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## Chapter 5 Infectious Diseases Control

### (Tuberculosis, Parasitic Disease, Immunization Programs)

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The number of deaths from infectious diseases reached 11,120,000 worldwide in the year 2002, accounting for some 20% of all deaths<sup>1</sup>. For example, every year 8 million people contract tuberculosis (TB), and 2 million die from this disease. The incidence of TB is rising sharply in Africa due to the spread of HIV/AIDS<sup>2</sup>. Although there are quite a large number of people infected with parasites and its disease burden is high, parasitic disease control tends not to have a high priority due to relatively lower mortality rate than other infectious diseases. These infectious diseases are not just a problem for the health of the individual, but a major obstacle to the economic and social development of developing countries, and infectious diseases control is one of the core issues of Poverty Reduction Strategy Paper. Moreover, infectious diseases in developing countries can no longer be ignored in developed countries after the progress of globalization.

Infectious diseases such as cholera and TB were the greatest health problems in Japan; however, during the short period from the end of the World War II to present, Japan has successfully reduced morbidity and mortality from infectious diseases to a great extent through policy formulation by central and provincial governments and activities of private organizations. Using the lessons from its own experience, Japan has expanded its cooperation programs of infectious disease control in a number of countries. Japan has strengthened its commitment strategically, in particular, the “Hashimoto Initiative” in 1998 having commenced the promotion of parasitic

disease control based on Japan’s experience, and the “Okinawa Infectious Disease Initiative (IDI)” with commitment of US\$3 billion over a 5 year period.

In this chapter, first a historic overview of infectious diseases control activities in Japan will be introduced. Then we will study what can be applicable to developing countries among Japan’s experience by reviewing TB and parasitic diseases control programs in which Japan was particularly innovative. We will also review activities in the area of immunization programs, an essential part of infectious disease control. Two appendices discuss activities in Japan for the control of HIV/AIDS, a major challenge in many developing countries, and the actions taken regarding Hansen’s Disease (leprosy) that caused much regret and soul-searching.

### 1. Trends in Infectious Disease Control

#### 1-1 Acute Infectious Disease Control Phase (1868~1919)

Epidemics of acute infectious diseases, including cholera, bubonic plague, and smallpox, brought from overseas were frequent as the trade with countries abroad was initiated after Japan opened the country to the world in Meiji Era (1868~1912). The damages of epidemics prevail nationwide as the movement of people and goods within the country also increased<sup>3</sup>. The greatest challenge of this era was acute infectious diseases control.

As a part of the immunization program, the

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<sup>1</sup> WHO (2003)

<sup>2</sup> *ibid.* (2002)

<sup>3</sup> Kawakami, Takeshi (1965) *Gendai Nihon Iryoshi - Kaigyosei no Henesen* [Japan’s History of Modern Medical Care - History of System of Medical Practitioners] Keiso Shobo.

**Table 5-1 Cholera Patients and Deaths**

Year	No. of patients		No. of deaths	
	Number	Per 100,000 population	Number	Per 100,000 population
1877	13,816	38.5	8,027	22.4
1878	902	2.5	275	0.8
1879	162,637	446.0	105,786	290.1
1880	1,580	4.3	618	1.7
1881	9,387	25.4	6,237	16.9
1882	51,631	138.6	33,784	90.7
1883	669	1.8	434	1.2
1884	904	2.4	417	1.1
1885	13,824	36.1	9,329	24.3
1886	155,923	404.6	108,405	281.3
1887	1,228	3.2	654	1.7
1888	810	2.1	410	1.1
1889	751	1.9	431	1.1
1890	46,019	115.3	35,227	88.3
1891	11,142	27.7	7,760	19.3
1892	874	2.2	497	1.2
1893	633	1.5	364	0.9
1894	546	1.3	341	0.8
1895	55,144	132.7	40,154	96.6

Source: Number of cholera patients and deaths from Kawakami, Takeshi (1965) p. 131. Rate per 100,000 population calculated from estimated population on January 1 each year according to the Statistics Bureau of the Prime Minister's Agency.

