

Global economic crisis and pre-adolescent overweight risks among shingle parental status: a nationwide 10-year birth cohort study in Japan

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Abstract

Background: Although it is known that overall overweight prevalence among Japanese children are smaller than Western countries, evidence has suggested that recent economic crises increased the risks of socioeconomically disadvantaged children. We hypothesized that children in single-parent households or those became single-parent during the 2008 global economic crisis may particularly be at increased risk of being overweight.

Methods: We used the data of the ten waves (2001–2011) of governmental nationwide longitudinal survey following up all Japanese children born within 2 weeks in 2001 (boys: n = 24,425, girls: n = 22,590). Childhood overweight was defined according to age and sex-specific cutoffs of body mass index scores established by the International Obesity Task Force. The number of parents was assessed in 2008 (before the economic crisis) and in 2009 (after the crisis). The sex-stratified generalized estimating equation model tested child's parental status. We considered yearly average trends in weight status, parental ages and educational attainments, household income (quartiled) before the crisis, negative changes in income during the crisis, residential area, and having grandparent(s).

Results: Before the economic crisis, overweight prevalence were 8.5% and 8.3% among single-parent boys and girls, which were 8.2% and 8.1% among both-parents boys and girls, respectively. After the crisis, the gap increased 0.3% point among boys and 1.3% point among girls. Girls from continuous single-parent households during the economic crisis showed a greater increase in risk of overweight after the crisis onset (adjusted odds ratio 1.23, 95% confidence interval: 1.08–1.40) compared to girls continuously having both parents. Boys transitioning from single-parent to both-parents had a lower overweight risks (odds ratio: 0.61, 95% confidence intervals: 0.40–0.92).

Conclusions: Although the overall overweight prevalence was comparable even in the

period of economic recession, we obtained the evidence that raising a child alone may increase the overweight risks of children, independent of other conditions including the changes in household financial statuses during the economic downturn.

Introduction

Childhood overweight is a global public health challenge. Overweight in early life has been linked to the increased risk of future chronic diseases and become epidemic all over the world.¹⁻

³ In Japan, childhood overweight has become a serious public health issue too. Despite its relatively lower prevalence of childhood overweight compared with many Western high income countries, it is increasing in recent years. In 2007, approximately 10% of the 6 to 11-year old children were overweight but it was doubled during the last 3 decades.⁴

Socioeconomic disparity in childhood overweight and other health issues is another global challenge.^{5,6} Socioeconomic disadvantage has in numerous studies been linked to childhood overweight, though the association differs depending on study setting, sex and ethnicity.⁷⁻⁹ Exposure to negative life events and psychosocial stressors in childhood –including parental stress and financial problems– may also increase risk of childhood overweight and obesity.¹⁰⁻¹³ In relation to the recent volatile worldwide macroeconomic conditions, child poverty is a particular issue to be concerned.¹⁴ In Japan, study on recent nationwide longitudinal study has indicated the widening income-based gradient in overweight risks among children after the Global Economic Crisis in 2008.¹⁵ During the crisis, gross domestic product dropped by 6.3% in 2009 and unemployment rates increased from around 4% in the first half of 2008 to 5.5% in July 2009.¹⁶

Children from single-parent households may particularly be vulnerable to economic downturns as they are more likely to be suffered from parental stress and financial problems associated with changes in macroeconomic conditions. In Japan, in 2012, relative poverty rate among households with only one adult was 54.6%, whereas it was 12.4% among households with two or more adults.¹⁷ This Japan's poverty rate among single-parent households is in fact the highest of all Organization for Economic Co-operation and Development (OECD) member countries.¹⁸ In addition to the risks for being impoverished, single-parent household may have extra burden as they tend to have the limited opportunity for having instrumental and emotional supports in childbearing, leading to strong psychological burden of their parent.¹⁹

Against this background we hypothesized the potential widening in overweight risks among children under various parental statuses in relation to 2008 Global Economic Crisis. To test this, we examined the relation between the changes in the number of parents living with children in the same households and trajectories in overweight risks throughout the period of the economic crisis, using data from a nationwide longitudinal birth cohort study. Children in this cohort were born in 2001, and were thus exposed to the economic downturn at a possibly sensitive age for the development of overweight.^{4,20}

Methods

Data

We used data from 10 waves (from 2001 to 2011) of the Longitudinal Survey of Newborns in the 21st Century, conducted by the Ministry of Health, Labour and Welfare in Japan. All babies born in Japan between January 10 and 17, and between July 10 and 17 in 2001 were identified using the birth record list of vital statistics for Japan (n=53,575). Questionnaires were sent to parents with mail when the children were 0.5, 1.5, 2.5, 3.5, 4.5, 5.5, 7, 8, 9, and 10 years old.

Measurement

Overweight

At each wave, parents were asked to report children's height (to the nearest 0.1 cm) and weight (to the nearest 0.1 kg), as well as a date of measurement. Body mass index (BMI) values were calculated based on the following formula: weight (kg)/height² (m). Childhood overweight was defined according to age (months) on a date of measurement and gender specific BMI cut points established by the International Obesity Task force starting from 2 years of age.²¹ These cut points project to the adult cut-offs for overweight (25 kg/m²).

Household parental status

We used the data on the number of parents cohabitating with a child in the same household, which were reported in 2008 (before the economic crisis) and 2009 (after the crisis). At each wave, we categorized children into either "both parents" (both a father and a mother were living together) or "single parent" (only one of parents was cohabitating with the child). We then categorized subjects into 4 groups according to the transitions between having both parents and only one.

Covariates

Following the recent study using the same data, we treated educational attainments of their parent(s), household income, income reductions after the economic crisis, having grandparent(s), and characteristics of residential areas as potential confounding factors.¹⁵

Statistical analysis

We constructed a data based on 1-month intervals starting from January 2003, when the first group of children in the survey reached 2 years of age. We then used the generalized estimating equation (GEE) models to calculate odds ratios (ORs) for overweight in each wave. GEE can control for within-person correlation of errors across different time points.²³

We then evaluated the changes in risk of the childhood overweight after the onset of the

economic downturn with respect to changes in parental status. Specifically, to offset the effect of temporal changes in overweight risks due to the natural physical development, we put age (in months) in the regression models. We also created a step term for the crisis onset (dummy variables representing that the data was after the crisis onset: September 2008) and the interaction terms between parental status and the crisis onset step term. Using these explanatory variables, we formally tested, in model 1, the between-parental-status differences in overweight risks after the crisis onset. In model 2 we added parental educational attainments, household income (quartile) before 2008, negative income changes during economic crisis, characteristics of residential area, and having grandparent(s) as covariates.

To address potential biases due to missing data, we executed multiple imputation analysis. We stratified all models by gender.²⁴ All analyses were conducted using STATA SE statistical package, version 12.1 (Stata Corporation, College Station, TX, USA).

Results

The overall prevalence of overweight among boys were 8.2 % (95 % Confidence Interval: 7.8-8.6) in 2008 and 10.8 % (95 % CI: 10.4-11.3) in 2009, whereas the prevalence of overweight among girls were 8.1 % (95 % CI: 7.7-8.6) in 2008 and 9.7 % (95 % CI: 9.2-10.1) in 2009 (**Table 1**).

While majority of children had both parents continuously (91.7% for boys and 91.3% for girls), 6.4% of boys and 6.8% of girls were from continuous single-parent households during the economic crisis. Among boys, 1.8% experienced the changes in the number of parents. Among them 1.2% lost a parent during the economic crisis and 0.6% had both parent during the crisis period. Among girls, 1.4% changed their parental statuses from both parents to single-parent, whereas 0.5% of girls experienced transition from single-parent to both-parents households (**Table 2**).

