

“Think PHC, Do TB”
Integration-based scale up of tuberculosis control in Japan

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ABSTRACT

Failure of tuberculosis control in developing countries is often blamed on ill-functioning health systems. Successful scale up of tuberculosis control therefore necessitates scale up of health systems. However, how to make the optimal use of available resources to meet the need is a parallel dilemma for many countries.

In 1950, Japan faced the dilemma. Tuberculosis was extremely prevalent and was considered as the “national disease.” The health system was not functioning well and economic situations were considerably poor. Japanese approach was to address tuberculosis extensively and scale up tuberculosis control in line with the framework for the health system scale up. The basic financing, payment and organizational mechanisms for tuberculosis control were the same for the health system control. However, specific mechanisms were added: e.g., governmental subsidies for financing and tuberculosis advisory committees for payment. This integration-based scale up worked very well in Japan, as tuberculosis mortality declined extremely rapidly.

Japanese experience is however not simply replicable in developing countries because of the external uniqueness that Japan enjoyed: particularly the rapid economic and social development. Still, the philosophy that Japanese official built, that is to say addressing tuberculosis extensively while keeping primary health care always in mind, or “Think PHC, Do TB,” is still meaningful at the present time.

1. INTRODUCTION

Scaling up of tuberculosis control in a country where overall health systems are weak is a parallel dilemma that many developing countries are facing. The epidemic of tuberculosis is so serious and countries cannot delay the scale up of tuberculosis control. At the same time, overall health systems are not functioning appropriately, and without scaling up health systems, tuberculosis control may not function efficiently. Resources available in terms of financial, human and technical are almost always limited. Countries have to decide the optimal use of the limited resources.

Addressing the dilemma is becoming more and more important as DOTS, the WHO recommended tuberculosis control strategy, has finally started scaling up. By 2002, 70% of the global populations were in countries, or parts of countries, covered by DOTS [1]. If the scale up continues, there is an opportunity to meet the Millennium Development Goals and bring the disease under control. However, this necessitates the scale up of health systems as well. The Stop Tuberculosis Partnership recently indicated that many constraints on the scaling up of DOTS were found relating to underlying weakness and under-financing of health systems [2].

In 1950, Japan faced the dilemma. The economy was poor: per capita Gross National Product (GNP) was in the same range with the Philippines and Malaysia [3]. The health system was almost collapsed: the insurance coverage was less than 40% of the population [4]. Health status was deteriorated. Epidemic of tuberculosis was extremely serious. Above all, tuberculosis was recognized as the “national disease.” It was the leading cause of death, accounting for 15% of all deaths [5] and its negative impacts on social and economic activities were significant [6] [7].

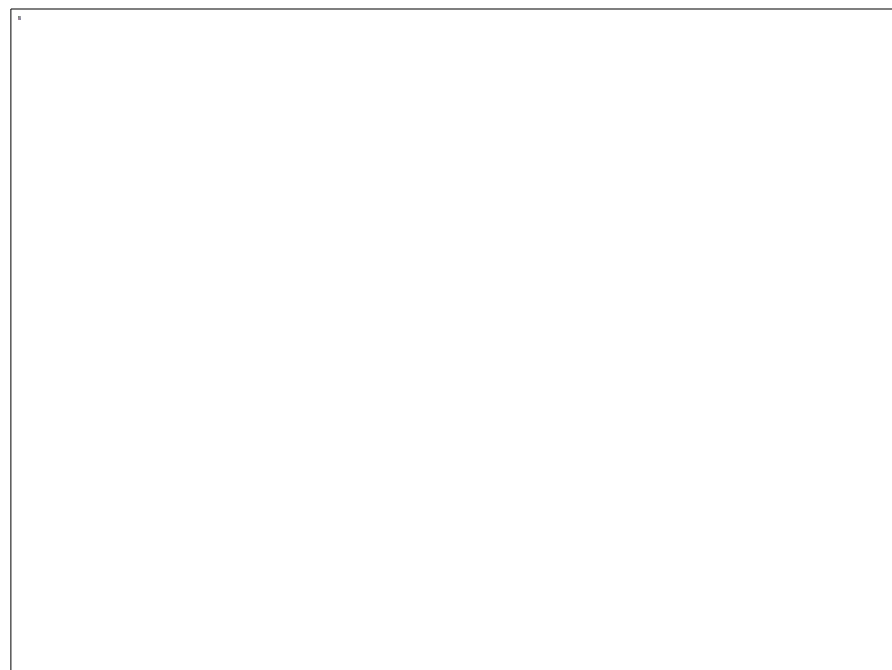
Japan managed to address the “national disease” effectively through scaling up tuberculosis control as well as the

health system. Tuberculosis declined rapidly: the mortality became one tenth by 1970 [5]. In the meantime, the universal insurance coverage was achieved in 1961 [8]. We analyzed how Japan brought the “national disease” under control and addressed the dilemma effectively. We assessed the interaction between the tuberculosis control and health insurance by using the recently developed concept of control knobs for health system performance [9].