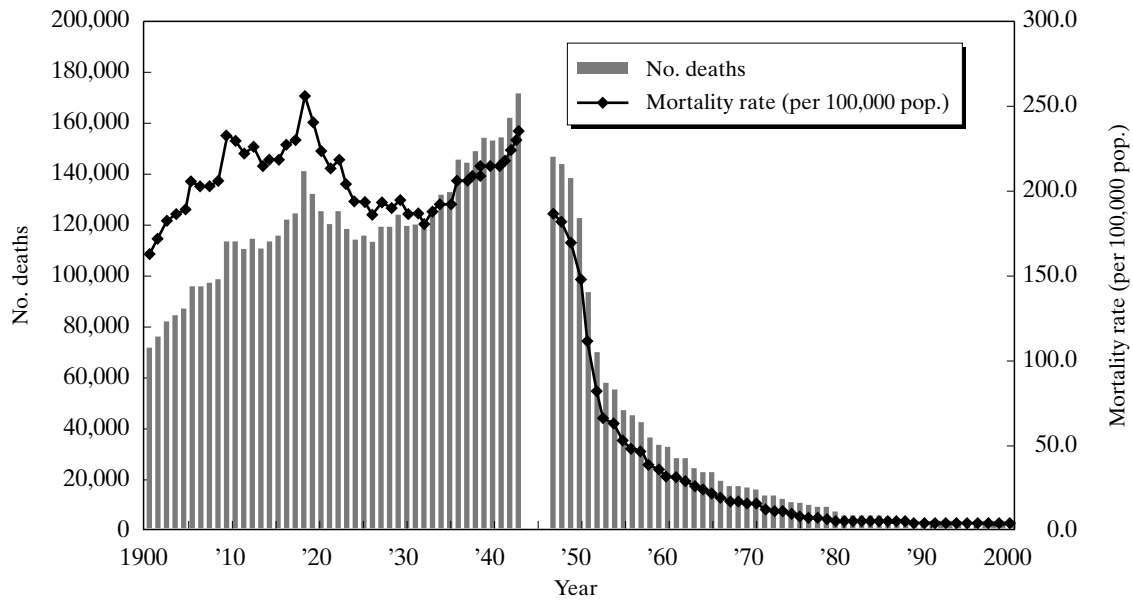
Meiji government set up a Vaccination Center at the 'Daigaku-Higashiko' (literally means 'University East Building' and later the University of Tokyo) in 1870, and promulgated the 'Vaccination Regulations' in 1874. In 1876, the 'Vaccination Regulations' were repealed, and replaced with the 'Medical Vaccination Regulations' and the 'Smallpox Prevention Regulations'. As a part of cholera control, the "Guide to Cholera Prevention" was issued in 1877, followed by the "Provisional Regulations for the Prevention of Cholera" in 1879. The "Central Sanitary Bureau" was also established in 1879 as an advisory body for cholera control. Emergency measures were instituted including the establishment of quarantine hospitals beginning with the "Cholera Quarantine Hospital" (1879, headquarters in Tokyo). All of these measures did not have much success, however, with the death toll

in the cholera epidemic of 1879 exceeding 100,000 (see Table 5-1).

In 1880, the "Infectious Disease Prevention Regulations" were issued as a comprehensive preventive code, making it mandatory to report six infectious diseases: cholera, typhoid fever, dysentery, diphtheria, epidemic louse-borne typhus, and smallpox. This regulation resulted in the establishment of a continuously working prevention program and enabled rapid response when necessary. However, cholera outbreaks occurred every few years until the end of the 19th century.

In 1879, the national government introduced "Municipal Public Health Committees," publicly elected by the local residents as community-based epidemic prevention organizations to deal with a lack of finances and personnel. This was a revolutionary concept for the time, mobilizing

**Figure 5-1 Tuberculosis Deaths**



Source: Research Institute of Tuberculosis website (<http://jata.or.jp>)

government and citizens working together to solve public health problems<sup>4</sup>. As the centralization advanced, however, local public health systems underwent radical reform after local administrative structures were extensively reformed in 1885. The Department of Police took charge of public health administration at the local level, and the Municipal Public Health Committee system was abolished. The Department of Police had been responsible for public health administration until the end of the World War II in 1945.

Programs against cholera and other acute infectious diseases having showed some success, in 1916 the Ministry for Home Affairs established the “Health and Sanitation Research Committee.” It was revealed for the first time by the nationwide surveys this committee conducted that disease burdens of chronic infectious diseases such as TB, infant mortality, and problems with the physiques and health of the populace were markedly more serious than in other countries.

TB spread throughout the country as the young workers, particularly women, drawn from rural areas into the cities hoped to find jobs in the

industrial revolution, and then spread infections in their hometowns after they were laid off when they became infected with disease in poor working and living conditions. Communal living conditions, such as in the armed forces and school dormitories, also increased TB infections. Having spread across the country in this way, TB was referred to as the “national scourge.” Mortality from TB continued to climb after 1912, peaking at 140,000, or a mortality rate of 257.01 (per 100,000 population), in 1918 (see Figure 5-1). Although Dr. Robert Koch identified the tubercle bacillus in 1882, at that time there was no effective treatment but build-up of physical strength by rest, nutrition and clean air.

