

### 3-3 医療問題

医療の問題としてメディアでとりあげられているもののうち、過少医療の危険性と関連するもの、および社会サービスとの関連の問題についていくつか紹介する。

#### 1. がん治療の待機期間中の死亡

68歳の男性は、2006年の1月に Aalborg 病院で検査を受け、尿路の腫瘍が発見された。2月3日に生検を実施しがんが確定したが、その後手術をするまで3ヶ月が経過し、死亡した。最大待機期間を定めた法律によれば、がん患者は診断がつき、患者が治療に合意をしたから2週間以内に手術されなければならない。もしそれができないのであれば、病院はより早期に治療のできる別の病院を国内、国外で探すか、保健省に海外での治療場所を見つけるように依頼をしなければならない。医療事故賠償協会 (Patientforsikringen) は、病院に対し DKK454,872 を遺族に賠償するよう請求した。

より沢山のがん患者が待機期間の長さのために命を失っていると考えられるが、医療事故賠償協会に報告されるのは一部である。現在まで166人の患者および親族が、国会で定められた最大待機期間を超えた待機期間に対し、医療事故賠償協会に対し賠償金を請求した。ほとんどのケースは決定されており、医療事故賠償協会は保健省と国会に対し声明を出した。

Ventetiden slog kræftpatient ihjel 2008年4月11日 Politiken

#### 2. 下肢血栓で7時間待機したため足を切断した女性

(48歳の女性の投書) 2009年年5月11日の夜に足に痛みがあった。前にも経験があり血栓であると確信したので、夜23時に当直医に電話をした。当直医も私の見解に同意し、階

下におり電話か医師が来るのを待っているように言われた。待っていても来ないので何度も当直医に電話をし、朝の4時ようやく医師が到着した。しかし医師はこれは血栓だから、朝8時になるのを待って、自分のかかりつけ医に行くようにと言った。私と夫はへとへとになり、血栓を治してくれる病院はどこか尋ねた。それは Viborg だと医師が教えてくれたので、私たちは彼に入院紹介書を書くように頼み、Viborg に自分たちで運転して入った。我々は Viborg におよそ 06.30 につき、入院となり、手術を受けたが、膝から下を切断する必要があった。

Ben amputeret efter svv timers ventetid med blodprop 2009 年 6 月 16 日 TV2

### 3. 当直医体制の問題

当直医に電話をしても、つながらない、みてくれない、ということが問題になっている。患者団体の代表によれば、かかりつけ医の不足が当直医を忙しくしている、当直医制度を改善するために、医者を増やすか、患者からの最初の電話は看護師がとり、当直医につなげるケースを選択することを提案している。患者団体は、かかりつけ医が当直医をしなければならないこの制度に問題あると言っているが、開業医医師会は、デンマークはかかりつけ医が当直する義務のある非常に少ない国のひとつであり、患者からの症状を聞き、診断するのに日常的に慣れているかかりつけ医は、病院の救急室の経験の少ない医師よりも十分機能する、と話す。以下は、1998 年以降に家族等が当直医のミスがあったとしているとメディアが報じた 19 のケースの概要である。昨年 1 年間では、6 件が争われている。

**February 2009** Herning の 2 歳女兒が死亡。Ritzaus bureau によると、両親は、娘がひどい嘔吐をしているため当直医を受診したが、両親によると、当直医は娘の検査をするそぶりがなかった。女兒は帰宅後熱性痙攣を起こし、救急車で入院した日に死亡した。医療監査 Embedslægen と警察が事件の背景を調べている。

**January 2009** 36歳の男性が Kolding の当直医からの帰り道で死亡した。

JydskeVestkysten によると、医療監査が現在調査中である。

**November 2008** 14ヶ月の男児が、Berlingske Tidende によると、2cm 大の電池を飲みこみ死亡した。男児の両親によると、彼らは 14 日間の間に 11 回当直医とコンタクトをしたが、そのような大きな電池を飲み込むことは考えられないと、ほとんどの場合に断られ、レントゲンは結局撮られることはなかった。医療事故賠償協会が調査中。

**November 2008** www.jp.dk と www.dagensmedicin.dk 等によると、Gambia から帰国した Åbyhøj の女性がマラリアで死亡した。女性の友人によると、当直医で診察され、翌日かかりつけ医に行くことを勧められたが、翌朝死亡していた。同時期、7名の Gambia 帰りのデンマーク人がマラリアで入院していた。医療監査は経過と当直医の診察内容を調査している。

**Juni 2008** 45歳男性が Køge の当直医から戻ったところで死亡した。男性は胸部の痛みを訴え、当直医は筋肉痛のための関節炎の薬 (gigtpiller for muskelsmerter) を出し、その後その男性は家に戻った。医療事故賠償協会の調査後、当直医の処置は正しかったと判断された。

**Juni 2008** 当直医を受診し、再度救急室に行く途中で女性が死亡した。この件を調査した医療事故賠償協会によると、女性は左腕から胸部の痛みを訴えていた。救急室の当直医は、心電図をとり、lungehindebetændelse か、あるいは神経が触っていると結論づけ、女性は鎮痛剤を受け取り、痛みが悪化したら救急室にくるように勧められた。同日、女性の夫は女性を救急室に連れてきたが、途中で意識を失った。医療事故賠償協会が介入し、女性の治療内容に問題があったことを非難している。

