

HH household

on healthcare, facing disproportionately higher financial burden.

On average, households spent about 11.0% of their total household budget on healthcare, and had high incidence of financial hardship as a result of OOP healthcare payments. The study demonstrated that the overall rate of impoverishment was 5.6%. Similar rates of impoverishment was found in China (5.7%) and Vietnam (7.7%) [31]. Our study also found that around 7% of households faced distress financing (borrowing or selling household assets) to pay for healthcare costs. Consistent with other studies in developing nations [19, 27, 32], the risk of using distress financing was strongly associated with household socio-economic status. Financial hardship including catastrophic payment and distress financing from healthcare were substantially high in the poorest households compared to their richest counterparts, and

this is consistent with previous studies from developing countries [31, 33, 34].

Financial hardship is closely linked with the utilization of health services in Bangladesh. In this study, incidence of financial hardship for inpatient care was quite different from those that received care in outpatient facilities. For example, inpatient treatment costs incurred around 69% of financial catastrophe, 41% of impoverishment, and 37% of distress financing, while the proportion was nearly four times lower among public and private outpatient care. These findings were similar to several studies from developing countries [19, 27]. According to Xu and colleagues [25], the availability of health services requiring OOP payments, low ability to pay, and absence of health insurance are the three key preconditions for financial risk including catastrophic payments, impoverishment, or distress financing. We found that all these

conditions were present in our study area. Therefore, it is clear that public health services fail to perform their social safety net roles properly.

The higher burden of financial hardship found in this study proved that health financing in Bangladesh relies heavily on OOP payments for both public and private health services. A previous study suggested that although about 70% of households in Bangladesh received inpatient treatment from public facilities, but were more likely to receive outpatient treatment in private health services [35]. Subsidized public health services in Bangladesh may be associated with financial risk because of unofficial charges, tips, lack of monitoring systems in subsidized programs, and dependency on private health markets for essential ancillary services such as medical supplies and drugs [35]. For instance, a study in Bangladesh reported that the average level of per-patient unofficial fees was 12 times the amount that could be expected in official payments – assuming that no respondents were exempted from paying official fees [36].

In Bangladesh, although health has been prioritized since the inception of the First Five Year Plan (1973–1978), for the first four decades after independence, the country lacked a national health financing policy to reduce the burden of financial hardship caused by OOP health payment. Bangladesh's first 20 years health care financing strategy, developed in 2012, had a vision to halve the share of OOP payment in total health expenditure and to implement a social health protection scheme by 2032 through raising tax revenue and mandatory social health contribution [37]. However, the implementation of social protection scheme remained a challenge since majority of the people are engaged in informal sectors. The government of Bangladesh aims to increase the allocation of budget for health to 15% by 2032 from its current level of about 5%, which might be challenging. The government recently implemented a pilot project of health insurance, called *Shastyo Suroksha Karmasuchi* (SSK), for the population of three sub-districts of Dhaka division living below the poverty line. The benefit package includes one health card for each household and free treatment services for 50 diseases. The per capita health expenditure in Bangladesh has been increasing over the years, from 9.1 US dollars in 2000 to 30.8 US dollars by 2014. The benefit package might be insufficient to protect poor households from the burden of OOP payment considering the ever-increasing health expenditure. The reduction of OOP payment burden will be difficult unless national health insurance scheme is to be implemented to cover all citizens with priority for the poor population. A nationwide implementation of health scheme with better benefit package for total population like Universal Coverage Scheme of Thailand or *Seguro Popular* of Mexico can protect people from this high burden of OOP payment [38, 39]. Through

the introduction of risk pooling mechanisms, many other low-, middle- and high-income countries have successfully reduced user fees at the point of care and mitigated the economic risk that OOP payments posed for families [33, 40].

Strength and limitations

The research protocol and sampling process in this study was designed carefully to avoid any bias in the results. Despite this, the study has some limitations. First, the study was conducted only in urban populations from one metropolitan area of the country; therefore the results cannot necessarily be generalized to the whole country. However, we selected our study subjects through a random selection process to improve the representative nature of the sample which may be applicable to other urban areas in Bangladesh. Second, our study was cross-sectional, leading to its inability to capture seasonal variations in household consumption or illness-related expenditure and coping strategies. Third, a relatively small number of households experienced inpatient hospitalization in the past 30 days recall period so we were unable to provide any result separately for inpatient public versus inpatient private facilities.