2. METHODS

We reviewed articles and documents that describe policies, strategies and activities on the development of tuberculosis control and the national health system in the post-World War II period [4, 5, 7, 8, 10-22]. We also reviewed documents describing policies, strategies and activities in the pre-World War II period (i.e. before 1945) [23]. We interviewed a number of experts on tuberculosis control and/or health system development who had hand-in experience on the activities in 1950s and 1960s [24, 25].

In our analysis on the scale up of tuberculosis control as well as health system, we used the recently developed concept of the “control knobs” for health system performance [9]. Control knobs are the major five instruments that governments use for structuring the health system, and eventually to achieve the goals of health systems: i.e. overall health status, financial risk protection, and customer satisfaction. The control knobs include *finance, payment, organization, regulation* and *behavior*. The Box explained the nature of these control knobs.



3. FINDINGS

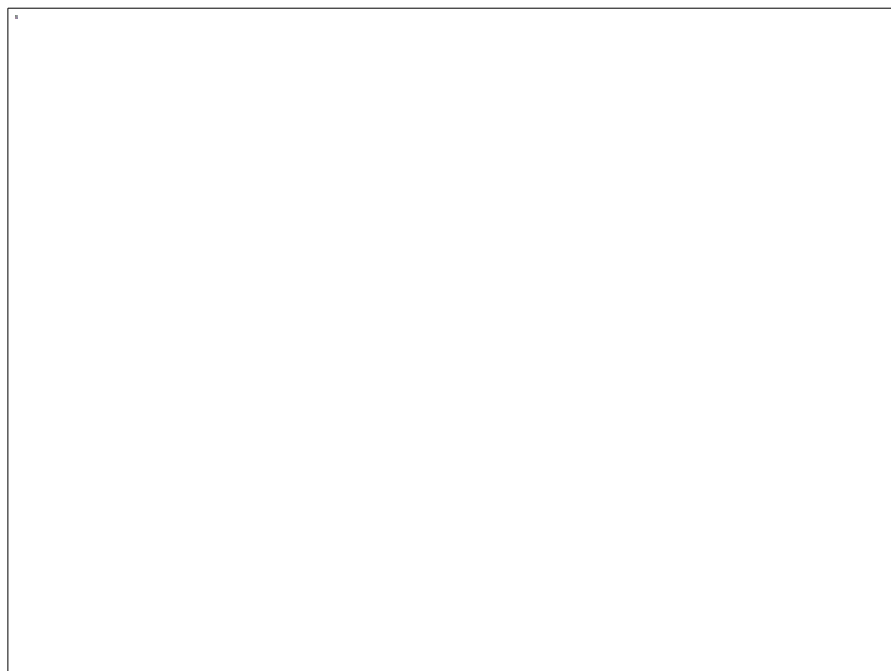
Situation of economy, health and tuberculosis in 1950

The World War II came to an end in Japan in August 1945. The War brought insurmountable damage throughout Japan. Almost 3 million people died and one quarter of the national property was lost [20]. The economic difficulties were significant. In the 1950 current dollars, GNP per capita was only US\$ 114, or JPY 40,397 [3]. The Japanese GNP per capita was in the same range with that of the Philippines or Malaysia (US\$ 1070 and US\$ 1559, respectively), and significantly less than that of the USA and the United Kingdom (\$ 9,561 and \$ 6,939, respectively) (1990 International Geary-Khamis dollars) [26].

Health status was also seriously deteriorated as poverty, malnutrition, and poor living condition prevailed. Infant mortality rate was 63 per 1,000 live births, while it was 29 in the USA and 102 in the Philippines [3].

The life expectancy was 52 years, while it was 67 years in the USA. Infectious diseases were rampant, and outbreaks of cholera, typhus fever and smallpox which were previously contained occurred again [8]. Two out of the three leading causes of deaths were infectious diseases: tuberculosis at the top and bronchopneumonia on the third [5].