医療事故賠償協会は 2001 以降平均年間 128 件の当直医に対する訴えを扱っている。

**April 2008** ドイツ人の女性が Ringkøbing 県立病院の駐車場で死亡した。女性の夫は、病院の救急室の待合室の電話を使い、その後自分の携帯電話を使って、救急室の医者に診察を申し込もうとした。しかし電話が故障しており、デンマーク語による自動メッセージをそのドイツ人は理解することができず、その間に女性は駐車場で死亡した。医療事故賠償協会が介入したが、病院の職員に責任はないと結論づけた。ただし、救急室の電話が使えなかったことに対して県は賠償金を支払うことになった。

**Marts 2008** 男児が、数日間の高熱と首の固縮と発疹後、髄膜炎で死亡した Fredericia Dagblad と Vejle Amts Folkeblad によると、母親は 3 月 4 日に当直医に電話し、両親によると、当直医は首に氷嚢をあて、解熱剤を与えて熱を下げるように勧めた。翌日母親はベッドの中で男児が死亡しているのを見つけた。医療事故賠償協会がこの当直医を問題にし、死亡から 1 年経過して患者団体が調査中である。

**Juli 2007** 52 歳の男性が心血栓で死亡した。男性は、Dagbladet Roskilde と Sjællandske によると、胸の痛みと左腕の痛みのため Ringsted Sygehus の当直医を訪ねたが、家族によると、当直医は、その男性に翌日かかりつけ医にかかるようにといい、家に帰した。

**Maj 2007** 53 歳の男性が、Ringsted の当直医のもとで首の診察を受けたあとに血栓で死亡した、と Dagbladet Ringsted と Dagbladet Køge が報じている。その男性は胸部と頸部に痛みがあり、家族によると医師は男性の首を診察し、筋肉のこりと結論付けた。男性は家に帰され、翌早朝死亡した。

**Marts 2007** 14 日間にわたる胸部と両腕の痛みの後、当直医を受診した、この件を調査した医療事故賠償協会の報告書によると、当直医は、この痛みは筋肉痛であり、かかりつけ医にかかって運動療法をするよう手続きをした。その日のうちに男性は死亡したが、病理解

剖は行われなかった。町や年齢については報じられていない。医療事故賠償協会が介入し、医師の治療方法に問題があったと非難している。

**Oktober 2006** 62歳の男性が自宅で死亡した。近隣によると、男性は意識朦朧、酩酊状態であったため、警察と当直医と訪問看護師を呼んだ。JydskeVestkystenによると、当直医は訪問看護師とこの男性は夜間を通じて観察の必要があることで同意したが、その後当直医と訪問看護師が相談し、当直医は男性は急性の状態ではないと評価しなおした。男性はその夜死亡した。当直医の管理者が調査したところ、問題はなかったと、JydskeVestkystenは報じている。

**August 2006 Ekstra Bladet**によると、42歳の男性が自宅で死亡しているところが発見された。それは男性の友人が、一度受診した際、後日かかりつけ医を受診するように勧めた当直医ともう一度コンタクトをとったその前日のことであった。男性の友人は、アラームセンターと当直医と両方に電話したが、どちらも男性を再度みようとしなかった。翌日男性は台所の床で死亡しているのが発見された。

**Juli 2005** 男性が当直医にいった後に心停止で死亡した。男性は咳をして、呼吸困難があり、胸郭の痛みを訴えていた。医療事故賠償協会の報告書によると、医師はその男性を急性の気管支炎として、ペニシリンを処方した。男性は2日経っても改善しなければ再受診するように言われたが、9時間後に死亡した。医療事故賠償協会が調査したが、医師を非難する理由はないとした。

**Februar 2002** 男性が寝室で死んでいるのが発見された。その前夜男性は腹部とそけい部の重度の痛みを訴え、当直医が訪問診療しており、男性の既往である腎結石と誤診した。医療事故賠償協会が介入したが、当直医の診察に非難すべき理由はないとした。

**Februar 2001** 4歳女兒が髄膜炎死亡。JydskeVestkystenによると、家族は最初電話で当直医にコンタクトしたが、女兒を診察してくれなかった。その後家族は Kolding 病院の当直医に女兒を連れて行き、受診をしたが、入院はさせてくれず、自宅に帰ってすぐに女兒は死亡した。

**Februar 2001** 16歳の男児が髄膜炎で死亡。男児の様子がおかしいので、家族は当直医に電話をしたが、受診する必要はないと言われた。さらに悪化したため、再度両親が電話したが、再度受診の必要はないと言われた。翌朝、Kolding 病院に高熱で入院し、すぐに死亡した。

**Februar 1999** 両上腕の痛みのため2回当直医に尋ねた後に男性が死亡した。医療事故賠償協会の報告書によると、初回当直医は関節炎の薬を処方し、2回目は電話で鎮痛剤を処方した。その夜その男性は心停止で死亡した。町名や男性の年齢は明らかにされていない。医療事故賠償協会が介入し、治療方法を非難する理由は見当たらないとしている。

**1998** 9週の男児が、母親が3回当直医にコンタクトをしたが、当直医は男児が百日咳を患っていると誤解をし3回とも拒否された。男児は病院に入院となった翌日に死亡した。場所は明らかにされていない。医療事故賠償協会が介入し、男児を診察した複数の医者を非難した。

Forening: Vagtlæger er lige glade 14-06-09 TV2

#### 4. ナーシングホーム待機のため退院できない患者

BerlingskeTidendeによるとコペンハーゲン市内の公的病院に、治療が終了したにも関わらず入院し、病床を占拠している高齢者が常に50人から70人いる。市はこの問題の解決を約束しながら、未だ解決していない。