For girls, the yearly increase in the likelihood of being overweight was 0.99 (95% CI: 0.97-1.00) before the crisis and 1.26 (95% CI: 1.19-1.35) after the crisis. Even allowing for this yearly changes, girls continuously residing in single-parent households had a greater increase in risk of overweight after the crisis onset (OR: 1.23, 95% CI: 1.08-1.40) relative to their peers from households continuously with both parents. There was no statistically significant interaction between the step term variable (representing the period after the crisis onset) and the transition from both-parents to single-parent status and transition from single-parent status to both-parents status, as compared to have both parents continually. For boys, yearly increase in the likelihood of being overweight was 1.02 (95% CI: 1.01-1.03) before the crisis and 1.66 (95% CI: 1.56-1.76) after the crisis (Model 1, **Table 2**). The OR of the interaction between crisis onset and continuous single-parental status, as comparing to continuous both-parents status, were 1.10 (95% CI: 0.96-1.25). We obtained a moderate or strong evidence of interaction

between the crisis onset and the transition from single-parent to both-parents in the risks of overweight compared with boys continuously with both parents (OR: 0.61, 95% CI: 0.40–0.92). Additional adjustment for further covariates including household socioeconomic residential conditions did not largely changed these results (Model 2 in **Table 2**).

Discussion

The key findings of this study were twofold. First, although overall overweight risks are small and so as its income-based gradient, we obtained a clear evidence of gender specific widening trends in the gaps of overweight risks across parental statuses. That is, girls continuously having single parent appeared to be at greater risks for developing overweight after the economic crisis. Conversely, boys from households transitioning from having single parent before the crisis to having both parents after the crisis were at the lower post-crisis risks of developing overweight than did both-parents boys. These gender-specific links of changes in parental status and post-economic crisis overweight risks were independent of the changes in their household financial statuses during the crisis period.

The sociodemographic gaps in overweight risks were small, potentially reflecting Japan's resilient health systems to maintain child health.^{2,25–28} We suggest three potential reasons of this “resilience” of Japanese society in maintaining child health. First, universal health insurance coverage may contribute. Japanese health insurance offer cheaper (20%) copayment for children aged 6 or under. Although older children and adults pay more on having medical services, the majority of municipality governments have in fact offer extra coverage for schoolchildren until 15 years old. Although better accessibility to medical care does not directly contribute to keep proper weight status of children, widely-opened opportunities of consulting pediatricians and other healthcare services in medical facilities may be beneficial to child health. Second, health education programs in schools and communities may play a role in maintaining relatively low prevalence of overweight among Japanese children. For example, Japan has promoted nutritional education programs called “Syokuiku (food education)” to improve dietary habits at population level.²⁹ Third, although evidence is mostly not available, more upstream factors, including food culture, built environment, public safety, socioeconomic equality may also support children maintaining their health.^{30,31}

Notwithstanding this overall small overweight risks and its socioeconomic gradient among Japanese children, we also found gender-specific post-crisis widening of the gaps in overweight risks across parental status trajectories. The increased overweight risks among girls continuously with single parent are intuitive, which can be explained by the hypothetical pathways linking macroeconomic crisis to health if impoverished population: a sense of future insecurity due to macroeconomic downturn may increase parental stress even when individual

economic situations are unchanged. Some studies indicate that stress may reduce self-control or willpower by impeding one's cognitive function and lead to unhealthy dietary behavior and physical activity.^{32,33} Stress can also increase the risk of being overweight via releasing cortisol, which may accelerate abdominal fat accumulation.^{32,34}

On the other hand, boys newly obtained a parent after the crisis appeared to be less influenced by the economic crisis. Boys may benefit from the new parent in various ways. First, the new parent may directly provide further cares for boys including better food, opportunities of exercises and emotional supports. New parent may also contribute boys to maintain their health, making their household more "stable" physically, psychosocially, and materially, even in the period of macroeconomic hardships.

To our knowledge, this is the first study to evaluate the association between the changes in parental status and changes in the overweight risks among children during and after the recent economic downturn. The strengths of our study include the use of the large-scale nationally representative 10 year longitudinal data with repeated measures of exposures and outcomes. However, several limitations should be noted when interpreting our findings. First and foremost, we did not directly evaluate the impacts of economic crisis on changes in overweight risks across various parental statuses. To address this, future studies should adopt more sophisticated analytic approach with additional data. For example, modeling the changes in regional macroeconomic statuses (e.g., at prefecture or municipality levels) during and after the economic crisis may work. Second, in our models, we controlled for the trends in household financial statuses and parental educational attainments. However, there should be remaining unobserved socioeconomic characteristics (e.g., occupational status, housing, and other material conditions). Third, weight and height of the children were based on parental report and, therefore, may not be precisely measured. However, parental reports of children's weight status in Japan were found to be relatively precise.³⁵ Besides, allowing parents to specify any date of measurement could increase accurate reports of weight and height statuses of the children.

Our study has important public health implications. Despite the basically affordable and resilient social and healthcare systems in Japan, there may be vulnerable socioeconomic groups stemming from their specific parental status: single-parent household. As we have suggested about the factors contributing to maintain child health, universal medical care insurance coverage cannot fully support keeping good health. Social protection reforms may also be necessary. Because current social protection frameworks for families assume marital relations between a child's parents, the safety net is not fully fit the current diversified family statuses. For example, child care services for sick children is lacking, making it difficult for single-parent to engage in full-time work.³⁶ Recent trends in household composition toward the nuclear family may increase the importance of the roles of better environment outside of household.

Providing better social and physical environment in which children makes better daily choices would be necessary.

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Table 1. Overall prevalence of overweight among boys and girls by year, Japanese Longitudinal Study of Millennium Babies, 2001-2011.

By year		Boys			Girls	
Year	Age	%	(95% CI)	%	(95% CI)	
2003	2.5	8.8	(8.4, 9.2)	9.5	(9, 9.9)	
2004	3.5	6.8	(6.4, 7.1)	7.3	(6.9, 7.7)	
2005	4.5	6.3	(6, 6.7)	7.8	(7.4, 8.2)	
2006	5.5	6.8	(6.4, 7.2)	8.3	(7.9, 8.7)	
2008	7	8.2	(7.8, 8.6)	8.1	(7.7, 8.6)	
2009	8	10.8	(10.4, 11.3)	9.7	(9.2, 10.1)	
2010	9	12.5	(12, 13)	10	(9.5, 10.4)	
2011	10	13.6	(13.1, 14.1)	9.4	(9, 9.9)	

Table 2. Descriptive analysis of Japanese newborns within 2 weeks in 2001

	Boys		Girls	
	n	%	n	%
Total	24435	52.0	22590	48.1
Changes in single parental status between 2008 and 2009				
Both parents to Both parents	16589	91.7	15230	91.3
Both parents to Single parent	222	1.2	236	1.4
Single parent to Both parents	107	0.6	91	0.5
Single parent to Single parent	1165	6.4	1133	6.8
Missing	6342		5900	
Income quartile				
1 (lowest)	4120	25.1	3783	24.9
2	4085	24.9	3817	25.1
3	4119	25.1	3783	24.9
4 (highest)	4079	24.9	3823	25.1
Missing	8022		7384	
>30 % negative income change during economic crisis				
Missing	7807		7235	
Residential area				
20 designated cities	4558	25.8	4187	25.6
Other cities	11480	65.0	10658	65.2
Rural	1624	9.2	1505	9.2
Missing	6763		6240	
Mother's age				
<20 years	326	1.3	295	1.3
21-25 years	2859	11.7	2734	12.1
26-30 years	9411	38.5	8549	37.8
>30 years	11829	48.4	11012	48.7
Father's age				
<20 years	133	0.6	114	0.5
21-25 years	1920	8.0	1814	8.1
26-30 years	6962	28.9	6385	28.7
>30 years	15111	62.6	13964	62.7
Missing	299		313	
Mother's education				
Junior high school	928	4.1	894	4.3
High school	9137	40.3	8603	41.0
Vocational school	9522	42.0	8512	40.6
Higher education	3070	13.5	2961	14.1
Missing	1768		1620	
Father's education				
Junior high school	1554	6.9	1434	6.9

High school	9237	41.2	8525	41.1
Vocational school	3526	15.7	3232	15.6
Higher education	8089	36.1	7536	36.4
Missing	2019		1863	
Three generation household	4101	23.2	3714	22.6
Missing	6712		6179	