In response to the wide spread of TB, the first intervention taken by the Ministry of Home Affairs was the “Regulations for the Prevention of Pulmonary Tuberculosis” issued in 1904. The directions by the regulations were quite simple such as instructing public institutions e.g. hospitals and hotels, to disinfect rooms used by TB patients, hospitals not to place TB patients in the same room with patients of other diseases, and public facilities e.g. schools and government offices, to provide

<sup>4</sup> *ibid.* p. 133-134

spittoons. However, they were effective in increasing public awareness of TB<sup>5</sup>. Afterwards the “Factory Hygiene Data” compiled by the detailed survey of the health status and working and living conditions of workers in mines and factories in 1910 revealed the TB infection route from mines and factories to rural villages. This result urged the government to enact the “Law Regarding the Establishment and Government Assistance of Pulmonary Tuberculosis Sanitaria” in 1914. Furthermore, the “Tuberculosis Control Law” was enacted in 1919, with measures such as the prohibiting TB patients who were potential sources of infection from working, and forcing public institutions to establish TB sanatoria. Fundamental measures for the control of chronic infectious diseases were established during this period<sup>6</sup>.

## **1-2 Chronic Infectious Disease Control Phase (1920~1944)**

TB remained a major national challenge during this period. The armed forces that relied on the recruitment in rural villages were concerned that the spread of TB in villages might lead to a deterioration of military strength. The military initiated a TB preventive program nationwide since they deemed it necessary to institute a strong strategy involving the entire population in the fight against TB in terms of the “*Kenpei-Kenmin* (Healthy Soldier, Healthy People)” concept. In the absence of an effective treatment for TB at that time, the strategy depended heavily on early detection, notification, and quarantine after all.

Although the “Tuberculosis Control Law” was enacted in 1919, Japan did not engage fully in anti-TB programs until the submission of a report by the Health and Sanitation Research Committee in 1934. Based on this report, in 1937 the Tuberculosis

Prevention Law was revised, public health centers were established, the registration system of TB patients was adopted, and the number of sanatoria was increased.

A non-profit foundation representing the collaboration of governments, academia, and the private sector, the “Japan Anti-Tuberculosis Association” (JATA), was established in 1939 with an Imperial household initiative, merging the Japan Tuberculosis Prevention Association, a non-government organization formed in 1913. JATA remains today the central organization in tuberculosis control programs in Japan. Also in 1939, the administration of the TB prevention was strengthened with the establishment of a Tuberculosis Division within the Prevention Bureau of the Ministry of Health and Welfare. Japan promoted build-up of physical strength of the people with the emphasis on TB control for the young by enactment of the National Physical Strength Law in 1940.

## **1-3 Post WWII Acute and Chronic Infectious Disease Control Phase (1945~1960)**

### **1) Epidemic Louse-borne Typhus During the Period of Disorder after WWII**

During the period immediately following the end of the World War II, the living standard of the people drastically got worse. This led to epidemic outbreaks of louse-borne typhus at that time. Over 32,000 cases were reported in the year 1946, and this led to a lice extermination program that was strongly supported by the General Headquarters of the occupying forces (GHQ). In 1946 an average of 10 supervisors for insect and rodent pest extermination were posted in each of 205 cities and at the same time, 10,000 community-based “Extermination Groups” were organized<sup>7</sup>. These

<sup>5</sup> Murakami, Yoichiro (1996) *20 Seiki no Nihon (9) Iryo - Korei Shakai he Mukatte* [20 Century's Japan (9) - Medical Services - Toward Aging Society] Yomiuri Shimbun Sha. p. 50.

<sup>6</sup> Suzuki, Shosuke and Hisamichi, Shigeru eds (2003) *Shinpuru Eisei Koshueisei-gaku 2003* [Simple Hygiene and Public Health 2003] Nanko do.

<sup>7</sup> Ministry of Health and Welfare (1988) *Kosei Sho Goju-nen Shi (Kijutsu-hen)* [Fifty Years' History, Ministry of Health and Welfare (Descriptive Version)] Kosei Mondai Kenkyukai.

**Table 5-2 History of Infectious Disease Control**

1897	Enactment of Communicable Disease Prevention Law (8 target diseases: cholera, dysentery, typhoid fever, smallpox, epidemic louse-borne typhus, scarlet fever, diphtheria, and bubonic plague)
1910	Enactment of Vaccination Law
1919	Enactment of Tuberculosis Control Law and Trachoma Prevention Law
1932	Enactment of Parasitic Disease Prevention Law
1939	Establishment of Japan Anti-Tuberculosis Association
1947	Establishment of Institute of Public Health (now National Institute of Infectious Diseases)
1948	Enactment of Immunization Law (vaccinations against 12 diseases)
1951	Revision of Tuberculosis Prevention Law completely
1959	Support for care and education for children with tuberculosis, outbreak of polio in Hachinohe, Aomori Prefecture
1961	Emergency importation of polio vaccines and nationwide immunization program
1964	Revision of Immunization Law (live polio vaccine legislated)
1981	Infectious disease surveillance program commenced
1983	Trachoma Prevention Law repealed
1987	Commencement of Tuberculosis and Infectious Diseases On-line Surveillance System
1994	Tuberculosis Control Law revised
1998	Enactment of Laws Regarding Tuberculosis Control and Medical Treatment of Infectious Diseases (Infectious Disease Prevention Laws repealed)
1999	Tuberculosis State of Emergency declared
2001	Revision of Immunization Law

insect and rodent pest extermination programs were incorporated into community-based health organization activities, and expanded nationwide as “No Mosquitoes and Flies Program” launched in 1949. The use of DDT<sup>8</sup>, introduced by the GHQ, led to a marked reduction in fly and mosquito numbers. As a result of the use of insecticides and the activities of community volunteers, the incidence of acute infectious diseases associated with poor hygiene was rapidly reduced.