これらの高齢者は、ナーシングホームや在宅ケアの体制が整って退院できるまで平均 13 日から 28 日間待機入院している。待機中は市が病院に一日 DKK1,771 (3 万 5 千円程度) 支払う義務があり、この値段は 3 日間ごとに高くなる仕組みである。したがって市が治療が終了したにも関わらず、患者を 8 日間入院させておくと、DKK14,000 から 30,000 (28 万円から 60 万円程度) かかり、12 日間では DKK60,000 (120 万円) になる。市は早急にナーシングホームや在宅ケアの体制を整えなければならないが、保守党の議員の意見では、高齢者および精神病患者は入退院を繰り返しており、そのたびの手間の大きい。彼らのためのナーシングホームや在宅ケアの体制を整えるのよりも、県が運営する病院に彼らを世話させたほうが安いと市は考えている、という。

市は、閉鎖する予定のナーシングホームの 36 床を開けて運営することにしたが、それで十分ではないだろう。

Raske patienter skal på plejehjem 17-02-09 および: 03-03-09 TV2

## 4章 まとめ

かかりつけ医制度を中心としたデンマークの医療システムを概観すると、全体に 1 章で触れたデンマーク医療の原則 LEON（効果的な治療のためのコストを最小にする）が貫かれていることがわかる。

医療行政における LEON は、高コストである病院医療を県に集約し、さらに高度医療については中央集権化および海外施設の利用によって効率化を図っており、他方の病院以外の医療サービスについては、より住民に近く、社会サービスの責務を担う市に集約している。さらに市に対して、市民の病院医療利用に対する財政負担を部分的ではあるが負わせることによって、市が病院以外の代替治療やケアの方法を追求することを促進している。

かかりつけ医の診療においても LEON は生きており、電話や EMAIL による診療の評価、病院でなくかかりつけ医である程度の医療を行うことを促進する加算料や検査料、処方箋の更新には受診を要さず秘書が対応できる柔軟性がある。当直においては、明確に電話だけで終わらせることに対するインセンティブをつけている。なお、現在看護師が処方できる薬剤や求められる教育体系についても具体的に検討されている。さらに、出来高払い部分の診療報酬の点数は、物価水準の高いデンマークにおいて非常に低く設定されていることと、人頭払いと登録住民のファーストコンタクトが必ずかかりつけ医であることによる安定した経済基盤を考えると、報酬のために診察や検査の数を稼ぐインセンティブはかかりつけ医にうまれにくい構造といえる。

一方、病院の予算性とかかりつけ医のゲートキーパー機能に加え、こうした LEON の原則の徹底は、ともすれば過小医療の危険性をもたらしている。かかりつけ医や当直医へのアクセスの良さは国際的に評価されているが、そのアクセスは診療ではなく電話に限られることが多い。病院待機期間の長さに対しては病院選択制、民間病院や海外施設の公的医療



制度の対象化などが導入され短縮化の傾向にあるが、治療を受けられないことによる問題は日常的に存在している。

しかし、こうした一見すると過少の医療が提供されているにも関わらずデンマーク国民の医療サービスに対する満足は常に高く、医療制度としてうまくいっているといわざるを得ないだろう。その背景としては、かかりつけ医との長期の安定した関係からうまれる安心感と、透明性の高い政策決定過程やメディア報道、確立した医療事故賠償制度により国民の間に医療制度全体への信頼感があることが指摘されている。付け加えるとすれば、開業医医師会までも 100% 出来高払いにより起こることを危惧しているほど、どんな症状でも医者にかかる（医療化する）ことの弊害を国民全体が基本的に認識している可能性であり、この点が日本との大きな違いであるかもしれない。

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# Horizontal Inequity in Regional Health Insurance and Inequality in Medical Levies: Uneven Distribution across the Central Regions

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## Abstract

In Japan, economic stagnation due to the lack of aggregate demand has hit the regional health insurance system and this affects most retired pensioners. The fiscal state of insurers in rural areas deteriorated. By contrast, urban areas tend to attract a favorable selection of risk. This paper aims to investigate whether the distributions of medical levies that are paid to health insurers conform to the concept of horizontal equity (i.e., the equal treatment of equals) across different areas within two regions of Japan. The paper examines prefectural-level variations in income-related inequality in health care financing. Data of the central two regions of the Japanese National Health Insurance in 2005 were extracted. Retired employees and self-employed individuals are covered by this insurance system. Horizontal inequity in health and inequality in medical levies were measured by Concentration index and Theil's second measure, respectively. We found significant variations across prefectures regarding the distribution of medical levies to health insurers per household. Kyoto and Nara were subject to a pro-poor distribution of health care financing. We can consider that such proportionality was not built into NHI system through the near constant contribution rates across the distribution of living standards. Using plutocratic weights, the different degree in the inequality in medical levies among prefectures was revealed. The inequality in the multiplier of income levies in Nara was the largest. The regional differences in medical levies to health insurers were mainly derived from income-related inequality per household. To reduce inequality in income levies, local government should lower the proportion of households whose payment of premium of health insurance was reduced.

Key words: horizontal equity, Japan, medical levies, national health insurance

## 1 Introduction

Japan has an advanced social insurance system covering the entire population and family allowances for old age, for disabilities, sickness and maternity, work injuries, and unemployment (USDHH 2000). But, because of tightening budgetary constraints, benefits are likely to be reduced even as contributions rise. Total government debt was 170 percent of GDP at the end of 2008. This is the highest in the industrialized world, and twice what it was twelve years ago. Unless fiscal policy is tightened this ratio could rise to 200 percent by the end of 2010.<sup>1</sup>

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<sup>1</sup> The Ministry of Health and Welfare (MHW 2000) reported gloomy prospects for the social security system. Social security pay-outs by the government will nearly triple by fiscal 2025 to 207 trillion yen based on the projected rate of benefit growth of the past decade. The ministry calculated that the

National health care expenditures (NHE) accounted for about 9.11 percent of national income (NI) in 2007. The rise in this ratio during the decade raised concerns that health care costs were out of control. After 1991 the Japanese economy declined sharply, while NHE increased at an annual rate of 4.9 percent compared to 0.46 percent for NI for the period 1990-1999. From 1987 to 1991, NHE grew at about the same rate as NI, so the ratio of NHE to NI remained below 6.5 percent.