Table 2. Odds ratio (OR) and 95% confidence interval (CI) for overweight

	Model 1				Model 2			
	Boys		Girls		Boys		Girls	
Age (years)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Changes in single parental status between 2008 and 2009								
Both parents to both parents	1.02	(1.00-1.03)	0.99	(0.97-1.00)	1.02	(1.00-1.03)	0.99	(0.97-1.00)
Both parents to single parents	1.00 (Ref.)		1.00 (Ref.)		1.00 (Ref.)		1.00 (Ref.)	
Single parents to both parents	0.95	(0.64-1.40)	1.11	(0.79-1.56)	0.91	(0.61-1.36)	1.07	(0.76-1.51)
Single parents to single parents	1.33	(0.83-2.15)	1.34	(0.80-2.23)	1.26	(0.78-2.03)	1.32	(0.79-2.21)
Single parents to single parents	1.13	(0.96-1.33)	1.09	(0.93-1.28)	0.96	(0.81-1.14)	0.97	(0.82-1.15)
Step term								
Before September 2008	1.00 (Ref.)		1.00 (Ref.)		1.00 (Ref.)		1.00 (Ref.)	
After September 2008	1.66	(1.56-1.76)	1.26	(1.19-1.35)	1.66	(1.56-1.77)	1.27	(1.19-1.35)
Interaction between single parent in 2008 and step term								
Both parents to both parents *September 2008	1.00 (Ref.)		1.00 (Ref.)		1.00 (Ref.)		1.00 (Ref.)	
Both parents to single parents *September 2008	1.23	(0.90-1.70)	0.91	(0.68-1.22)	1.24	(0.90-1.71)	0.91	(0.68-1.23)
Single parents to both parents *September 2008	0.61	(0.40-0.92)	1.00	(0.65-1.54)	0.61	(0.40-0.92)	1.00	(0.65-1.55)
Single parents to single parents *September 2008	1.10	(0.96-1.25)	1.23	(1.08-1.40)	1.10	(0.97-1.25)	1.23	(1.08-1.40)
Household income quartile before 2008								
1 (lowest)					1.00	(0.89-1.11)	1.07	(0.95-1.21)
2					1.04	(0.94-1.16)	0.98	(0.87-1.10)
3					0.94	(0.85-1.05)	0.93	(0.82-1.04)
4 (highest)					1.00 (Ref.)		1.00 (Ref.)	
>30% negative income change during economic crisis								
No					1.00 (Ref.)		1.00 (Ref.)	
Yes					1.10	(0.97-1.24)	1.00	(0.88-1.15)
Father's education								
Junior high school					1.00 (Ref.)		1.00 (Ref.)	

High School	0.98	(0.86-1.12)	0.91	(0.78-1.05)
Vocational School	0.92	(0.79-1.07)	0.87	(0.74-1.03)
Higher Education	0.76	(0.65-0.88)	0.76	(0.65-0.89)
Mother's education				
Junior high school	1.00 (Ref.)		1.00 (Ref.)	
High School	0.72	(0.61-0.84)	0.72	(0.61-0.86)
Vocational School	0.66	(0.56-0.78)	0.61	(0.51-0.73)
Higher Education	0.64	(0.53-0.78)	0.56	(0.45-0.68)
Residential area				
20 designated cities	1.00 (Ref.)		1.00 (Ref.)	
other cities	1.07	(0.98-1.16)	1.15	(1.05-1.27)
Rural	1.13	(0.99-1.29)	1.39	(1.21-1.60)
Three generation household				
No	1.00 (Ref.)		1.00 (Ref.)	
Yes	1.40	(1.29-1.52)	1.24	(1.14-1.36)
Father's age				
< 20 years	1.00 (Ref.)		1.00 (Ref.)	
21-25 years	1.81	(0.98-3.36)	0.89	(0.49-1.61)
26-30 years	1.69	(0.91-3.15)	1.04	(0.57-2.48)
>30 years	1.92	(1.03-3.58)	1.25	(0.69-2.28)
Mother's age				
< 20 years	1.00 (Ref.)		1.00 (Ref.)	
21-25 years	0.86	(0.61-1.21)	1.06	(0.70-1.58)
26-30 years	0.85	(0.60-1.21)	1.02	(0.68-1.55)
>30 years	0.94	(0.66-1.33)	1.07	(0.71-1.63)

Health Care Reform through Demographic Transition

The Case of Japan: Integrated Community Care System for Sustainable UHC and Society

Group 4

The views and opinions expressed herein are those of the authors and do not necessarily reflect the views of the Ministry of Health, Labour and Welfare of Japan; the Government of Japan; its affiliates; or its employees.

Abstract

The aim of this article is to propose an ideal approach to health care policy reform through demographic transition. In this article we discuss the current comprehensive social security reform that is underway, and the “Integrated Community Care System (ICCS)” that the Japanese government promotes.

The Japanese government is working to establish ICCS by 2025 when the baby boomers will be over the age of 75. The MHLW has been implementing the necessary domestic legislation, showing guidance, and motivating through economic incentives according to its comprehensive reform plan for Japan’s social security system.

Whether aging proves to be a burden on society or increases a nation’s capital depends on policies regarding not only health but also labor and urban planning. When planning UHC implementation or reform, the externality of a policy should be carefully considered.

1. Introduction

Japan has entered into an unprecedentedly aging society with the enormous related financial burden of increased social security costs. Universally, aging has been recognized as a financial and social burden due to these associated social security costs. As the world will without exception age, a political paradigm shift is now urgently needed.

Since 1961 when Japan established universal health insurance, Japan’s demographic composition and society has changed dramatically due to its aging population, declining

birthrate, diversified employment patterns, and the emergence of poverty and income inequality. In order to change to meet the needs of a new era and sustain the social security system, Japan is currently implementing comprehensive social security reform so that people can live with mutual support to foster peace of mind.

In this article, Japanese medical government officials who are directly involved in the planning and implementation of health policies in the Japanese Ministry of Health, Labour and Welfare (MHLW) share pragmatic methods and lessons learned based on Japan's experiences and the challenges that it faces, which have not yet been articulated, so that low- and middle-income countries (LMICs) can refer to the positive and negative aspects of Japan's experience when they design and implement UHC in their own country contexts.

What follows are the key messages from Japan's young medical officers, which are based on the following philosophy. First, a country should introduce a pragmatic way to establish a financially sustainable health system that can respond to a vigorous society and longevity. Second, it should propose health policies aiming at total optimization rather than partial optimization. Third, policymakers should discuss not only retrospectively (to tell a history) but also prospectively (to suggest a solution).

The aim of this article is to propose an ideal approach health care policy reform through demographic transition. In this article, we discuss the current comprehensive social security reform that is underway, and the integrated community healthcare system that the Japanese government promotes.

2. Toward Next-generation UHC – Integrated Community Care System (ICCS) –

(1) The Path of Japan after the Establishment of UHC

In the 1960s when Japan had just established UHC, Japan was “generous”; in other words, Japan paid more for health care than Japan earned. (**figure 1**) At the time, the population was young and there were no signs of aging. After the 1970s, the rate of aging has gradually and continuously increased. The Japanese government sensed the potential challenges, and has worked to implement policies dealing with its aging society up until the present.

(2) From Cure in a Hospital to Care in a Community

As seen in **figure 2**, an aging population means an increase in mortality rates. Rapid aging

causes a change in disease structure from infectious diseases that require short-term treatment at a hospital to life-style diseases and cancers that require long-term medical services throughout daily life. **(figure 3)** Therefore, *community-oriented healthcare* that enables the elderly to live in their communities is required rather than *hospital-oriented healthcare*.

To realize sustainable UHC, we should shift from *top-down centralized UHC* dealing with acute diseases to *bottom-up decentralized UHC* which is based on individual needs and is tailored to the situations of community residents in order to achieve a *citizen-centric health community*, making full and effective use of local social resources. **(figure 4)**

(3) Guiding Philosophy for Japan's Social Security System

The Japanese government is trying to reconstruct a robust social security system with multi-layered safety nets. The first layer is “governmental aid”, or welfare through tax subsidies. The second layer is “public support”, which includes health insurance and long-term care insurance. The third layer is “mutual aid” comprising non-institutional and unofficial activity among local communities, such as volunteer activities. The fourth and last is “self-care”.¹ Since these activities are currently isolated from each other, efforts are required effectively and efficiently manage and merge these layers.