Conclusion

The study clearly revealed that the existing health financing system in Bangladesh fails to protect households from financial risk associated with health service. Therefore, health financing reform is essential to protect people from financial shocks caused by OOP payment. Reforms should include increasing government spending on health through budget reallocation, proper monitoring of subsidized programs, ensuring standard costs for both official and unofficial fees across all public facilities, and committing to health insurance for the whole population.

Additional file

Additional file 1: Table S1. Basic characteristics of households, Bangladesh, 2011. **Table S2.** Incidence of catastrophic expenditure, impoverishment and distress financing by care-seeking behavior and household characteristics, Bangladesh, 2011. (DOC 62 kb)

Abbreviations

CI: Confidence interval; GDP: Gross domestic product; NGO: Non-Governmental Organization; OOP: Out-of-pocket; RII: Relative index of inequality; SDGs: Sustainable development goals; SII: Slope index of inequality; SSK: Shastyo Suroksha Karmasuchi; UHC: Universal health coverage; WB: World Bank; WHO: World Health Organization

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Availability of data and materials

The datasets and materials used in this study are available upon request to the corresponding author.

Authors' contributions

MRI and MMR conceptualized the study design. MRI drafted the paper. MRI and MSR performed the statistical analysis together with MMR and ZI. SP supported administrative, technical, and field supervision. MMR and CZ revised it critically for important intellectual content. All authors have reviewed and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

This study received ethical approval from the Research Ethics Committee of the Bangladesh National Research Ethics Committee, with reference number BMRC/NREC/2010-2013/1161. A consent form to obtain verbal or written consent from respondents was proposed and approved by the Ethics Committee together with the study protocol. Prior to the interview, our enumerator carefully read the consent form to the subject and then very briefly explained the aims and importance of the study. This consent form contained information on the objectives of the study, risks, benefits and freedom of participation, and confidentiality.

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Global Health Diplomacy Workshop

13-14 November, 2017

Institute for Global Health Policy Research, National Center for Global Health and Medicine, Tokyo, Japan

1) Objectives

Global health, defined as issues that directly or indirectly affect health that can transcend national boundaries, needs a pooling of experience and knowledge and a two-way flow between developed and developing countries. Global health is a global political engagement at the intersection of health, diplomacy and global collective action.

In May 2016, Japan hosted the first G7 Summit since the adoption of the Sustainable Development Goals and the end of the Ebola crisis—Japan requires a group of experts in global health diplomacy consisting of stakeholders with diverse expertise to move the global health agenda forward. The G7, along with the World Health Assembly (WHA), could once again advance the global health agenda and strengthen health systems at global and national levels by identifying joint actions that contribute to the development of comprehensive cooperation in global health.

This workshop aims to:

1. Develop and strengthen the capacity of the next generation of leaders in global health diplomacy with a special focus on the changing landscape and context in global health and practical applications to health diplomacy at major meetings such as the WHA and the G7
2. Strengthen a network and partnership in collaboration with key stakeholders both within and outside Japan; and
3. Prepare effectively for WHA and board meeting of international organizations like Global Fund.

2) Target participants

1. Young professionals who will attend upcoming or future WHA or any other board meeting of international organizations, mainly from organizations like National Center for Global Health and Medicine (NCGM), Japan International Cooperation Agency (JICA), National Institute of Public Health (NIPH) and National Institute of Infectious diseases (NIID). They are expected to be well prepared for the board meetings of WHO and other international organizations, as well as to be actively participate into the

meetings through its preparatory process.

2. Young professionals who are in charge of global health policy at each organization like NCGM, JICA, NIPH, NIID and Health and Global Policy Institute (HGPI). They are expected to well translate global health policy into their respective activities at regional, national and community level.