Ikegami and Campbell (2004) pointed out that economic stagnation has hit the National Health Insurance (NHI) system, which covers most retired pensioners, in two ways.<sup>2</sup> First, declining incomes have meant that worker's premium contribution rates have had to be raised. Second, the fiscal state of NHI has become even more precarious as laid-off workers with low incomes have enrolled and as more people have been unable to pay premiums. For NHI, it is well known that the premium in the most expensive municipality is five times that of the least expensive municipality. The distribution of income and health can be altered by changing medical levies to health insurers under a situation of economic stagnation.

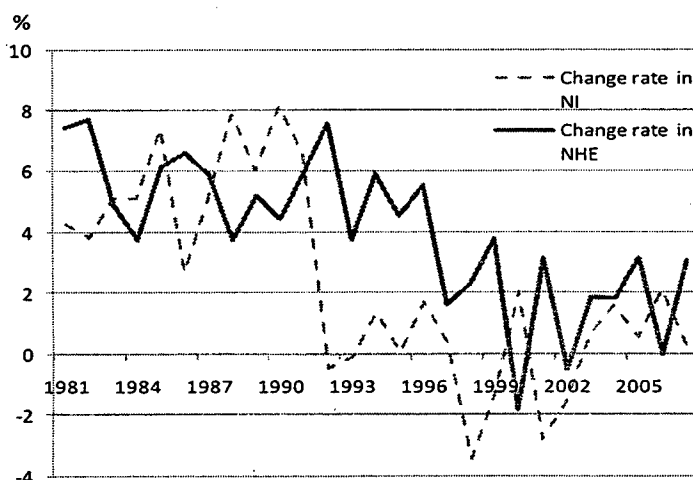


Figure 1. Trends in National Income and National Health Care Expenditures

Previous studies have shown horizontal inequity in health care utilization in Japan (Endo and Shinozaki 2003, Ohkusa and Honda 2003, Kumagai 2007, O'Donnell et al. 2008).<sup>3</sup> O'Donnell *et al.* (2008) estimated the Kakwani indices of 13 Asian territories and concluded that social insurance is slightly regressive and direct payments are regressive. However, their results for Japan were derived from the 1998 Comprehensive Survey of Living Conditions, which covered the whole

consumption tax of 5 percent would have to be increased to 25-41 percent to cover the 100 trillion yen needed for basic benefits a quarter century down the road.

<sup>2</sup> They paraphrased NHI as Citizens' Health Insurance.

<sup>3</sup> Kumagai (2007) found that the municipal subsidy showed almost horizontal equity for inpatients with a cerebrovascular disease. Based on estimation results of censored regression, Kumagai (2007) concluded that municipalities can gain hospital revenues by raising the utilization of beds slightly and then reduce the municipal subsidy.

population, and they did not analyze disparities in the Japanese regional health insurance system.

It is believed that wealthier is healthier. But, are the distributions of medical levies to health insurers proportional to the insured's health? This paper presents the first research to investigate the characteristics of Japanese National Health Insurance from the viewpoint of equity in health care financing. The structure of this paper is as follows. In Section 2, Japanese health insurance system is briefly summarized and recent changes to premium rates set that reflect differences in health care expenditures among prefectures are shown. Section 3 presents empirical results using Concentration index and Theil's second measure. Based on empirical results, we consider the roles of the prefectures that are responsible for regional health care systems. Section 4 offers a conclusion.

## 2 Health Care Financing and Health Insurance System in Japan

Japan has a policy of universal health care and Japanese public health insurance covers the entire population. The compulsory health insurance system with income-based premiums has been universal since 1961 and is organized on an occupational-based system or regional-based (municipality-based) system. Social insurance schemes and taxation constitute the main sources of health funding in Japan. Approximately half of the NHE are financed by health insurance plans and the remainders are financed by subsidies from the government, co-payments, and other out-of-pocket expenses (See Figure 2 and Table 1). Medical services in Japan can be accessed freely and patients can visit medical institutions of their choice at any time. Payments for medical treatment are based on the medical and technical service fee.<sup>4</sup> Reimbursements to health care providers are uniform across regions with little concern for differences in type of facility or severity of illness because the government sets the fee schedule and drug prices. Many people in Japan obtain insurance via employer-related groups. For example, employees of large companies and their dependent family members enroll in plans for which occupation-based cooperatives are the insurers. Insurance societies or mutual aid societies are established within industries. Most employer-group plans require copayments for dependents. These plans also have a catastrophic cap feature that limits monthly out-of-pocket expenses.<sup>5</sup> Japanese public health insurance systems are classified roughly into [1] insurance for employees and their dependents, [2] insurance for the self-employed, retirees and their dependents, and [3] insurance for the elderly.