Due to the financial situation resulting from Japan's aging population combined with its diminishing birth rate, massive expansion of governmental aid and public support can no longer be expected. While mutual aid and self-care play an ever-greater role within the community. Therefore, it is critical that municipal governments play the leading role in harmonizing the different layers of social safety nets. The current Japanese administration is promoting the decentralization of administrative power so that municipal governments are able to pay close attention to and provide services that best meet the needs of their communities. The future is a “community era”, and Japan is now struggling to establish a community-based healthcare system.

(4) Overview of the Integrated Community Care System (ICCS)

Currently, the Japanese government is promoting the establishment of an “Integrated Community Healthcare System (ICCS)” by 2025 when the baby boomer generation will be over the age of 75. The MHLW has been implementing the necessary domestic legislation, showing guidance, and motivating through economic incentives according to a comprehensive reform of the social security and tax systems.² **(figure 5)**

The objective of the ICCS is to enable people to continue to living in their home towns with a sense of security through the end of their lives, even if they are in severe need of long-term care. The MHLW defines the ICCS as a system that provides five services: (1) medical care, (2) long-term care, (3) long-term care prevention, (4) living support, and (5) housing, in an integrated manner in the local community. Concretely speaking, these five services imply the following:

- (1) It is crucial to strengthen collaboration between long-term care and medical care so that the MHLW can promote 24-hour home medical care, long-term home-visits, and rehabilitation services with the cooperation and collaboration of acute care hospitals, recovery hospitals, and general physicians fostered by financial incentives through Japan's fee schedule.
- (2) It is a key that each municipal government urgently establish the bases of long-term care, such as intensive care homes for the elderly and in-home services providing 24-hour routine home-visits and responsive support services.
- (3) Considering increase in the numbers of the elderly living alone with dementia, various life support services and services for protecting the rights of the elderly are necessary, e.g. keeping an eye on the elderly, delivering meals, shopping, and property management.
- (4) Preventive care is important as well. Therefore, through the ICCS, long-term care supports the independence of the elderly and includes services preventing them from being in conditions requiring the provision of long-term care.
- (5) The construction of housing for the elderly where they can continue to live independently is being promoted in cooperation with the Ministry of Land, Infrastructure, Transport and Tourism.^{ii, iii}

(5) How to create ICCS: Health Governance

As part of the Comprehensive Reform of Social Security and Tax^{iv, v}, the so-called Social Security Reform Program Act, hereafter the Program Act, was enacted in December 2012. The Program Act shows the reforms required and the schedule of legislation and budget formation for four social security regions, including those that cover medical services and long-term care. Some of the legislation is for the establishment of ICCS in those regions. Regarding medical and long-term care, there are three main pillars of the Promotion of Integrated Securing of Medical Services and Long-term Care Act, i.e. (1) a new fund for ICCS and strengthening of collaboration between medical service and long-term care, (2) the securing of efficient and effective healthcare delivery systems in the community, and (3) the expansion of a community support programs with fair cost burdens.^{vi}

First, a new fund for the integration of medical services and long-term care was established in each prefectural government by using additional revenues from increased consumption tax that was increased from 5% to 8% in 2014. In order to establish ICCS, each prefectural government subsidized medical institutions and service providers of long-term care that intend to promote functional differentiation of hospital beds, improve their facilities, enhance home medicine and long-term service, and train healthcare professionals.

Second, the Medical Service Act (MSA) regulates medical service institutions and structures, such as the establishment and management of hospitals and clinics, the number of hospital beds in each prefecture, and the allocation of the function of hospital beds in order to ensure necessary medical services are sufficiently provided. In 2014, the MSA was amended as a part of the Comprehensive Reform of Social Security and Tax. The major aim of the amendment was to establish the ICCS. Under the act, every hospital is supposed to report the own medical service functions (highly-acute, acute, recovery, and chronic) to the governor of each prefecture, and the governor should then institute a “Community Health Vision” that stipulates an ideal future healthcare service structure in the community by holding a coordination conference. In that process, the data and information needed to plan a vision are gathered, analyzed, and shared. The catchment area covered by the vision is also decided. Healthcare demand is estimated in each area, and then every stakeholder discusses their required healthcare supplies in terms of function and amount.

Moreover, in addition to health-related legislation, a financial incentive for health care professionals and hospital administrators is an extremely potent driver affecting behavior change and in support of ICCS. One of the unique aspects of the health insurance system in Japan is that Japan adopts a nation-wide unified single-price fee schedule. Through amendments made to the fee schedule, the MHLW can induce behavioral change of health care professionals every two years. In a previous amendment, high medical prices were set for acute care hospitals that allocate more personnel per bed and provide intensive nursing care, which was followed by an enormous increase in that kind of acute care hospitals. As a result, the distribution of hospitals was transformed to include more ‘profitable’ acute care hospitals. The MHLW was hard-pressed to revisit the issue in the most recent amendment in 2014, which included measures to promote implementation of the ICCS.^{vii} Once a government has established a hospital-based health system, changing to a community-based health system is met with great difficulty. Therefore, governments ought to draw blue prints of community-based health systems for the future in the early stages of developing their health systems.

Third, a function of a community support program that consists of care prevention and consultation etc., and is a part of the long-term care insurance scheme, was expanded to include home-visit long-term care and facility-based long-term care, so that municipal governments can more flexibly provide necessary services based on the situation in each area. Moreover, it is recommended that in addition to official care services, unofficial community available resources, e.g. non-profit organizations, private sector actors, volunteers, and even the elderly themselves, are utilized to support the elderly who need a help.

(6) How to Finance the Cost of Aging: the Case of Japan

Financial schemes for UHC differ from one country to another, ranging from a tax system in the UK, public health insurance in many countries, a mix of public and private health insurance in the US, and a health savings system in Singapore, which reflect each nation's philosophies for the role that should be played by the state. Japan employs health insurance, taxes, and out-of-pocket payments to fund its UHC. Therefore, there are three major ways that the Japanese government can discuss reforming its financial schemes for UHC, for example the reconstruction of health insurers, or where the government should levy taxes.

Comprehensive social security reform in Japan aims to stabilize the financial foundations of the social security system, to accommodate its aging society. The main element of the reform is an increase in the consumption tax. Japan's consumption tax has been set to increase gradually, to eight percent in 2014 and to ten percent by 2017. All increased tax revenue, estimated 14 trillion JPY (113 billion USD—equivalent to an additional five percent of consumption tax—is supposed to be allocated for social security. Of this revenue approximately 10%, or 1.5 trillion JPY (12 billion USD), is to be spent on health care and long-term care in order to support the implementation of ICCS and other social security programs.^{viii}

It has been frequently asked why consumption tax was chosen to solve issues related to the aging. As they age, the elderly tend to consume more medical services and retire from their jobs. Namely, the young work and the elderly spend, or in other words, there is a transfer of income from the young to the elderly. This situation fosters a perception of unfairness among the working population. To solve this, increased revenues through income tax and corporate tax are inappropriate, because these tax-payers are workers. The advantages of a consumption tax are that they are robust against changes in economic climate and population demographics, neutral for economic activity without putting a heavy burden on the working class, and have high revenue potential, although consumption taxes do tend

toward being regressive.⁸

Since this is the case of Japan, a country that employs health insurance and taxes to sustain UHC, the applicability of the reform is limited. However, the important thing is that a government facing an aging population is able to better examine fair income redistribution mechanisms.

(7) How to Plan and Measure the Outcome of ICCS

As with evidence-based medicine, evidence-based healthcare policy is widely prevalent as well. For accountability of a policy to the public, central and local governments are required to quantitatively explain the *pros* and *cons* of a policy before implementation.