3) Resource persons

Prof. Kenji Shibuya, Professor and Chair, Department of Global Health Policy, Graduate School of Medicine, The University of Toyo,
Director, Institute for Global Health and Policy Research, National Center for Global Health and Medicine(NCGM)

Dr. Suwit Wibulpolprasert, Advisor to the Ministry of Public Health on Global Health, Ministry of Public Health, Thailand

Prof. Churnrurtai Kanchanachitra, Professor, Institute for Population and Social Research, Mahidol University

Dr. Attaya Limwattanayingyong, Director of Global Health, Ministry of Public Health, Thailand

Dr. Hironori Okabayashi, Bureau of International Cooperation, NCGM

Dr. Kenichi Komada, Bureau of International Cooperation, NCGM

Mr. Tatsuya Ashida, Senior Deputy Director, Health Team 4, Human Development Department, JICA

3) Tentative Agenda

| Day | Topic | Description | Speakers/Responsible persons |
|---|--|--|------------------------------------|
| <p>Day 1 (Tuesday, 13 November)</p> <p>Understanding changing contexts and political landscape in global health governance [Facilitator: Dr. Uechi, Dr. Sakamoto]</p> | | | |
| 9.00-9.40 | 1. Course overview | <ul style="list-style-type: none"> ▪ Overview of the course: background, objectives, expected outcomes, activities ▪ Sharing objectives: Why do we need a capacity-building mechanism for GH? ▪ Learning from good and bad practices (Global, Thailand, Japan, etc.) ▪ Why does Japan/Thailand invest in GH? What are their comparative advantages? | Dr Uechi (iGHP) /Dr Sakamoto (GHP) |
| | | <ul style="list-style-type: none"> ▪ Ice breaking session (20 min) ▪ Self-Introduction | Dr Uechi (iGHP), Dr Sakamoto (GHP) |
| 9.40-10.10 | 2. Changing Landscape and context of global health governance(I) | <ul style="list-style-type: none"> ▪ Global Health Landscape (30 min) <ul style="list-style-type: none"> ○ Definition, evolution of “global health architecture” ○ Who is who in GH? (GO/development agencies: eg, JICA/International organizations/private sector/foundations/academia/IGO (UNICEF, WB, UNDP etc.) ○ Changing landscape: the role and contribution of global health diplomacy in global health policy development ○ Role of the G7 and other groups | Prof Shibuya |

| Day | Topic | Description | Speakers/Responsible persons |
|-------------|--|---|--|
| 10.10-10.40 | 3. Global Health Diplomacy - part 1 | <ul style="list-style-type: none"> ▪ ▪ What is Global Health Diplomacy? <ul style="list-style-type: none"> ○ Perspectives from the Japanese government ○ Negotiation in the area of global health ▪ Role of Japan in global health <ul style="list-style-type: none"> ▪ | Dr Sumi (MOFA) |
| 10.40-11.00 | | Coffee Break | |
| 11.00-11.30 | 3. Global Health Diplomacy - part 2 | <ul style="list-style-type: none"> - What is Global Health Diplomacy? <ul style="list-style-type: none"> ○ Perspectives from bilateral agency - Role of Japan in global health | Dr Sugishita (TWMU) |
| 11.30-12.30 | 3. Role of Japan in global health | Panel discussion/Q&A session with Dr Sumi and Dr Sugishita | Dr Sumi and Dr Sugishita Modelator Dr. Sakamoto and D. Uechi |
| 12.30-13.30 | | Lunch | |
| 13.30-14.15 | 4. About WHO/WHA and WHA document system | <ul style="list-style-type: none"> ▪ WHO and WHA <ul style="list-style-type: none"> ○ WHO governance structure and changing role of WHO in global health landscape ○ WHA's structure, rules and process in detail | Dr. Sakamoto (UT)/Dr. Uechi (iGHP) |

| Day | Topic | Description | Speakers/Responsible persons |
|-------------|------------------------------|--|---|
| | | <ul style="list-style-type: none"> ○ Archiving WHO website and documents ○ Crucial role of secretariat ○ Inside story about WHA (Behind the door discussions, etc.) ▪ Wrap-up and Q&A | For all resource persons, kindly support Q&A session, especially who have prior experience at WHA |
| 14.15-15.15 | 5. Assignment #1 | <p>Assignment #1: First swimming (3 participants per group: 8 to 9 groups, 2 to 3 groups assigned on the same agenda) to draft an intervention on (Free position):</p> <ul style="list-style-type: none"> ▪ Cancer prevention and control in the context of an integrated approach (WHA70.31) | Dr Attaya (MOPH), Prof Shibuya (Tokyo Univ) and all resource person as group advisors |
| 15.15-15.30 | | Coffee Break | |
| 15.30-16.30 | 6. Mocked up (assignment #1) | <p>Mocked up assignment #1: making interventions (LAB)</p> <ul style="list-style-type: none"> ▪ What is an intervention? ▪ Interventions: DO and DON'T ▪ How to make a good intervention? | All resource person Dr Attaya (MOPH) |
| 16.30-16.45 | 7. Closure of the day | <ul style="list-style-type: none"> ▪ Wrap up, Q&A | Dr Suwit, Prof Boom (MOPH) and all resource persons |