## 2) Trachoma and Parasitic Diseases

Although the Trachoma Prevention Law was promulgated in 1919, trachoma was still endemic after World War II. The prevalence was 214.3 (per 100,000 population) in 1949. Particularly in some fishing and farming villages, prevalence between 10 and 50% were not uncommon<sup>9</sup>. Since 1947, the date

of October 10 every year has been designated as “Sight Day,” when the Ministry of Health and Welfare, prefectural governments and other organizations have cooperated in presenting activities on eye hygiene and trachoma prevention. The Trachoma Prevention Law had undergone several revisions since 1947, increasing the level of subsidy for medical costs from the national and prefectural governments. In 1954, notification of trachoma cases by medical practitioners to their local public health center manager became mandatory.

Parasitic diseases also spread throughout the country, affecting the health of the populace. Rural villages used urine for fertilizer, and this recycling system served to recirculate parasite eggs among people. An improved urine-separating toilet did not get popular in spite of the national government promotion since the pre-World War II era.

<sup>8</sup> The manufacture of DDT is now banned due to residual toxicity and adverse effects to human health.

<sup>9</sup> Ministry of Health and Welfare (1988) *Kosei Sho Goju-nen Shi (Kijutsu-hen)* [Fifty Years’ History, Ministry of Health and Welfare (descriptive version)] Kosei Mondai Kenkyukai.

The Ministry of Health and Welfare then promoted a system of regular mass screening and deworming, as well as a prevention awareness program. Community organizations such as the Tokyo Association of Parasite Control played a big role in these parasitic disease control activities. Mass deworming programs were conducted at schools and workplaces, aiding in a dramatic reduction in the incidence of roundworm prevalence within ten years after the end of WWII.

### 3) Tuberculosis

TB control was reinforced comprehensively by a sweeping revision of the Tuberculosis Prevention Law in 1951 to systematize activities into health checkups, immunization, subsidy for TB treatment, registration of TB patients, home visit by public health nurse and so on<sup>10</sup>. The Ministry of Health and Welfare conducted the first National Tuberculosis Survey in 1953, and found more severe endemic status than expected. In order to improve this situation, “Guidelines for Strengthening of Tuberculosis Control Measures” were issued in 1954, and further revisions to the Tuberculosis Prevention Law were made in 1955. Developments in medical science for TB treatment, particularly the development of chemotherapeutics, had a big impact on TB control<sup>11</sup>. With the advent of effective anti-TB drugs, TB was transformed from a fatal to a curable disease<sup>12</sup>.

The national government established the Institute of Public Health (now the National Institute of Infectious Diseases) in 1947 to deal with the spread of infectious diseases, in particular TB, typhoid fever and dysentery. This institute, a testing and research institute under the jurisdiction of the Ministry of Health and Welfare, has conducted basic and applied research into infectious diseases,

and has played a leading role in infectious disease control programs.

Through these nationwide actions, the mortality rate from TB dropped sharply, and “cerebrovascular disease” became the highest mortality rate in 1951. This time in Japanese history is considered a transition period that lifestyle-related diseases and malignant neoplasm (cancer) replaced infectious diseases as major health problems.

### 1-4 Decline of Infectious Disease Phase (1961~1979)

The mortality rate of TB dropped sharply as was described before, and the notification rate has also fallen steadily since the 1970's. In 1975, the notification of TB fell below 100 per 100,000 population for the first time, and the mortality rate of TB dropped below 10 per 100,000 population. At this time, Japan moved from a high to a moderate TB burden country<sup>13</sup>. As a result, the emphasis on TB control also changed from a program aimed nationwide to a program concentrated in areas with a high notification. The improvements of sanitary conditions and nutrition brought by high economic growth led to the decline of the incidence rate of other infectious diseases and people became less concerned about them.

The national government directed prefectural and designated municipal governments to establish “Prefectural and Municipal Public Health Institutes” to improve public health at communities in 1964. It was aimed to establish scientific and technical institutions of local public health administration for research, inspections and food testing in addition to collection, analysis, and dissemination of public health information.