However, there are several critical issues in assessing the impact of the ICCS. With regard to quality of medical care, Donabedian proposed an approach to assess three aspects—structure, process and outcome—half a century ago.^{ix, x} Concerning the ICCS, the “structure” consists of human resource allocation and the number of institutions; the “process” is assessed by service content and ways of providing a service, and the “outcome” indicates changes in health status resulting from care, including increased healthy life expectancy and Quality of Life (QOL). Among them, the “outcome” is the most important, because an improvement of a “structure” and “process” do not always directly result in the improvement of an “outcome”.

On the other hand, it is quite difficult to evaluate the “outcome” of the ICCS, in which mainly long-term care is provided rather than medical care. While the outcome of medical services can be measured by objective quantitative indicators, for example the result of blood examination for life-style diseases, five-year survival rates for cancer, an incidence of complications after operative treatment, the outcomes of long-term care have not only objective quantitative indicators but also subjective qualitative indicators that are heavily dependent on individual philosophies, views on life and death, and social and cultural background, that it is difficult to create a widely agreed upon measurement. Besides, since the health status of elderly people fluctuates frequently, a timing to assess is also considered. Moreover, long-term care includes various kinds of services, and is not only provided by health care professional but also by the family at home. Thus, it can be said that it is impossible to attribute all improvements in outcome solely to long-term care provision.^{xi}

Although, the establishment of an indicator for ICCS is debatable and still being developed, the MHLW is promoting “*Mieruka-ka (Visualization)*” of data and information for long-term and

medical care, integrating it with a wide variety of statistical data and policy information so that public and a local government are able to utilize them efficiently and effectively in order to build their own ICCS. In the *Mieru-ka* project, the central government and insurers provide data regarding health and long-term insurance, specific health check-ups and guidance, and certification of needed long-term care. As the data are integrated comprehensively, and are shown graphically and statistically in chronological order with geographic information systems, a user is able to evaluate progress of the development of the ICCS by accessing data historically and comparing with other area, which helps when planning and evaluation.^{xii}

4. Discussion

A health system does not only extend healthy life expectancy but also increases human capital by supporting a healthy work force. (see Annex) Therefore, before rapid progression in aging, a government should deliberate policies that make extended life expectancy meaningful, leveraging this labor surplus in order to enhance productivity and growth. In other words, the *externalities* of policies should be carefully considered. UHC extends healthy life expectancy, increases individual utility, enhances human and social capital, provides a labor market with a healthy workforce, and finally increases the nation's productivity and GDP. In addition, while we do not analyze it in this article, the capital injected into healthcare can spur a domestic demand for medical supplies and services, and lead to expanded investments for innovation in the health care field. As a result, this financial cycle enlarges the domestic market and economic scale through the multiplier effect. (**figure 6**) Moreover, even the elderly who do not work can contribute to enhanced social capital through social cohesion strengthened through active engagement in their own local communities, volunteer work, and so on.

Whether aging proves to be a burden on society or an increase in nation's capital gains depends on our policies regarding not only health but also labor and urban planning. When a country plans a comprehensive policy for an aging society, *horizontal collaboration* across multiple departments of the central government and *vertical collaboration* between central and local governments are essential.

5. Conclusion

The current Abe Administration announced an economic policy, so-called "*Abenomics*", which aims for sustainable economic growth, targeting a net annual GDP growth of three percent. To realize this, he has developed the "*Three arrows*" of *fiscal stimulus*, *monetary easing* and *structural reform*.^{xiii} Recently, he has adopted a policy package for a "*Society of Dynamic Engagement of All Citizens*" including a set of "*New Three Arrows*"^{xiv}, of which the third arrow

is the strengthening of social security. Next spring, the Japanese government will launch a plan for the dynamic engagement of all citizens, which compiles measures to prevent job separation due to care for elderly family members, and aims to create a work environment to allow employers to give care more easily. Thus, Japan has started to examine its policies of social security and sustainable economic growth in a more integrated fashion.

The major argument of this article aims to minimize the negative impact and maximize the positive impact of aging in order for a nation to sustain its social security system and attain fair economic growth. Aging is an indicator of success of social security policies. It is a major issue whether a nation can take full advantage of human and social capital gains resulting from increased healthy life expectancy or not.

The lessons learned from Japan are below.

1. Redefine UHC and aging.

UHC is not a cost but an investment for the future. Aging is not a burden but a nation's capital gain.

2. Create a community-based healthcare system.

Since a population will age, people need more care in addition to curative services.

3. Careful deliberation of policy externalities.

Health policies affect other policies including finance, labor, urban planning, and innovation.

ANNEX: Analysis of the impact of aging to the economy

How will ICCS work in a broader perspective in order to realize a sustainable society? One of the ultimate solutions for issues relating to social security in a super aging society is to increase GDP through an increase in productivity of the workforce, because Japan's UHC is dependent on public funds (taxation) for approximately 40% of its financing.^{xv} Solow, a US Macroeconomist, proposed an economic growth model, called the *Solow-Swan neo-classical growth model*.^{xvi} The model attributes economic growth to increases of inputs (labor and capital) and technical progress. If extension of healthy life expectancy increases the labor supply, it might contribute to economic growth, which means that the government can harvest the benefits through investments, i.e. social security, especially in UHC for this context.

To analyze this effect, first we explore trends in employment rates of the elderly compared with the aging rate. (**figure 8**) After enacting the Act on Securing, etc. of Equal Opportunity and Treatment between Men and Women in Employment in 1972, the employment rate of the elderly female population had increased. However, over the last two decades, the increase of the employment rates of the elderly has been basically lower than the aging rate. As a result, the employment rate of the overall population has been decreasing, which may cause low GDP growth rates.

To analyze the relationship between an extension of healthy life expectancy and employment in more detail, we conducted the following statistical analysis through a multiple regression model. The regression formula is below. The subjects were all 47 prefectures in Japan. We used the data of employment rates and job-seeking, aging ratio, average income per capita of each prefecture, and healthy life expectancy from the Employment Status Survey in 2012 (conducted every five years) based on the Statistics Act (Act No.53, 2007), the Population Estimates complementing the Population Census in 2012, the Prefectural Accounts in 2012 by the Cabinet Office, and "The result of estimation of healthy life expenditure (in 2010)" conducted by Hashimoto et al. supported by a Health and Labour Sciences Research Grant of MHLW, respectively. We used the Stata 10.1 of Stata Corp US.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \varepsilon$$

Y: Employment rate among those who are over 65 years old

X₁: Ratio of elderly people at least 65 years old

X₂: Average income per capita by prefecture

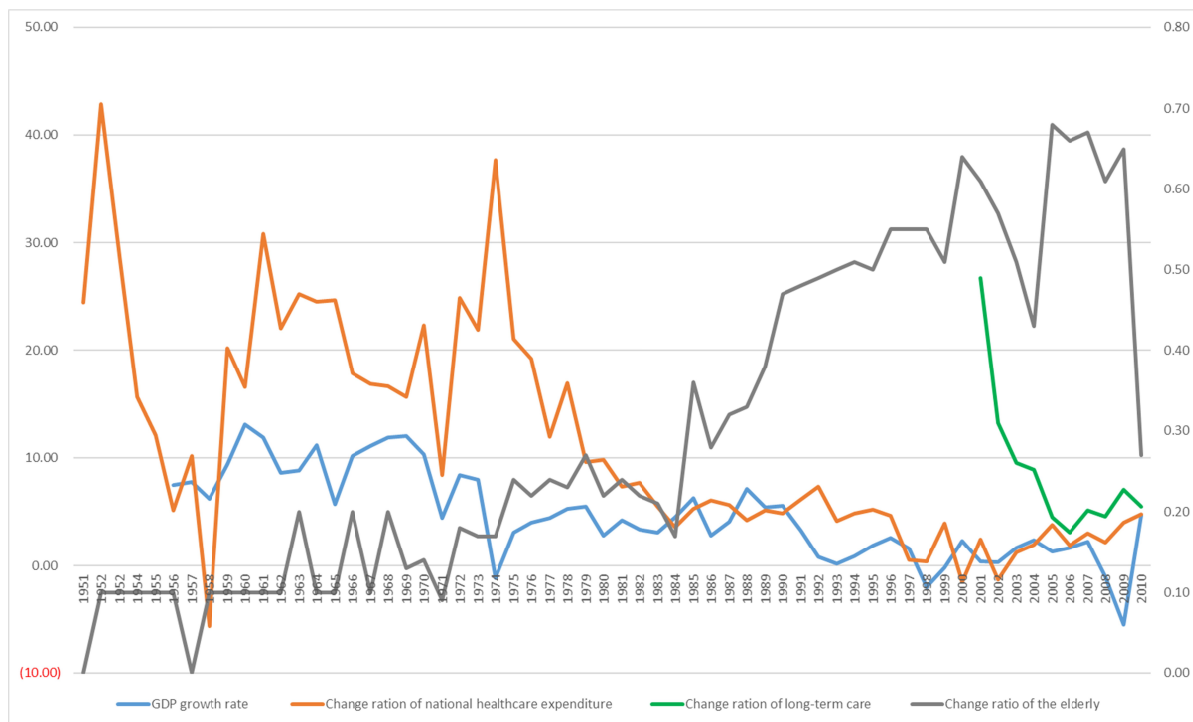
X₃: Year of deference (healthy life expectancy minus 65)