| Day 2 (14 November): Experiencing “real” health diplomacy at WHA [Facilitator: Dr Uechi, Dr Sakamoto] | | | |
|--|---|---|---|
| 9.30-9.40 | 8. Debriefing | Debriefing by lucky participant | Dr Uechi (iGHP)/Dr Sakamoto (GHP) |
| 9.40-11.00 | 9. Assignment #2 | Assignment #2 (Paired work) to study documents and prepare interventions on: past WHA agenda on - Human resource for health (one group will be assigned to be specific country’s representative) | Dr Attaya (MOPH), and all resource person as group advisors |
| 11.00-11.15 | | Coffee Break | |
| 11.15-12.00 | 10. Mocked up (assignment #2) | Mocked up for assignment #2: role play and making interventions ▪ Feedback for intervention ▪ Wrap up | Dr Attaya (MOPH), and all resource person as group advisors |
| 12.00-12.30 | 11. Brief introduction of WHO Kobe Centre (WKC) | ▪ Brief introduction about WKC from Dr Barber ▪ Q&A | Dr Barber (WKC) |
| 12.30-13.30 | | Lunch | |
| 13.30-14.00 | 12. Negotiation | Negotiation in Global Health ▪ Negotiation tips and technics | Dr.Boom /Dr.Suwit/Dr.Attaya |
| 14.00- | 13. Assignment #3 | Assignment #3: Exercise on negotiation (MIYCN: Maternal | |

| | | | |
|-------------|--|--|---|
| 15.00 | | Infant and Young Child Nutrition) | |
| 15.00-15.30 | 14. Negotiation feedback (Assignment #3) | Feedback on Negotiation | Dr.Boom /Dr.Suwit/Dr.Attaya |
| 15.30-16.00 | 15. Course summary | <ul style="list-style-type: none"> ▪ Ground final comment ▪ Summary of the course Feedback from participants | Prof Shibuya (Tokyo Univ) Dr Suwit Dr Attaya (MOPH) |

IV 章

研究成果の刊行に関する一覧表

研究成果の刊行に関する一覧表

(2017年4月1日～2018年3月31日迄)

書籍

| 著者氏名 | 論文 タイトル名 | 書 籍 名 | 出版社名 | 出版地 | 出版年 |
|--|--|--|---|------------|------|
| <u>Sakamoto H</u> , <u>Rahman MM</u> , <u>Nomura S</u> , et al. | | Japan Health System Review | World Health Organization, Regional Office for South-East Asia | New Delhi | 2018 |
| <u>Nomura S</u> , <u>Shibuya K</u> | Improving Population Health in the Era of Superaging: Japan's Challenges and Opportunities | Innovative Asia: Innovation Policy and the Implications for Health Care and the Life Sciences. | The National Bureau of Asian Research | Washington | 2018 |

雑誌

| 発表者氏名 | 論文タイトル名 | 発表誌名 | 巻号 | ページ | 出版年 |
|---|--|---|------------|---------|------|
| <u>Sakamoto H</u> , Ezoe S, Hara K, Hinoshita E, Sekitani Y, Abe K, Inada H, Kato T, Komada K, Miyakawa M, Yamaya H, Yamamoto N, Abe SK, <u>Shibuya K</u> | The G7 presidency and universal health coverage, Japan's contribution | Bulletin of the World Health Organization | 96 | 355-359 | 2018 |
| <u>Nomura S</u> , <u>Haruka S</u> , Scott G, et al. (31 co-authors) | Population health and regional variations of disease burden in Japan, 1990-2015: a systematic subnational analysis for the Global Burden of Disease Study 2015 | The Lancet | 390(10101) | 1521-38 | 2017 |

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