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<sup>10</sup> *ibid.*

<sup>11</sup> *ibid.*

<sup>12</sup> Murakami, Yoichiro (1996) *20 Seiki no Nihon (9) Iryo - Korei Shakai he Mukatte* [20 Century's Japan (9) - Medical Services - Toward Aging Society] Yomiuri Shimbun Sha. pp. 103-108

<sup>13</sup> Shimao, Tadao (1996) *Wagakuni no Kekkaku Taisaku* [Tuberculosis Control in Japan] JAATA BOOKS No. 9, Japan Anti-Tuberculosis Association

### 1-5 Emerging and Re-emerging Disease Phase (1980~present)

The notification rate of TB remains still high in Japan compared with other developed countries even though TB is not referred to as the 'national disease' anymore due to the drop of its notification as it used to be<sup>14</sup>. The number of newly notified TB cases increased slightly in 1997 due to the trend since late 1980's that had increase of cases in the aged and small TB outbreaks in the susceptible young that were born after TB became less common. In 1999 the Ministry of Health and Welfare announced a "Tuberculosis State of Emergency," and instituted a series of programs based on the Tuberculosis Prevention Law, including promoting campaigns to increase public awareness of TB as a reemerging infectious disease, and strengthening the system of health checks, also expanding the system of specialized TB treatment centered on National TB Sanatoria.

The first official report concerning HIV was issued by the Centers for Disease Control and Prevention (CDC) of USA in 1981. In Japan, it was the first step in HIV/AIDS control that an "AIDS Taskforce" was established within the Ministry of Health and Welfare in 1983 to discuss the possible contamination with HIV in non-heat treated blood products imported from the U.S. Until the use of heat-treated blood products was regulated in 1985, a number of people contracted HIV from contaminated blood products. Notwithstanding the arguments put forward by various parties, it is undeniable that the delayed response by the national government increased the number of HIV infections (see Appendix 1).

Since 1990's, the threat of emerging diseases has come to be recognized even in developed countries. Cases of Ebola Hemorrhagic Fever brought from endemic area, outbreaks of Legionella that entered hot springs and water systems, Methicillin Resistant Staphylococcus Aureus

(MRSA) infections spread within hospitals, and food poisonings with the enterohemorrhagic E. coli group (O-157) have been observed globally. Most recently, the severe acute respiratory syndrome (SARS) attracted worldwide attention in 2003.

### 2. Tuberculosis Control Measures

TB remains a major health problem in many developing countries. The public health approaches, which were adopted by Japan and could reduce the incidence and mortality rate from TB rapidly, should therefore be of interest to these developing countries today. In this session, we will introduce the main TB control activities in Japan for the 10-year period commencing in 1946, and discuss which of them may be applicable in developing countries.

According to Ishikawa (1999), five factors contributed to the rapid reduction of TB after WWII in Japan: 1) increased level of national herd immunity due to the high prevalence before and during the WWII; 2) improved social environment and living standards (improvements in economy, nutrition, dwellings, education, social security, health insurance, and administrative structures); 3) improved public health infrastructure (increased numbers of medical institutions, establishment of public health centers, and improved skill base of medical services personnel); 4) strong government commitment to TB control (passing and enacting laws, budget allocation); and 5) promotion of community participation (establishment of Japan Anti-Tuberculosis Association, organization of patient support groups, educational activities by publication and broadcasting). Shima (1996) stated that the lessons learned from Japan's TB control initiatives are: 1) commitment of the national government to conducting TB control measures; 2) training of personnel; 3) participation and cooperation of the community; 4) importance

<sup>14</sup> Ishikawa, Nobukatsu (1999) *Nihon no Kekkaku Taisaku ni Manabumono* [Lesson from Japan's Tuberculosis Control] Public Health, Vol. 58, No. 8. pp. 26-27.

of technical developments; and 5) importance of international cooperation. Of these, the particularly emphasized points are 1), 3) and 4).

In this section, we will examine the present state of TB control programs in developing countries based on the analysis stated above. We will introduce four reference features as Japan conducted TB control when TB prevailed in the country: 1) strong governmental commitment (passing and enacting laws, budget allocation); 2) public health approach; 3) private sector participation; and 4) activities of TB specialists.

## 2-1 Main Tuberculosis Control Activities

### 2-1-1 Strong Governmental Commitment

#### (1) Legislation

TB control was strongly promoted in Japan during the World War II under the leadership of government. The strong governmental commitment can be seen in the legislation process in the relevant laws. The first legislation concerning TB was the 1919 "Tuberculosis Control Law." In the post-WWII period, "Regulations for Notification of Infectious Diseases" were issued in 1947, based on a directive from the General Headquarters of the occupying forces (GHQ) that was keen on tuberculosis control. These Regulations introduced the mandatory reporting of TB patients by medical practitioners to the local public health center within 24 hours after diagnosis. The Immunization Law enacted in 1948 made it compulsory for everyone aged less than 30 to undergo yearly tuberculin skin test, and BCG vaccination based on the test result. In 1951, the Tuberculosis Prevention Law underwent a complete revision, setting in place a comprehensive TB control program.