The epidemic of tuberculosis was extremely serious [5, 10, 11, 13, 14]. The disease was the leading cause of death, accounting for 15% of all deaths. The mortality rate was extraordinary high: around 200 per 100,000 population. This rate was three to four times higher than that of industrialized countries at that time; 22 per 100,000 population in the USA and 55 in England & Wales [5]. The rate was actually closer to that of developing countries: 200 in the Philippines and 174 in Singapore. Even in comparison with the current world, the Japanese mortality in 1950 is still extraordinarily high as shown in the Graph 1 [1].



The impact of tuberculosis was significant in the field of economic development as the epidemic resulted in the loss of labor forces. For example, 2.3% of labor forces in Tokyo were found, through mass screening, to have active tuberculosis and were in need of sick leave [6]. In a large bank with around 16,000 staff members, 243 of them, i.e. 1.5% of total, had developed tuberculosis in one year[6]. Tuberculosis was indeed the “national disease.”

Health system and its scale up strategy in 1950

The Japanese health system was built on the German social insurance model [21, 22]. The insurance was firstly introduced in 1926 for manual workers, followed by the introduction of the Citizens’ Health Insurance for self-employed in 1938. The insurance plans could be categorized into three: society-managed health insurance for large-firm employees with an insurance society as insurer; government-managed health insurance for small-firm employees with government as insurer, and; citizens’ health insurance for self-employed persons with municipalities as insurer. Unlike the original German system, the Japanese government took more active role by providing the insurance coverage, and insurance concentrated on financing rather than developing its own health care systems[22].

After the War, the insurance plans were seriously damaged [8]. Almost half of labors previously insured with society-managed or government-managed insurance became uninsured as they lost their jobs. Citizens’ health insurance also stopped functioning as insurers, i.e. municipalities, could not collect premiums nor conduct administrative management due to the post-war confusion. In 1950, not more than 40% of the entire population was covered with health insurance [4].

In 1946, Japan

promulgated the new Constitution that identified the overall principles for the reconstruction of the country. The Chapter 25 of the Constitution stated the basic idea for the Japanese public health [19]: “All people shall have the right to maintain a certain standard of healthy and cultured life, and, to achieve this purpose, the state shall try to promote and improve the conditions of social welfare and security, and of public health.” The Constitution was the cornerstone of the massive demilitarization and democratization reform that Japan experienced under the occupation by the USA.

The universal coverage of health insurance was the core of the health system scale up [8]. The universal coverage was firstly discussed by the Council for Social Services that was established in 1949 as a consultative body to the Prime Minister. In early 1950s, the presence of a large number of uninsured populations, almost one-third of the total population, became a political agenda. The government in response developed strategies to achieve the universal coverage of health insurance. The following is the summary of the strategies along with the five control knobs.

Financing: University coverage of health insurance particularly through expansion of the Citizens’ health insurance was the basic strategy. To facilitate this, the National Health Insurance Act was enacted in 1958. Under the Act, all municipalities had to establish their own insurance plan by the Japanese fiscal year 1960 [19]. In order to ensure sufficient financing, the governmental started providing government subsidies for the citizens’ health insurance and the government-managed health insurance. The Japanese financing system is a hybrid of social insurance and tax-based models [21, 22].

Payment: Fee-for-service was the basic strategy. Physicians and hospitals were covered by the same fee-for-service schedule [21, 22]. Billing to insurers and the payment to providers were centralized through the payment fund or the National Health Insurance fund, established at the prefecture level. Evaluation is based on the information contained in the bill.

Organization: The network of clinics and hospitals was the core organization for clinical services [21, 22]. Japan

had a good network of private general physicians who owned the clinics. The majority of the out-patient services were provided by them. As for the public health services, the newly developed network of public health centers were the core. The network was built based on the Health Center Law enacted in 1947. The Law requested all prefecture and large municipal governments to establish one center every 100,000 population in general to provide public health services. The centers carried out preventive and environmental activities, but not for clinical services.

Regulations: The government enacted and revised laws and regulations on public health. These included revision of the Health Insurance Law originally issued in 1922, Health Center Law in 1947, Child Welfare Act in 1947, Medical Care Act in 1948, and Inoculation Act in 1948.

Behavior: The network of public health centers was the core. The public health nurses working at the centers conducted extensive community visits and health education to address important health matters such as family planning, environmental health, nutrition, and disease control including tuberculosis.