The first type of insurance is Employee's Health Insurance, which consists of Government-managed Health Insurance (GHI), Society-managed Health Insurance (SHI), Mutual Aid Associations (MAA), and Seamen's Insurance (SI). MAA includes national and local public employees, and private school teachers and staff members. Self-employed individuals, farmers, and retired employees enroll in National Health Insurance (NHI) for which municipalities are the insurers. In general, an

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<sup>4</sup> The fee schedule is decided through key biennial negotiations between insurers and providers, and that forum — the Central Social Insurance Medical Care Council (Chuikyo) — has provided a mechanism for dealing with many recurring issues in a routinized way with very restricted participation. Proof of insurance is submitted when receiving health care and medical compensation is decided after the Ministry of Health, Labour and Welfare consults with the Chuikyo.

<sup>5</sup> When the monthly out-of-pocket amount was higher than the ceiling, the excess amount was paid back to the patient from insurance funds. A ceiling on patient cost-sharing was introduced for the first time in 1973.

employee and his/her dependents are covered by a regional-based system after his/her retirement. The system is not an independent health insurance system for the retirees but is a financial support system for physician visits with small copayments at the time of a medical service is provided. Employees' Insurance contributes to NHI to cover retired employees. For most NHI insurers, the premium is supplemented by subsidies from national and local governments.

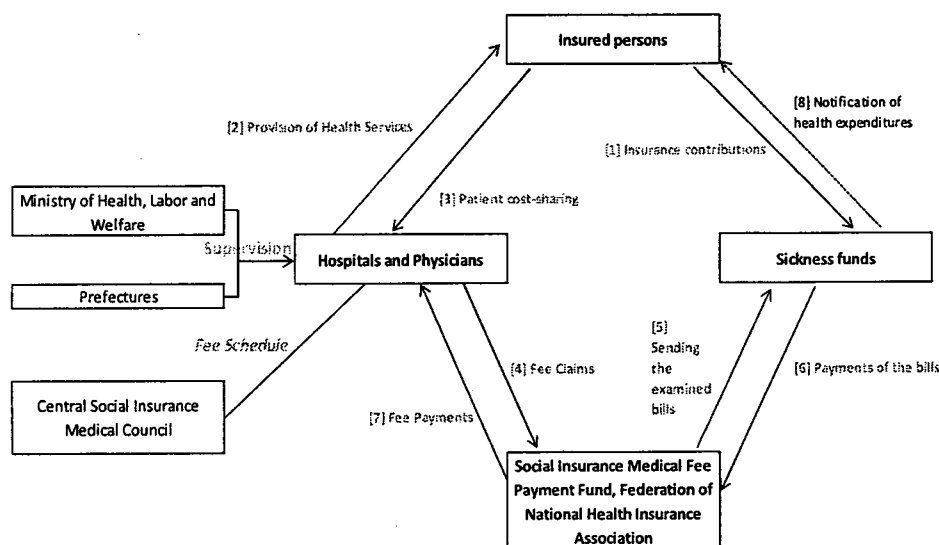


Figure 2. Flow of Funds in the Japanese Health Care System

GHI includes workers employed by small and medium-sized companies. The insurer of GHI was the national government as of September 2008. The GHI received around 8.3 percent of the insured's monthly income during the last two decades, evenly split between employer and employee. Because of regional differences in respective health care expenditures, the participation of the prefectures, which are responsible for health care systems, is needed to control health care expenditures in a systematic manner. To promote prefectural integration, GHI became a public corporation of the Japan Health Insurance Association in October 2008. It is able to set premium rates that reflect the relevant health care expenditures of the different prefectures, as well as offer health services according to the actual situation in the respective region. In SHI, large firms organize their own insurance group. The contributions to SHI are income-related. It is set as a percentage of monthly remuneration. The legislation requires the contributions of employers and employees to be shared equally. The proportion of the share can be changed by agreement. Casual and Part-time employees and most of dispatched workers are excluded from society membership and have to be covered by the other type of public health insurance unless their working hours exceed three quarters of regular workers. Those individuals who are not enrolled through their job must enroll in the NHI Program through the government office in the city, town, or village in which they live. Insurers are linked to a person's employer, occupation, or geographic location, and each insurer operates a different scheme. People are assigned to one or other scheme depending on their occupation or place of residence.

Table 1. Outline of Health Insurance System in Japan (As of March 2007)

	Employer-based health insurance			National Health Insurance	Long life medical care system
	Government managed	Society managed	Mutual Aid Associations		
Insured Persons	Mainly employees at small and medium-sized companies	Mainly employees at large companies	National and local public service employees, and Private school teachers and staff members	Farmers, self-employed, and so on	Persons aged 75 and over as well as disabled persons aged 65-74
Insurer	National Government	Health insurance societies: 1514	Mutual aid associations: 76 (21, 54, 1)	Municipalities: 1818, NHI associations: 165	Long life medical care partial-affairs association
Number of subscribers (Total, Insured, Dependents) 1000 people	35938, 19501, 16437	30474, 15456, 15018	9437, 4399, 5038	51268 (Municipalities: 47380)	13000 (FY2008 estimate)
Population Covered (% 127.3million people)	28.2%	23.9%	7.4%	40.3%	
Partial cost-sharing (%)	30% (After entering school age to 69 years old), 20% (Before entering school age), 20% (People aged 70 to 74, 30% for those earning full salaries)			10% (30% for those earning full salaries)	
Premium rate (%)	8.2%	---	---	---	10%
Government subsidy	13% of benefit costs	Fixed amount	None	Municipalities: 43% of benefit costs, NHI associations: 32-55% benefit costs	Support coverage 40%, Public fund 50% (National: Prefecture: Municipality = 4:1:1)

Note: The arrow implies that the transition of the elderly from NHI to Long life medical care system.

Source: White Paper on Health, Labour and Welfare 2009 Edition.