The revised Tuberculosis Control Law aimed to establish systematic TB prevention measures, and contained regulations for regular health checks, patient registration, infection control, patient

guidance, and medical treatment. It included specifically to: 1) widen eligibility for regular health checks (e.g. workers, school students, people in institution and other places living in groups, residents in areas with high rates of TB); 2) provide BCG vaccination annually to eligible people under the age of 30, or persons living in groups previously regulated under the Immunization Law; 3) to give home visits by public health nurses to TB patients according to the registration that public health centers made from notifications by local doctors; 4) to establish a system whereby the government bore part of the costs of treatment to encourage appropriate TB treatment; and 5) to promote the establishment and expansion of national, public and non-profit TB sanatoria. Ishikawa (1999) applauded this Law as legislation Japan can be proud of, and pointed out the following epoch-making three points: 1) a nationwide network of services (implementation of TB control) was set up, and the responsibilities of the national and local governments were specified; 2) subsidies were provided for preventive and therapeutic activities; and 3) TB treatment was integrated with general medical services.

TB treatment spending grew at this time to reach ¥64.1 billion in 1955, more than a quarter of the total health budget of ¥238.8 billion. The medical expense in hospital for TB was ¥48.8 billion, more than half of those in total<sup>15</sup>. These figures show us just how serious a TB problem was at the time as well as how much effort the country as a whole put into controlling this disease.

#### (2) Adoption and Spread of Screening and Treatment Guidelines

The Japan Anti-Tuberculosis Association (JATA) has played a leading role in TB control, and the government adopted the TB control guidelines produced by JATA, "Mass Screening for Tuberculosis" (1951), and "Therapeutic Guidelines for Tuberculosis" (1961). The screening and

<sup>15</sup> Ministry of Health and Welfare (1988) *Kosei Sho Goju-nen Shi (Kijutsu-hen)* [Fifty Years' History, Ministry of Health and Welfare (Descriptive Version)] Kosei Mondai Kenkyukai. p. 609.



treatment programs in these guidelines were also used as the standard for health insurance, improving the quality of screening and treatment for TB nationwide.

### **(3) Thorough Investigation of the Actual Situation**

Information collected from the system of patient registration at the public health centers, and monitoring activities by public health nurses, are analyzed by the public health centers to understand an accurate picture of the level of TB in the community. Treatment results are also evaluated, and used to improve future treatment regimens and control measures.

Since 1953, National Tuberculosis Surveys have been conducted every five years till 1973, and the results concerning the high notification of TB, and the symptoms of patients with TB, etc., have led to improvements in subsequent TB control programs. The results of these epidemiological surveys analyzed by the Tuberculosis Prevention Research Association, a specialized research institution, have been used to guide political decisions, such as making health checks and immunizations free (1957), and the change of TB control from a nationwide program for high TB burden situation to a more focused approach when Japan became a moderate TB burden country.

## **2-1-2 Public Health Approach**

### **(1) Collaboration between Public Health Centers and Private Medical Institutions**

After the “Tuberculosis Control Law” revision in 1951, the collaboration system between private medical institutions, including general practitioners, as service providers and health centres as specialized institutions for registration and management of patients as well as supervision of diagnosis and treatment was established.

The point of interest here is the involvement of

private general practitioners and their medical institutions into the prevention, diagnosis and treatment of TB. It was the time before the introduction of Universal National Health Insurance, when mostly doctors could consult patients without any standard of medical fee at private medical institutions. Moreover the quality of medical treatment was extremely varied, and did not have much trust from the populace<sup>16</sup>. It can be said that the situation at that time in Japan was similar to that in some developing countries now. In making use of private medical institutions, the Ministry of Health and Welfare sought to ensure the quality of the services, and increase the motivation of the people to have medical services. “Tuberculosis Advisory Committees” (comprising TB specialists, representatives from the Japanese Medical Association, and public health center directors) were organized in public health centers to monitor the quality of TB diagnosis and treatment at the private medical institutions. The Committees could successfully improve the skills in private medical institutions and encourage patients to have access to services through the system whereby subsidies for diagnosis and treatment could be withheld when the quality of diagnosis or treatment did not reach a certain standard. Hence, the collaboration system with wide use of private medical institutions and supervision by public health centers can be unique to Japan<sup>17</sup>.

### **(2) Community Activities by Public Health Nurses**

Another characteristic of Japanese TB control programs was that, based on patient registrations, public health nurses working at public health centers have primary responsibility for the management of the TB patients. Receiving notifications from doctors, the public health center made patient management cards (Visible Card). Then public health nurses managed patients by

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<sup>16</sup> *ibid.*

<sup>17</sup> Ishikawa, Nobukatsu (1999) *Nihon no Kekkaku Taisaku ni Manabumono* [Lesson from Japan’s Tuberculosis Control] Public Health, Vol. 58, No. 8.

recording the details of their treatment through home visits until the treatment was completed and the risk of recurrence was not observed. This one-on-one monitoring system by public health nurses to all patients was similar in concept to the present DOTS (Directly Observed Treatment, Short-course) strategy. It was also a reliable and inexpensive strategy, and at the same time a revolutionary system as well, that suited a time when medical institutions were in short supply, and the level of public awareness for TB was not high. In Okinawa Prefecture under American occupation after WWII, public health nurses were permitted to perform some medical functions (see Chapter 8 “Community-based Health Systems”), and conducted one-to-one monitoring of home-based TB patients, through identification, registration, and treatment. This method was unique to Okinawa where medical practitioners were extremely scarce, and it was most effective in reducing dropouts from treatment, and in preventing the spread of TB to other family members (see Boxes 5-2, 5-3).