As the results shown in [table 1](#), while the extension of healthy life expenditure is correlated with the increase of employment rates among male populations, there is no statistically significant relationship among female populations. Not surprisingly, there are positive correlations between population aging rates and employment rates for both genders. On the other hand, there are negative correlations between population aging rates and job-seeking behavior. Besides this, there are positive correlations between average income per capita and both employment rates and job-seeking behavior, although reverse causality should be noticed. There is no severe multicollinearity (All VIFs are below 1.22).

As described above, and as seen in [figure 9](#), the employment rate of the elderly male population has been decreasing. By contrast, while there is a substantial difference in the employment rate between males and females, the employment rate of females who are between 25 and 60 years old has been increasing. Moreover, our analysis shows that the increase of extension of healthy life expectancy among men has positive impacts on employment, which implies that an investment in healthcare causes GDP growth via an increase in labor supply. In our analysis, we cannot identify which effect, the cost of UHC or the benefit of labor surplus, is larger. At the same time the female employment rate is much lower than male employment rate, and the extension of healthy life expectancy among female populations does not contribute to labor supply. Thus, it is indicated that there is room for improvement in utilizing the labor surplus of the elderly, particularly of elderly females.

In Japan, according to a surveillance of the International Labour Organization, the employment rate of the elderly in Japan is higher than US and EU countries.^{xvii} 56.7% of workers who are 60-64 years old are willing to work after the age of 65, which is larger than 16.6% of those who do not want to work. Among total 60-64 year-olds, the percentage of those who want to work (44.0%) is larger than those who do not want to work (31.4%), which is larger than the actual employment rate (36.3%).^{xviii} There is a gap between work motivation and work opportunities. Therefore, in August 2012, the Japanese government amended the Act for Stabilization etc. of Employment of Older Persons etc. so that the elderly can play a more active role in the labor market. Thus, governments should integrate health policies and labor policies in order to take full advantage of extended life expectancy in enhancing the nation's productivity.

Figure 1. Trends in GDP growth rates and health care costs with population aging rates



Source:

Real GDP growth rate: National Accounts of Japan, Cabinet Office Japan

Population aging rate: Population Estimates, Ministry of Internal Affairs and Communications Japan, Statistics Bureau

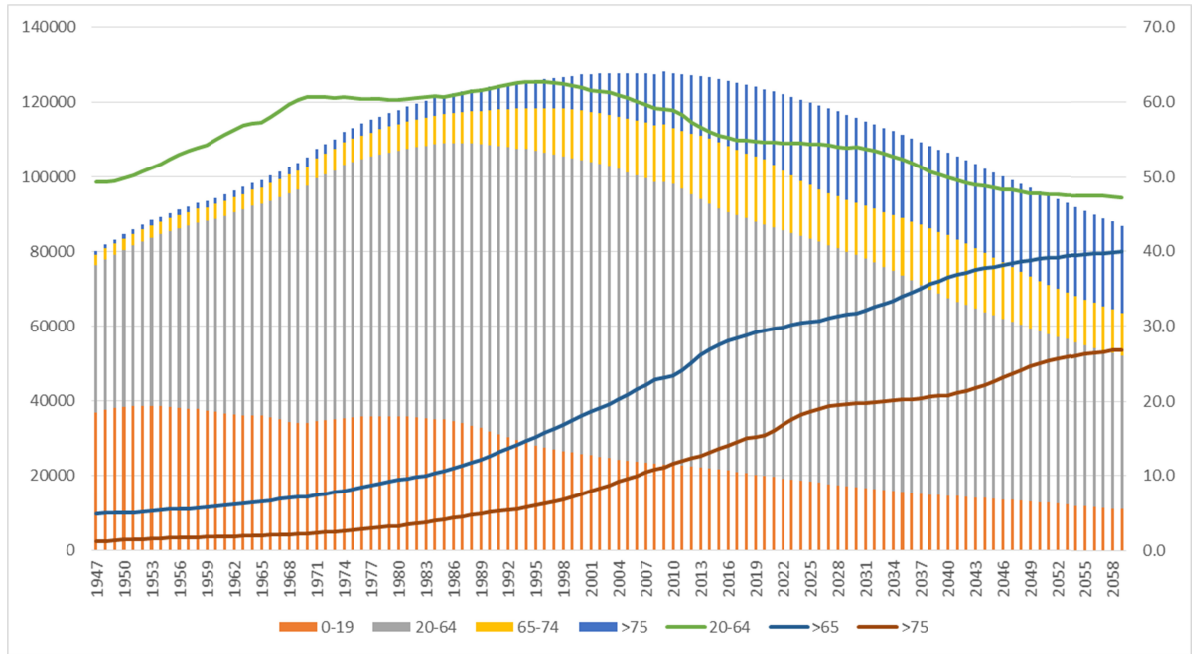
Healthcare expenditure: National Medical Expenditure, Ministry of Health, Labour and Welfare Japan

Long-term care: Ministry of Health, Labour and Welfare Japan

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- xvii <http://laborsta.ilo.org/STP/guest> (accessed November 2015).
- xviii White paper on aging society (2012), Cabinet Office,
http://www8.cao.go.jp/kourei/whitepaper/w-2012/gaiyou/s1_4_1.html