Scale up strategy for tuberculosis control

Japan

had long attempted to control tuberculosis. Tuberculosis was already epidemic before the War. Tuberculosis was the leading cause of death from 1935 [5, 13] and was the national concern as it affected labor and military forces. The government enacted a Tuberculosis Control Law in 1919, and took a series of activities [23]. However, tuberculosis remained epidemic and the mortality did not decline during the pre-War period. It was because of difficult social and economic conditions and lack of medical interventions except for isolation and rest.

After the War, tuberculosis remained national concern. The Government firstly enacted a new Tuberculosis Control Law in 1951, and defined a new tuberculosis control strategy. In comparison with the “old” Law that aimed at preventing the disease transmission, the “new” Law aimed at establishing comprehensive tuberculosis control in accordance with the latest knowledge and technologies [13]. The Law was composed

of policies relating to the disease prevention, financial risk protection and provision of appropriate care for tuberculosis patients. The Law included the following items [19]:

- Annual mass screening for persons who work in designated occupations or who live and work in groups like schools, and for people who live in areas where tuberculosis prevalence is high.
- Annual vaccination with BCG, if needed, for persons less than 30 years of age.
- Systems for registering patients at public health centers and for home visits by public health nurses
- Governmental subsidies to partially cover the tuberculosis care expenditure so as to expand proper care for tuberculosis patients.
- Improvement of public medical institutions, particularly tuberculosis hospitals or beds.

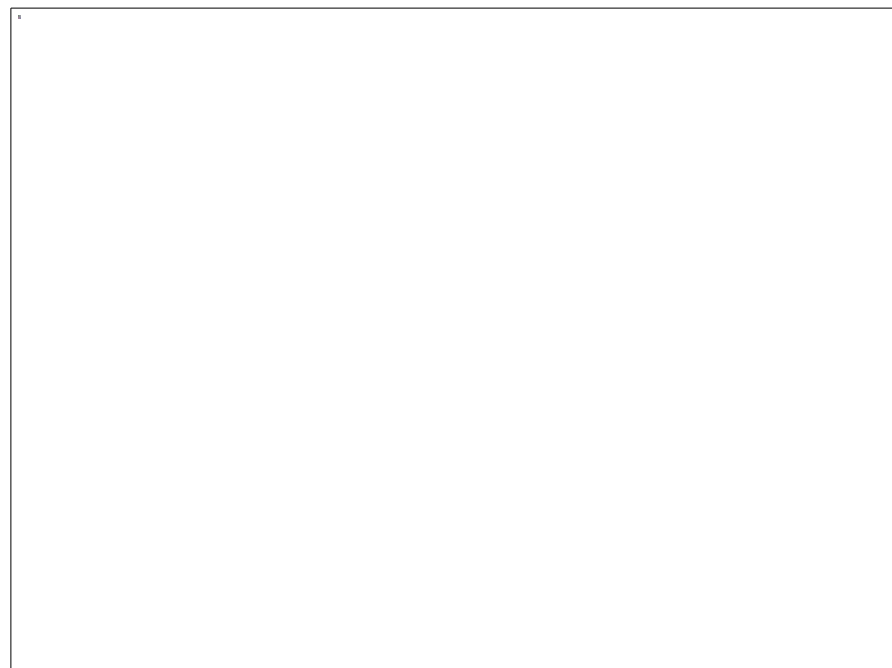
The Government also issued the guidelines for tuberculosis care in 1952 [13] which defined the set of medical interventions that could receive the governmental subsidies. As far as treatment is concerned, only streptomycin and PAS (Para-Amino-Salicylic Acid) were available in 1950; isoniazid became available from 1952. The main treatment methods in those years were, in addition to treatment with anti-tuberculosis drugs available, artificial pneumothorax, surgical resection of the affected parts in the lung and isolation.

Scale up activities for tuberculosis control

Along with the principles defined in the Tuberculosis Control Law, the Government started taking comprehensive actions. The following are the summary of these activities along with the five control knobs.