### 2-1-3 Private Sector Participation

#### (1) Activities of Private Organizations

In setting up TB control programs, the government placed considerable emphasis on private sector participation from the beginning, and fostered non-governmental organizations and community groups to utilize them as operational groups.

In particular, the “Japan Anti-Tuberculosis Association” (JATA) was organized in collaboration with public and private sectors and academia, and has been at the forefront of TB control in Japan. The “Women’s Anti-Tuberculosis Association” that expanded nationwide as community organizations played an important role too. In Okinawa, each community on the whole participated in TB control initiatives under the supervision of public health nurses (see Chapter 8 “Community-based Health Systems”). Here we will introduce some of the more notable community-based activities.

#### 1) Japan Anti-Tuberculosis Association

The Japan Anti-Tuberculosis Association (JATA) was established in 1939 supported by an Imperial household initiative. It is a non-profit corporation that has played an overall leading role in tuberculosis control programs up until present, together with the government, the business world, and the medical society. Since its foundation, JATA has assisted and conducted TB control activities, including research, treatment, health guidance, epidemiological surveys, and human resource development. The Association attracted the academic and financial elite of Japan and fund as well, with a member of the Imperial family as the Patron, the Minister of Health and Welfare as President, and Vice Presidents from the worlds of finance and medicine. A series of donations of land and money from the private sector have been received over the years for sanatoria and research

**Table 5-3 Promotional Activities by the Japan Anti-Tuberculosis Association**

Production of audiovisual materials	Publication of books, brochures, etc., production of slides, movies, video materials, etc.
Tuberculosis Control Week	Commenced in 1949. Present week commencing 24 September initiated in 1962.
JATA National Conference	Began in 1949 as Meeting of Regional Directors. National Conferences commenced in 1954.
Issue of Fukujuji (Patriarchal Cross) Seals*	First issued in 1952
Issue of “Fukujuji”, the official Journal of JATA	Issued bimonthly since March 1955
Tuberculosis Control Model City Awards	First awarded in 1957, selection criteria have been changed several times
Calling for medical histories from TB patients and survivors, and their families	First call in 1958, ceased in 1994

\*Fukujuji Seals are used for fundraising and promotion of the awareness and knowledge of the diseases in order to build a healthy and pleasant society without tuberculosis, lung cancer, or other chest diseases.

Source: Shimao, Tadao (1996)

institutions. JATA has established branches in prefectures all over the country, and has set up model regions, and conducted training programs for doctors, nurses and radiographers, as well as surveys on TB prevention.

In response to democratization after WWII, JATA was reestablished as a voluntary non-governmental organization with a president from civil society. The rules for donations and regional branches were also revised. Using the burnt out remains of the Dai-ichi TB Dispensary in Tokyo, JATA conducted X-ray testing and treatment activities. Group screening was also recommenced in earnest at workplaces and schools in the capital city area. Mobile clinic and counseling using portable radiographic equipment, which became available nationwide later from the model activity, began to tour rural villages around this time. In this period, TB control workers were overwhelmed with a flood of patients and those who wanted screening for TB due to the lack of medical facilities after the destruction of WWII. Screenings with portable X-ray equipment and health educations to proclaim the importance of TB control were conducted in front of train stations where many people gathered.

JATA also contributed to human resource development, conducting retraining for public health nurses and general nurses as TB control instructors prior to WWII. The Research Institute of Tuberculosis, JATA, began TB specialist seminars in 1948 in the midst of the endemic of the disease. Young enthusiastic doctors from all over the country participated in these seminars and contributed to the enhancement of technology for front line workers in TB control.<sup>18</sup> The Training Course in Tuberculosis Control entrusted by the Ministry of Health and Welfare was initiated in 1951 in order to train doctors and radiographers to disseminate the correct TB screening techniques.

JATA has consistently supported the development of techniques for the prevention and treatment of TB. In 1957, it developed a freeze-

dried vaccine to replace the previous liquid vaccine that had been difficult to store. This vaccine was subsequently declared the standard formulation by the World Health Organization (WHO).

In collaboration with national and local governmental and public bodies, JATA has conducted education and awareness campaigns to the general public and TB patients in order to teach TB control accurately and cooperate in it. Table 5-3 shows the main promotional activities undertaken by JATA in cooperation with national and local governmental and public bodies, after Japan had recovered from the confusion of the post-WWII era.