Table 1 shows that the outline of the health insurance system in Japan. For simplicity, it excludes SI. The rate of subscribers in NHI is almost 40 percent (the highest) and the rate of government subsidy for municipalities is almost 43 percent of benefit costs.<sup>6</sup>

<sup>6</sup> In 1982, the Health Care System for the Elderly (HCSE) was established. Elderly was defined as aged 70 and over in the 1990s. The definition of the elderly changed in the 2000s. Since October 2002, the minimum eligibility age has been increased by one year each year and continued to rise until it reached 75 in October 2007. Seniors aged 75 and older enroll in HCSE and receive benefits through

The NHI account is under financial pressure as most of the insured are elderly. NHI fiscal revenues are primarily derived from insurance premiums and the central government subsidy, although money is transferred from employer-based insurance to NHI to help cover the costs of retired employees. The focus of reforming health insurance for the elderly is always to provide appropriate nursing and care services, as well as health services, and ensure the long-term stability of the system (Fukawa 2002).

### 3 Empirical Analyses

Imai (2002) argued that uneven geographical distribution of resources and treatments largely reflects different needs in different prefectures, because there are good correlations between need and access rates variously measured, i.e., doctors and beds per capita, consultations and admissions per capita, and health expenditure per capita if the crude mortality rate of each prefecture is taken as a proxy for the need for healthcare. However, good correlations among health variables do not imply horizontal equity in health.<sup>7</sup> In this section, horizontal inequity in health and inequality in health insurance are measured by the Concentration index and Theil's second measure (Theil 1967), respectively. We may not consider the inequality in medical levies sufficiently within the framework of the concentration curve. Because regional disparities in income include differences in work-place environments and number of households, it needs another approach.<sup>8</sup> The paper takes account of the dispersion of income and analyzes the inequality in medical levies.

#### 3-1. Data

As the level of geographic aggregation influences the extent to which income inequalities exist, the choice of the level of analysis (country, state, county, urban versus rural, census tract, block level) will influence conclusions about the distribution of ill health (Starfield 2006). We use data for each municipality, because a local government basically calculates NHI premiums for a given year by estimating the expected cost of health care per member of the municipality. Insurance premiums are paid monthly under NHI. The per capita levy is reduced by 70 percent or 50 percent when the insured person's annual income falls below a specified amount. The maximum annual premium for medical insurance is about AU\$6600 (AU\$=80yen). 70 percent of medical treatment costs being paid by the NHI Program, with the remaining 30 percent paid by the insured. Copayment rate of persons under 3 years of age is 20 percent, and 10 percent or 30 percent for

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contributions from other insurance plans. It is well known that one of the major causes of the financial difficulties of health insurers is the Contribution for the HCSE (Sienkin), which is imposed on insurers to finance the health care expenditures of the elderly.

<sup>7</sup> Kumagai (2009) investigated the relationships among the need for inpatient care, the amount of inpatient care services provided, and money transfers to Japanese municipal hospitals in the Kansai region from the viewpoint of vertical equity. It was found that allotments (municipal subsidy) showed vertical inequity in the number of inpatients per day after taking into account the overall social welfare regarding the distribution of allotments.

<sup>8</sup> Poor planning has concentrated industry and urbanization in the Kansai and Kanto regions. The top three prefectures in terms of population in 2008 were as follows: Tokyo 12.462, Kanagawa 8.798, and Osaka 8.670 (million). Three prefectures could increase their share of populations to 25 percent next year.



persons 70 years or older.

A portion of health care costs is levied on the tax base as medical insurance. Income levy is determined according to household income.<sup>9</sup> Asset levy is excluded in many large cities and per-household levy is excluded in some cities. In such a setting, contribution rates are fixed by law, and the risk profile and per capita revenue depend on the profile of the scheme's members.<sup>10</sup> It is highly likely in this scenario that the benefit package differs across schemes, with low-income high-risk schemes being unable to offer a very generous package, and high-income low-risk schemes being able to offer a more generous package (Wagstaff 2009).

National Health Insurance Premium=Medical Insurance + Long-term  
(Nursing) Care Insurance

Medical Insurance = Income Levy (or Taxes from income) + Asset Levy (or  
Taxes from fixed asset) + Poll taxes

Poll taxes=Per-Capita Levy (insured persons) + Per-Household Levy

Table 2. Characteristics of Health Variables in the Central Two Regions

Kansai	SMRs	Income	Medical Levies	Density	Kanto	SMRs	Income	Medical Levies	Density
Osaka	101.7 (11.7)	833353.1 (114551.4)	156042.6 (12851.8)	0.0018 (0.0016)	Tokyo	96.9 (16.5)	825167.2 (246000.1)	122485.2 (16433.9)	0.0065 (0.0099)
Hyogo	100.4 (7.5)	651898.6 (142691.7)	137437.4 (15604.4)	0.0016 (0.0006)	Kanagawa	97.7 (11.8)	858481.3 (163492.4)	156147.8 (15697.2)	0.0040 (0.0032)
Nara	99.9 (9.2)	567091.6 (168517.3)	129882.8 (24505.6)	0.0038 (0.0027)	Saitama	100.6 (8.9)	907080.8 (188168.9)	152051.6 (20014.9)	0.0034 (0.0049)
Kyoto	97.1 (10.7)	639306.3 (178314.1)	130340.8 (21246.5)	0.0014 (0.0009)	Chiba	102.4 (9.2)	927352.8 (181362.9)	163586.8 (19061.3)	0.0039 (0.0061)
Total	100.0 (9.9)	679869.5 (180529.2)	139591.0 (21515.7)	0.0022 (0.0019)	Total	99.6 (12.0)	882762.2 (203488.1)	147632.9 (24144.2)	0.0045 (0.0068)

Note: Standard deviations are shown in the parentheses. The number of physicians in each municipality was surveyed in 2004.