Financing

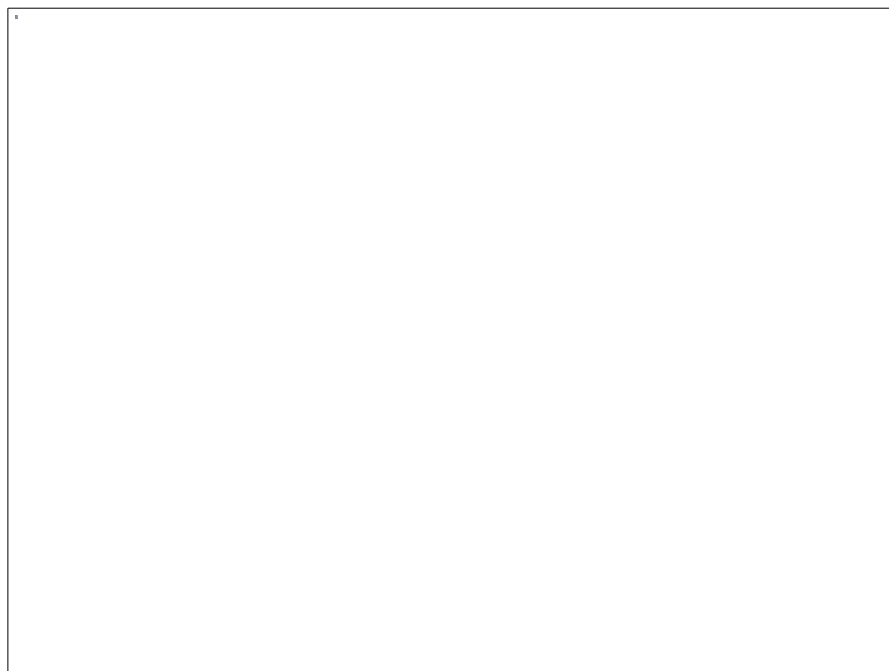
Financing for tuberculosis care was a serious problem. The total cost of tuberculosis care was extremely high because of the high burden of the disease. For example, in one insurance society in Tokyo, almost 50% of its total expenditure was spent for tuberculosis care (GRAPH 2) [10]. When the government started analyzing the national health expenditure (NHE) from 1954, expenditures on tuberculosis care accounted for 28% of the NHE [27]. Solving the financial problem for tuberculosis care was perceived as the first step in establishing the Japanese health insurance system, and the government was requested to take corrective actions.



In response, the government started providing governmental subsidies for tuberculosis care as defined by the Tuberculosis Control Law [13]. The degree of coverage of subsidies varied according to the type of

tuberculosis. For infectious patients, it was aimed to cover the entire cost of care: 50% by the governmental subsidies and 50% by their insurance plans. The government subsidies also covered the 50% of the cost of construction of tuberculosis beds in public sector as there was serious shortage of tuberculosis bed.

The subsidies helped to ensure financial risk protection for tuberculosis patients. Proportion of out-of-pocket payment to all expenditure became less than 20% among tuberculosis patients, while it was still close to 40% in overall NHE (GRAPH 3). The number of tuberculosis beds was doubled from 125,000 in 1945 to 260,000 in 1955. In 1961, the government started covering the entire cost of essential care for infectious patients with subsidies. This further decreased the proportion of out-of-pocket payment among tuberculosis patients to less than 10% in 1963 (GRAPH 3). This was the first governmental subsidies for a disease or area specific activity in Japan.



Payment

The fee-for-service payment mechanism was still the base for the payment of tuberculosis care. In addition, the government introduced a system of tuberculosis advisory committee in each public health center as defined in the Tuberculosis Control Law [13]. The committee was composed of several tuberculosis experts, and met every two to four weeks to assess the care of tuberculosis patients in their jurisdiction. When a physician diagnosed tuberculosis, he had to notify the public health center of the case. The notification was accompanied with a request for government subsidies. The request included detailed information on diagnosis and treatment schedule with a copy of chest x-rays. Once the committee approved the request, the government subsidies were provided. When there were different opinions, the committee informed the physician with suggestions.

The committee was primarily aimed at ensuring the appropriate use of the government subsidies. The committee was also a good incentive mechanism for physicians as they could receive payment once they submitted the request: in reality almost all requests were eventually approved. Moreover, the committee was a good quality control mechanism to ensure appropriate care. This was an innovative win-win mechanism.

Organization

The existing network of general physicians was the base for tuberculosis care. They made diagnosis and provided treatment for those hospitalizations were not needed. In early 1950s, artificial pneumothorax was the main treatment tool, and general physicians extensively conducted the procedure in their clinics.

In the meantime, beds for tuberculosis patients were important and there were absolute shortages of tuberculosis beds: only around 100,000 beds for tuberculosis patients in 1950 [27]. The government developed a plan to increase the number of beds to 190,000 by 1956, and started providing subsidies. The government then realized that the real need was much higher – the national tuberculosis survey in 1953 indicated that 1.4 million tuberculosis patients might need hospitalization – the government revised the plan to increase the beds to 260,000 by 1964.

At the same time many big companies established their own network of tuberculosis care for employees [6]. They developed tuberculosis clinics with fulltime staff, and conducted mass screening for employees. Some of them even constructed tuberculosis beds adjacent to the existing tuberculosis sanatoriums. This was the beginning of health care activities for many companies in Japan.