Figure 2. Demographic trends of Japan from the past to the future

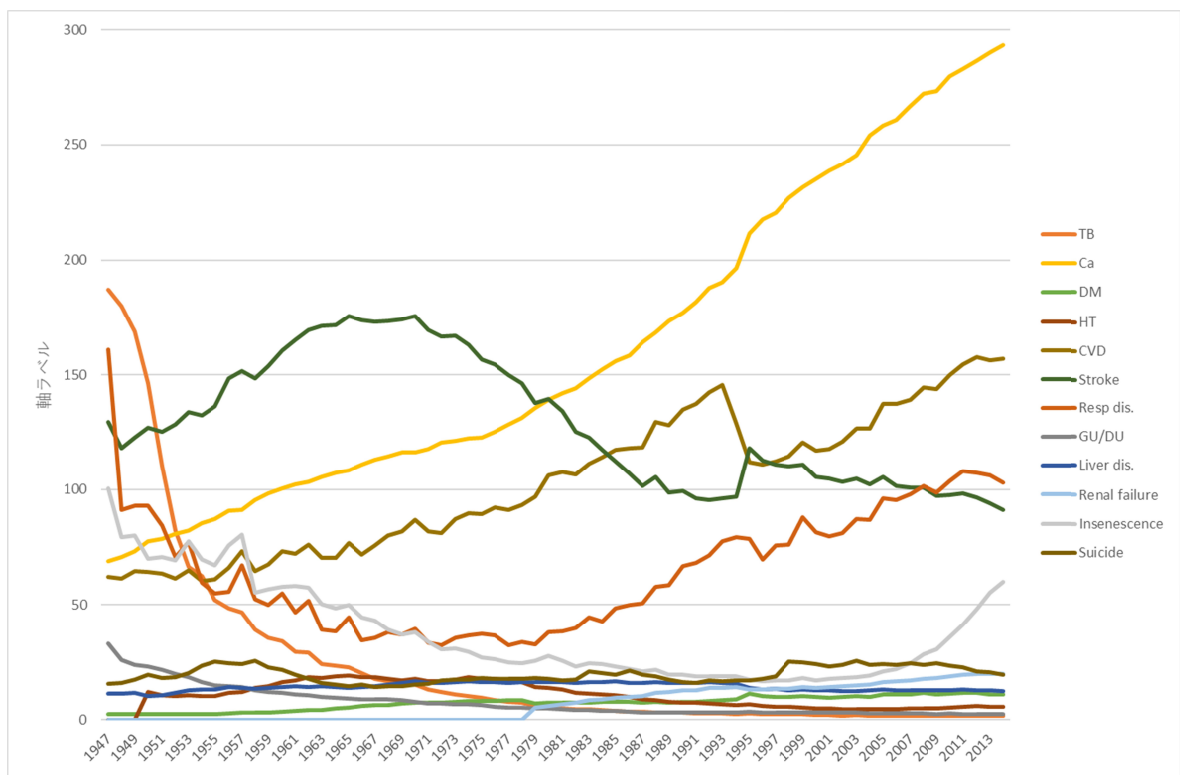


Source:

1947-2010: Ministry of Internal Affairs and Communications Japan, Statistics Bureau, *Population Estimates*

2011-2060: National Institute of Population and Social Security Research Japan, *Population Projections for Japan (January 2012), Total population, population by the major three age groups, and age composition: Medium-fertility (medium-mortality) projection*

Figure 3. Trends in disease structure of Japan



Source

Ministry of Health, Labour and Welfare, *Current Population Survey*

<http://www.e-stat.go.jp/SG1/estat/NewList.do?tid=000001028897>

Figure 4. Health policy reform through demographic transition

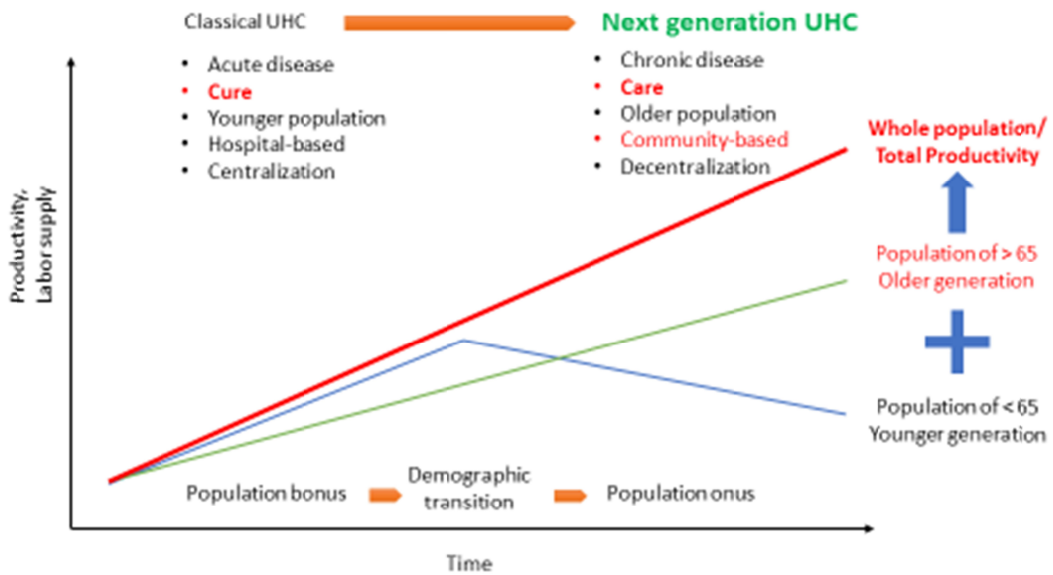


Figure 5. Overview of ICCS (simplified)