Data of the central two regions of the Japanese National Health Insurance in 2005 were extracted. The total number of municipalities in the central Kansai was 149 (Osaka 43, Hyogo 41, Nara 39, and Kyoto 26) and the total population was about 18.48 million (Osaka 8.82, Hyogo 5.59, Nara 1.42, and Kyoto 2.65). Their share of municipalities was about 8.2 percent and their share of population was about 14.5 percent in the end of FY2005. The total number of municipalities in the central Kanto was 223 (Tokyo 62, Kanagawa 35, Saitama 70, and Chiba 56) and the total population was about 34.48 million (Tokyo 12.57, Kanagawa 8.79, Saitama

<sup>9</sup> If a portion of health care costs were levied as medical insurance, the burden of medical insurance would be regressive to lower income people. This requires a reduction of the per capita levy.

<sup>10</sup> By 2008, about 21% of households that were covered by NHI failed to pay the premium. It is important to reduce this share by improving compliance.

7.05, and Chiba 6.06). Their share of municipalities was about 12.3 percent and their share of population was about 27.0 percent in the end of FY2005.

Table 2 summarizes both mean and standard deviation of health variables in the central two regions. We can read the difference in male' Standardized Mortality Ratios (SMRs) among prefectures and must doubt that wealthier is healthier because a higher income does not necessarily imply lower need for health care. It is noted that the standard deviation of medical levies in Nara prefecture was the largest and the magnitude was about 18.9 percent of the mean. Medical levies in Nara prefecture have a heavy-tailed distribution.

We calculated the horizontal equity in health insurance for the elderly using income per household, medical levies, and male' SMRs as the representative indicator of the need for health care of the elderly. The variance of male' SMRs is larger than that of female' SMRs. Income per household (actual taxable income per household) was used as the living standards variable. A calculation to obtain the variable is given in the Appendix. Density of physicians in each district is the ratio of the number of physicians to all households.

### 3-2. Horizontal Inequity in Health

A concentration curve plots the cumulative proportion of the health variables against the cumulative proportion of the population ranked by living standards. Because the living standards variable (income per household) is discrete, the concentration index is calculated as follows:

$$C = \frac{2}{n\mu} \sum_{i=1}^n h_i r_i - 1 - \frac{1}{n}$$

where  $n$  is sample size,  $h$  the health variable,  $\mu$  its mean and  $r$  the fractional rank by income. The health concentration index is defined as twice the area between the concentration curve and the diagonal, and is bounded by -1 and 1. If the need for health care is equally distributed across income groups, the concentration curve coincides with the diagonal. When the concentration curve lies above the diagonal, it indicates that the need for health care is concentrated more among low-income groups; when it lies below the diagonal, the need for health care is concentrated more among high-income groups.

Both  $h_i$  and  $b_i$  in Equation 1 are variables concerned when we analyze horizontal equity in health. When  $h_i$  is medical levy per household and  $b_i$  is the need for health care, the OLS estimate of  $\beta$  in Equation 1 represents the extent of horizontal equity in health insurance. The estimate of  $\beta$  in Equation 1 is HIwv (Wagstaff and Doorslaer 2000). If HIwv is zero as the result of t-test, we can consider that horizontal equity in health holds. The standard error of  $\beta$  is the estimate of that of HIwv.

$$2\sigma_R^2 \left[ \frac{h_i}{h^*} - \frac{b_i}{b^*} \right] = \alpha + \beta R_i + u_i \quad (1)$$

where  $R_i$  the fractional rank by income per household,  $\sigma_R^2$  its variance,  $\alpha$  the constant term,  $u_i$  error term,  $h^*$  the mean of  $h_i$  and  $b^*$  the mean of  $b_i$ .

Table 3 presents the results of the estimation. They are Newey-West estimates that modified the serial correlation in Equation 1. There are two major facts. First, medical levies (medical insurance) were distributed in favor of districts in which need for health care was high. However, from the view point of horizontal equity, the distribution of medical levies per household in the central Kansai region was partly distorted. Kyoto and Nara were subject to a pro-poor distribution of health care financing (See Table 3 and Figure 3-1). Second, density of physicians as an indicator of access to health care in Tokyo metropolis was subject to pro-rich distribution. On the contrary, it is noted that density of physicians in Kyoto prefecture showed equity in health (CI=-0.028, t=-0.383). However, Figure 3-1 shows that the concentration curve of density of physicians (green line) does not coincide with the concentration curve of the need for health care (red line).