The public health centers were the core for public health activities in tuberculosis control [13]. They carried out arrangement for mass screening, registration and monitoring of patients, and screening of household contacts. The multi-purpose public health nurses spent considerable time for tuberculosis care. For example, a total of 50,000 home visits and 120,000 health consultations were made in one month in Japan; of which 45% and 33% were relating to tuberculosis, respectively [10]. The advisory committee also played a critical role. Tuberculosis control was the core activity for the centers in 1950s and 1960s.

Regulations

The Tuberculosis Control Law enacted in 1951 set the legal framework. The government also developed treatment guidelines that would facilitate the appropriate implementation of the Law.

The Law was constantly updated to accommodate the latest findings and changes. For example, in 1953, the first national tuberculosis survey found that tuberculosis was almost ubiquitous throughout Japan. In response, the Law was revised in 1957 to expand the mass screening activities to entire communities: prior to that, the screening was conducted only in highly prevalent areas. The second national survey in 1958 found that the burden of tuberculosis was still much higher than expected. In response, the Law was revised in 1961 to extend the governmental subsidies to cover the entire cost for infectious patients: prior to that, subsidies covered only 50% of the cost – the remaining was covered by insurance plans.

This Law was very unique and important. This was the first law enacted for a specific disease or area in public health. This was also the first law defining the provision of governmental subsidies for a specific disease.

Behavior

Public health nurses conducted extensive activities for behavior change as discussed above. Non-governmental organizations, particularly the Japan Anti-tuberculosis Association and the Anti-Tuberculosis Women’s Association also played important role [16]. The Anti-Tuberculosis Association was founded in 1939, and conducted numerous activities including promotion of mass health screening, health education and provision of tuberculosis care after the War.

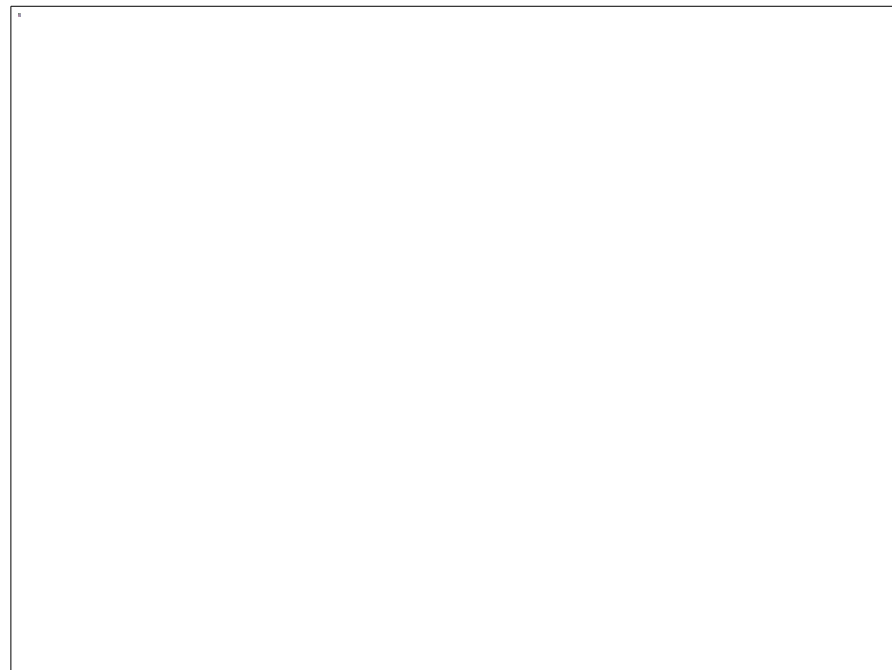
The Women’s Association has a unique background. In 1950, a tuberculosis outbreak occurred in one elementary school, and affected many students. Mothers of the students organized an association in response. The association was gradually extended its network and became a national organization in early 1960s in coordination with the Anti-Tuberculosis Association. The Women’s Association was active in mobilizing communities to mass screenings.

Progress towards 1970

The government rigorously implemented the above activities. As the universal insurance coverage was achieved in 1961 and the governmental subsidies were made available, tuberculosis patients could receive care without worrying about catastrophic expenditures. Patients with infectious tuberculosis could receive care without out-of-pocket payment. The three technical cores, i.e., mass screening, vaccination, and appropriate care, were expanded through the network of public health centers, general physicians and

tuberculosis inpatient facilities. The tuberculosis advisory committee played a critical role for the provision of appropriate care.