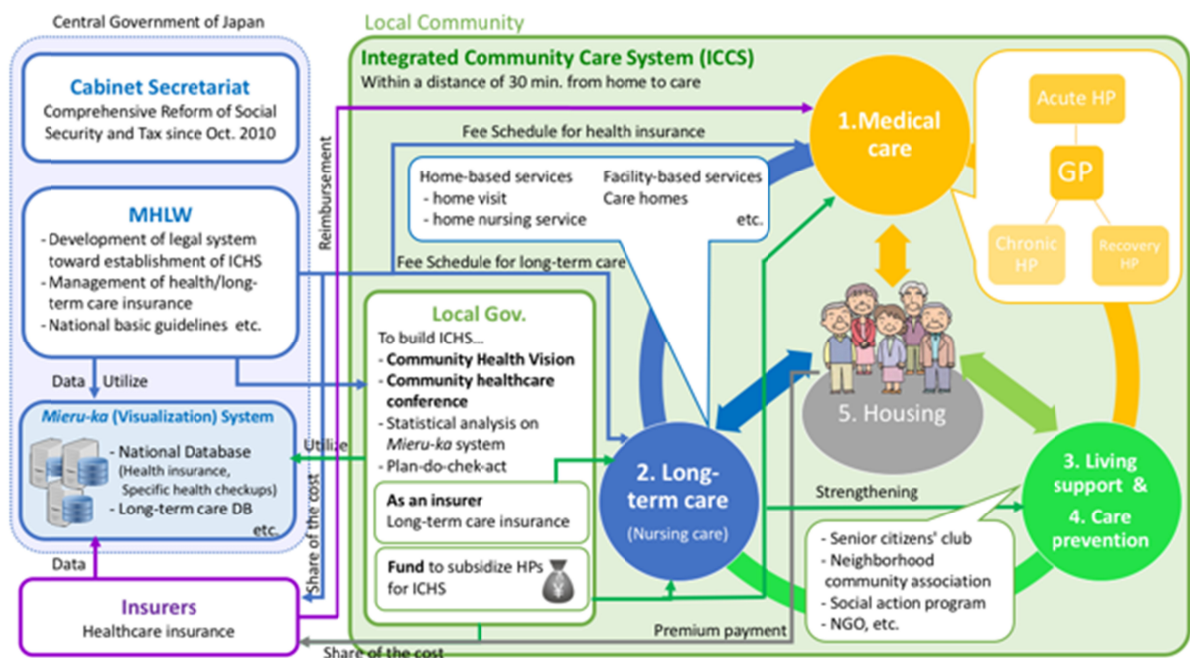


Figure 6. Policy externalities in terms of sustainable UHC

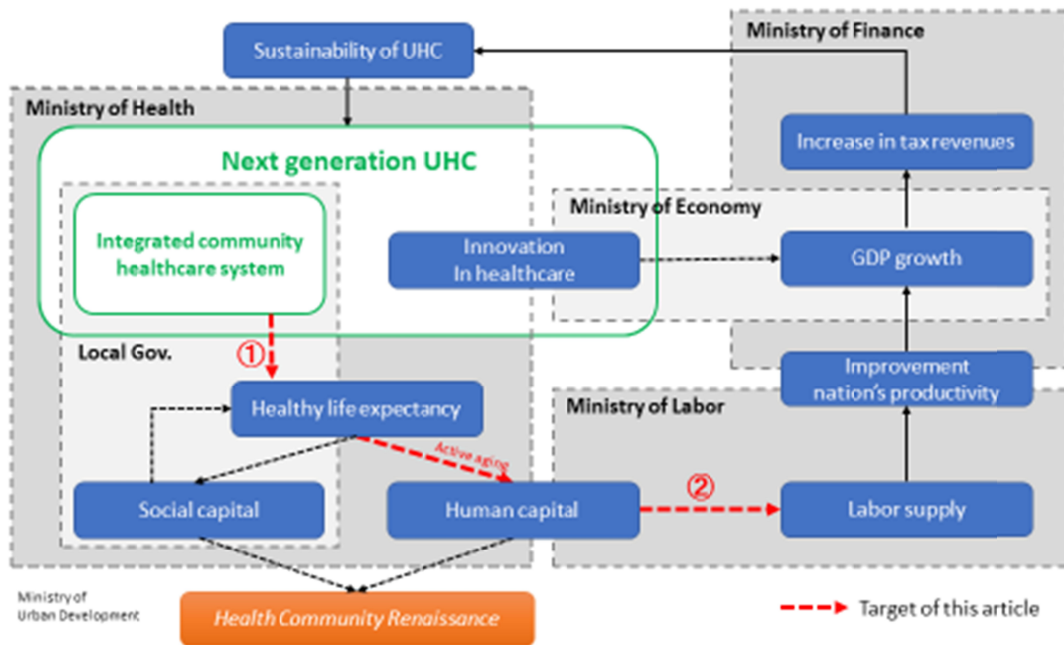
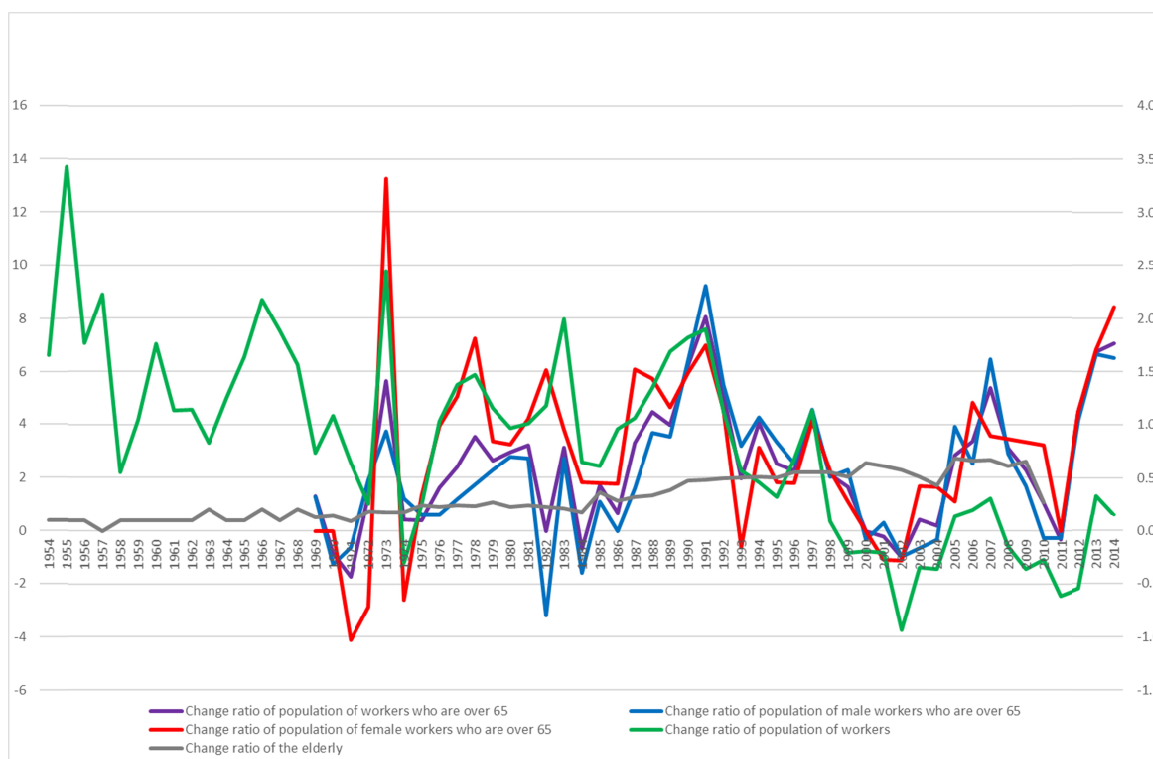


Figure 7. Trends of employment rate of the elderly comparing with aging rate



Source:

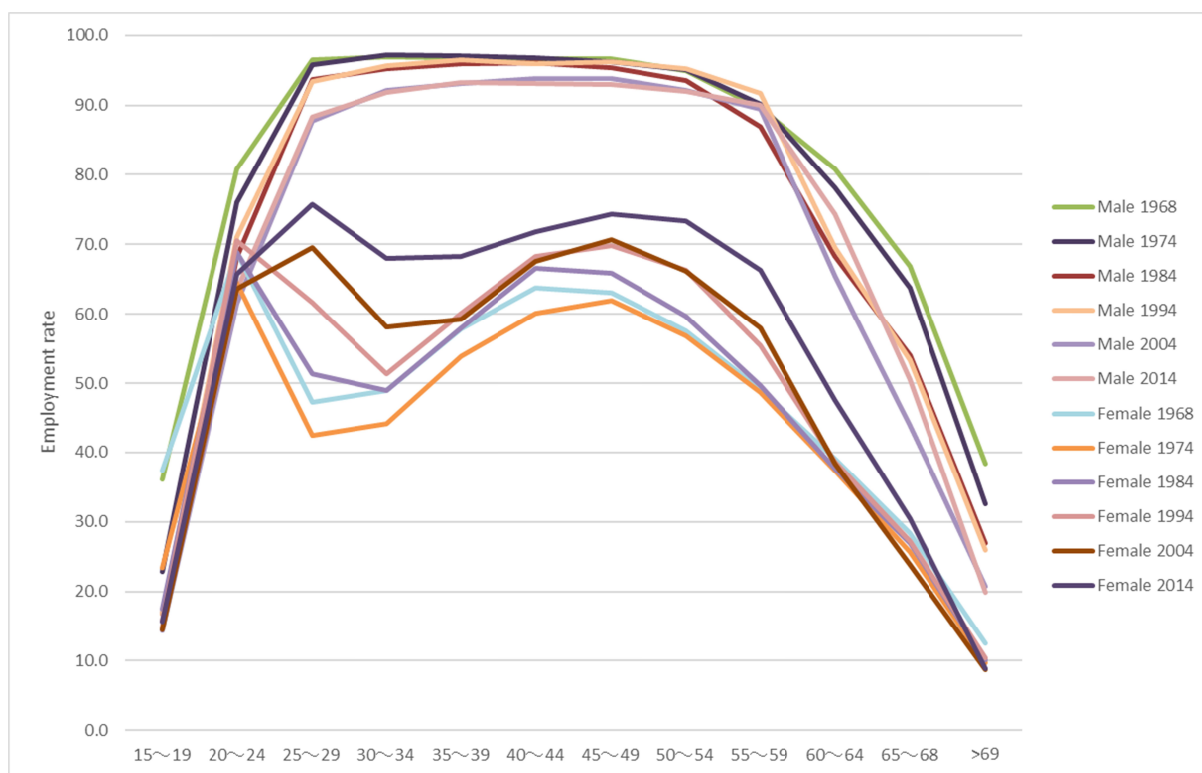
Population aging rate: Ministry of Internal Affairs and Communications, Statistics Bureau, *Population Estimates*

Employment rate: Ministry of Internal Affairs and Communications Japan, Statistics Bureau, *Labor Force Survey*

		ar65				aveincome				ha65			
		Ratio of elderly people at least 65 years old				Average income by prefecture				Year of deference (healthy life expectancy minus 65)			
		Coefficient	t	95% Conf. Interval		Coefficient	t	95% Conf. Interval		Coefficient	t	95% Conf. Interval	
Employment rate	male	0.69	3.86	0.33	1.04	0.0034	3.56	0.0015	0.0053	1.49	2.88	0.45	2.53
	female	0.34	3.66	0.15	0.53	0.0032	4.28	0.0017	0.0047	0.52	1.51	-0.17	1.21
Rate of job-seeking among the unemployment	male	-0.31	-2.51	-0.55	-0.06	0.0019	2.87	0.0006	0.0032	-0.23	-0.66	-0.95	0.48
	female	-0.24	-4.21	-0.35	-0.12	0.0009	1.89	-0.0001	0.0018	-0.16	-0.79	-0.58	0.25

Table 1. The relationship between an expansion of healthy life expectancy and work

Figure 8. Trends of employment rates by age and gender



Source

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