Table 3. Distribution of Health Variables

	Coefficient	Standard Error	t-value		Coefficient	Standard Error	t-value
<b>Osaka</b>				<b>Tokyo</b>			
Needs-Income	-0.069	0.014	-4.933	Needs-Income	-0.187	0.027	-7.030
Insurance-Income	-0.060	0.008	-7.327	Insurance-Income	-0.104	0.007	-14.938
Insurance-Needs	0.009	0.014	0.649	Insurance-Needs	0.083	0.022	3.835
Ph Density-Income	0.085	0.090	0.947	Ph Density-Income	0.274	0.160	1.705
Ph Density-Needs	0.154	0.100	1.541	Ph Density-Needs	0.461	0.170	2.717
<b>Hyogo</b>				<b>Kanagawa</b>			
Needs-Income	-0.141	0.008	-17.871	Needs-Income	-0.122	0.011	-10.758
Insurance-Income	-0.085	0.009	-9.648	Insurance-Income	-0.100	0.011	-9.332
Insurance-Needs	0.055	0.010	5.573	Insurance-Needs	0.022	0.008	2.742
Ph Density-Income	-0.048	0.032	-1.473	Ph Density-Income	-0.199	0.086	-2.321
Ph Density-Needs	0.093	0.032	2.870	Ph Density-Needs	-0.077	0.085	-0.899
<b>Nara</b>				<b>Saitama</b>			
Needs-Income	-0.191	0.018	-10.749	Needs-Income	-0.140	0.007	-20.369
Insurance-Income	-0.079	0.015	-5.139	Insurance-Income	-0.056	0.005	-10.435
Insurance-Needs	0.112	0.017	6.667	Insurance-Needs	0.084	0.007	12.358
Ph Density-Income	-0.049	0.050	-0.990	Ph Density-Income	-0.112	0.046	-2.449
Ph Density-Needs	0.142	0.053	2.695	Ph Density-Needs	0.028	0.049	0.574
<b>Kyoto</b>				<b>Chiba</b>			
Needs-Income	-0.188	0.025	-7.497	Needs-Income	-0.122	0.010	-12.128
Insurance-Income	-0.082	0.011	-7.649	Insurance-Income	-0.075	0.007	-10.597
Insurance-Needs	0.106	0.020	5.232	Insurance-Needs	0.047	0.007	6.736
Ph Density-Income	-0.216	0.059	-3.691	Ph Density-Income	-0.041	0.066	-0.625
Ph Density-Needs	-0.028	0.074	-0.383	Ph Density-Needs	0.081	0.065	1.239

Note: The dispersion of the subject of medical treatment was not taken into account due to data restrictions. Insurance in Table 3 means medical levies per household.

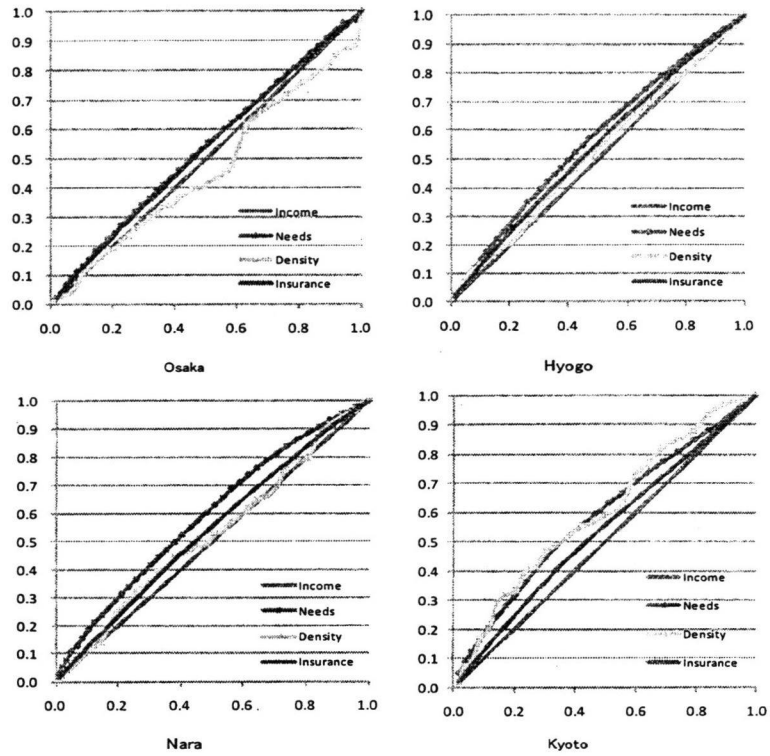


Figure 3-1. Inequality in Health and Density of Physicians in the Central Kansai

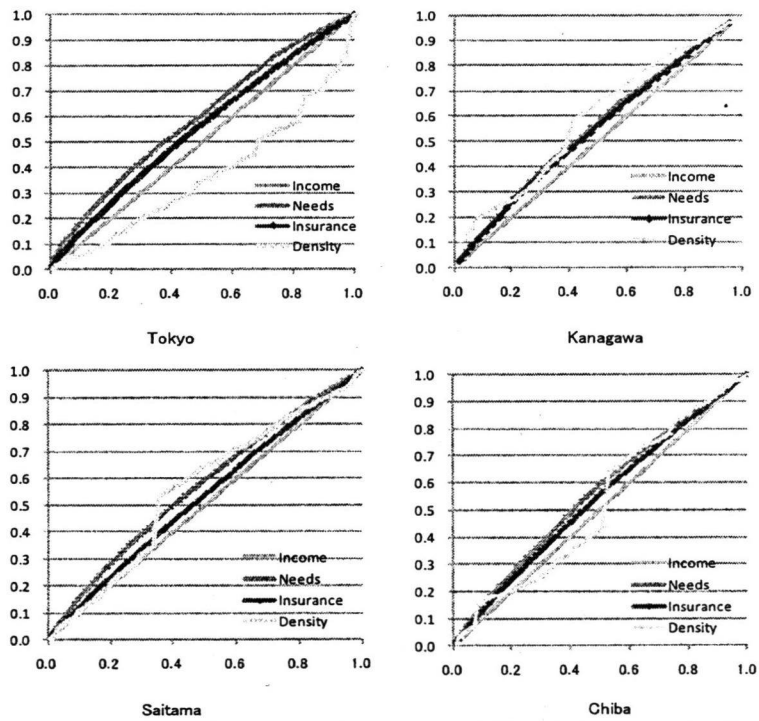


Figure 3-2. Inequality in Health and Density of Physicians in the Central Kanto