Subsequently, the epidemiological situation of tuberculosis improved rapidly.[5] In comparison with 1950, tuberculosis mortality reduced by 50% in 1955, 80% in 1960, and 90% by 1970. (GRAPH 4). From 1951, tuberculosis became no more the leading cause of death in Japan: 5th in 1955, 7th in 1960 and only 13th in 1970. Japan managed to produce one of the most rapid declines of tuberculosis mortality in the world from 1950 to 1970: almost 12% annual reduction.



Along with the decline of the disease burden, national expenditure on tuberculosis care as a proportion to the total NHE showed constant and rapid decline (GRAPH 4). It was 27% to the total NHE in 1955, 18% in 1960, and was only 5% in 1970. The absolute amount of expenditure in reality had increased till 1968; however it was due to the continued, rapid increase of the entire national health expenditure. All in all, by 1970, tuberculosis became no more a disease with serious burden in Japan.

4. DISCUSSIONS

Many developing countries face the epidemic of tuberculosis and need to scale up tuberculosis control. At the same time their overall health systems are quite often weak and in need of scaling up. With the limited resources available, effective scale up of tuberculosis control is a parallel dilemma.

One approach to address the dilemma is to give focused support to disease-specific interventions like establishing a network of tuberculosis centers and hospitals to accommodate all tuberculosis patients. This approach was common during the era of mass campaigns in 1950s and 1960s [28, 29], and was discussed again when the concept of selective primary health care was introduced around 1980s [30, 31]. Many tuberculosis control programs in developing countries have the influence of this approach, and are often called as vertical programs. The verticality of this approach would certainly strengthen the targeted disease control, as demonstrated in the small pox eradication campaigns [32]. However, the impact of this vertical program to the development of overall health systems to which the program belongs is a long debate[33, 34], and unfortunately without explicit conclusions.

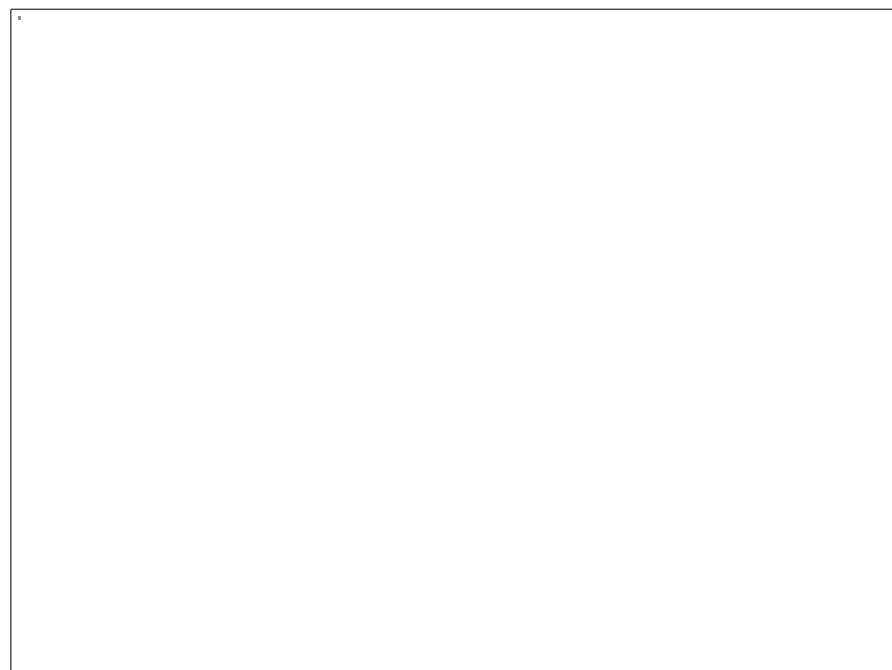
Another approach is to comprehensively strengthen the overall health system with the expectation that, once the system is extended, disease control would be addressed effectively as an integral part of the overall system. This approach is often called as integrated approach, was elaborated when the concept of primary health care was emerged in 1970s[35, 36], and also re-emphasized along with the introduction of the health

sector reform including sector-wide approaches in 1990s [37, 38]. There is no doubt about the need to improve overall health systems. However, unfortunately, integration may not always lead to the improvement of the specific services[39], and more importantly, improvement of overall health systems was not satisfactory in many developing countries and tuberculosis remained epidemic: let alone HIV/AIDS and malaria[1, 40].

Japan

in 1950 took an intermediate approach. The scale up was based on integration, and at the same time specific mechanisms were added: For *Financing*, social insurance plus governmental subsidies; for *Payment*, fee-for-service plus tuberculosis advisory committee; for *Organization*, network of general physicians and public health centers plus tuberculosis beds; for *Regulation*, comprehensive laws plus tuberculosis control law, and; for *Behavior*, public health nurse plus anti-tuberculosis NGOs (Table 2). This is not pure integration as disease specific mechanisms were installed. It is however not a pure vertical approach as Japan

did not developed tuberculosis-specific health facilities except for beds for hospitalization. We therefore call this approach as integration-based scale up (TABLE 1).



This integration-based scale up worked very well in Japan for the establishment of comprehensive tuberculosis control. Access to appropriate care was ensured and financial risk protection was achieved. The disease declined extremely rapidly and became no more the “national disease.”

The integration-based scale up was a reflection of the vision that public health officials had in those years. The vision was to establish a health system in line with the basic ideas defined in the new Constitution. At the same time, public health officials had to address the “national disease.” They sought pathways to scale up tuberculosis control within the framework of health system scaling up. They therefore integrated tuberculosis control into primary health care but added disease specific mechanisms as needed. There was a clear philosophy and approach among them: that is to say “Think PHC, Do TB” [24].

It is quite interesting to assess why Japan did not take a vertical approach: namely establishing a network of tuberculosis clinics. The “Think PHC, Do TB” philosophy certainly was the factor. There were also practical reasons behind. The demand for the then treatment, namely artificial pneumothorax, was extremely large and only the network of private general physicians could meet the demand. Government could not even think of establishing a network of tuberculosis clinics [25]. Moreover, treatment of tuberculosis patients was a good source of income for general physicians: it was said that one general physician can earn the living should he have three tuberculosis patients [18]. The strong political power that the Japan Medical Association, a network of general physicians, had was also an important factor[8]. The Association never allowed missing this source

of their income.

At the same time, it is worthwhile noting that the additional mechanisms introduced for tuberculosis control became precursors when similar mechanisms were introduced for other diseases and health problems in later years (TABLE 1). A good example is the regulation for the care of the intractable diseases that was installed in 1972[8, 41]. Governmental subsidies were provided for the care of these difficult to treat diseases. Such mechanisms took place smoothly as administrative, legal and even political matters had already been discussed and cleared when the mechanisms were firstly introduced for tuberculosis control [24].

External uniqueness of Japan certainly contributed to the drastic improvement of tuberculosis situation [7]. Japan enjoyed the rapid economic growth and social development after 1955: per capita GNP continued to increase around 8% annually [8]. The government was able to finance all scale-up activities needed. The presence of good medical infrastructure was also important. The network of general physicians was already significant in 1950: 92 physicians per 100,000 population [6]. The stability of the country was an advantage: no war or political instability after the War. The absolute impact of the external uniqueness on the epidemiology of tuberculosis is difficult to measure. However, the external uniqueness surely made significant impact in Japan as observed in other industrialized countries [42].

In developing countries, such external uniqueness does not always, if not at all, exist. Japanese experience on integration-based scale up therefore may not simply be replicable in developing countries. Moreover, Japan in 1950 was a country with full of hope and will for the national reconstruction. Addressing the “national disease” was directly linked to the national development both in terms of welfare of the people and economy of the country. Unfortunately, many of the current developing countries are to some, if not large, extent in the long-term struggle from development failures.

However, we still believe the Japanese experience is meaningful for the current world where tuberculosis is epidemic and an extremely large amount of funds is seemingly available. These funds are generated through the global initiatives like the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the “3 by 5” initiative for HIV/AIDS. The initiatives already indicated the importance of scaling up of health systems at large to make disease specific intervention success [40]. The Japanese experience based on the “Think PHC, Do TB” philosophy is an interesting example. For instance, it would be fascinating if the initiatives allocate the resources primarily for health systems and their scale up, and then attempt to scale up tuberculosis together: instead of directly investing disease control.

In 1950, Japan faced the extraordinary epidemic of tuberculosis. The government developed a framework for scaling up the health system. The framework was used for tuberculosis control and its scale up, and disease-specific measures were added. This integration-based scale up worked very well in Japan. Tuberculosis mortality declined rapidly. Unique externalities that Japan enjoyed certainly contributed to the improvement significantly. However, the vision that public health official had played a critical role. Whether this vision, “Think PHC, Do TB” can be implemented at present is an important challenge to us.

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