## **2) Women's Association for Anti-Tuberculosis**

A characteristic of awareness and information campaigns related to TB control in Japan is the role of women's organizations. Women have banded together in their local communities to recommend TB screening and vaccination to promote early detection and treatment. A representative group is the Women's Association for Anti-Tuberculosis formed in Nagano City in 1950 on the recommendation of Princess Chichibu. It later developed into a prefecture-wide confederation in 1957. Similar organizations were then inaugurated in other prefectures nationwide. With "Tuberculosis is prevented by the hand of housewives" as its motto, the Women's Anti-Tuberculosis Association has conducted education and awareness campaigns aimed at housewives, and developed a number of detailed and passionate programs in collaboration with governments.

## **(2) Activities by Major Corporations**

As the national TB control program went into action after WWII, it was the programs initiated by major corporations that firstly showed significant results. In the late 1940s, the burden of TB in employees of major corporations was that 6.3% required treatment, and 2.3% needed to take time off work to recover. Typically TB treatment

<sup>18</sup> Shimano, Tadao (1999) *Rokuju-nen no Kiseki* [Sixty Years' History] Japan Anti-Tuberculosis Association.

required admission for two to three years to mainly take a rest when the effective chemotherapy was not available, but the law guaranteed three years compensation for patients who had sick leaves for TB treatment. If an employee developed TB, their employer had to pay their salary for the time off work, and for the treatment itself, as well as the cost of a replacement worker. Large corporations accordingly set up their own TB management clinics, employed specialist staff, instituted a system of twice a year health checks, and treated any diagnosed patients in dedicated wards. The results were remarkable with a rapid drop in new notifications due to early diagnosis through regular health checks, and an end to the cycle of infection within the companies. The success of these TB control programs contributed not only to benefits to these large companies themselves, but also to the increase of the gross national product (GNP) of Japan, and gave impetus to its economic development<sup>19</sup>.

### (3) Roles of the Mass Media

It was an important approach to encourage people to understand and cooperate with TB control programs when TB was endemic. To this end, education and awareness campaigns were conducted for the general population as well as TB patients. The main activities in this field were the aforementioned awareness campaigns conducted by JATA, and another example was the monthly series "Accurate Knowledge about Tuberculosis" in the magazine "Kenko Dohjin" (Health Club), written by TB specialists and mainly aimed at TB patients. NHK ('Nippon Hoso Kyokai' Japan Broadcasting Corporation) also provided a regular program on the radio, one of the most powerful forms of mass

media at the time, called "Ryoyo no Tomo" (Friends of TB Treatment, later changed to "Ryoyo no Tebiki," or Guide to TB Treatment). Through the use of both print and broadcast media, accurate information about methods of diagnosis and treatment for TB was disseminated to doctors as well as patients throughout the country<sup>20</sup>. In this way, the entire population came to be aware of the seriousness of the TB problem, leading to the revisions of the Tuberculosis Control Law in 1951.

#### 2-1-4 Activities of Tuberculosis Specialists

TB specialists at that time were mostly pathologists, microbiologists, or clinicians. Their wide-ranging activities on behalf of public health played an important role in research, collection and assessment of information, lobbying to politicians and administrators, and increased awareness in the general populace. Public health specialists, based in the Ministry of Health and Welfare, prefectures and public health centers, were very well-trained<sup>21</sup>.

Technology advances in early detection and vaccines also played an important part in the reduction of TB. Particularly worthy of note are the development of indirect chest radiography, and the mass-production of freeze-dried BCG vaccine. As mentioned before, this freeze-dried vaccine is still in use as the world standard formulation. In 1957, Professor Hamao Umezawa developed Kanamycin, an antituberculosis drug still used today for multiple drug resistant strains. Furthermore in 1963, Canon, a private company, contributed to the technological innovation by the development of a mirror camera for indirect chest radiography, which is used for early detection of lung cancer today.

<sup>19</sup> Shimao, Tadao (1996) *Wagakuni no Kekkaku Taisaku* [Tuberculosis Control in Japan] JAATA BOOKS No. 9, Japan Anti-Tuberculosis Association. pp. 42-44.

<sup>20</sup> Ishikawa, Nobukatsu (1999) *Nihon no Kekkaku Taisaku ni Manabumono* [Lesson from Japan's Tuberculosis Control] Public Health, Vol. 58, No. 8.

<sup>21</sup> *ibid.*

**Table 5-4 Differences in Tuberculosis Control Strategies between Japan and Developing Countries**

	System previously used in Japan	System used in developing countries (WHO system)
Case detection	<ul style="list-style-type: none"> <li>• Mass screening using indirect chest radiography</li> <li>• Symptomatic patients self-report to health services</li> <li>• Emphasis on radiography</li> </ul>	<ul style="list-style-type: none"> <li>• Symptomatic patients self-report to health services</li> <li>• Mainly diagnosed by sputum smear microscopy</li> </ul>
Treatment	<ul style="list-style-type: none"> <li>• Institutional treatment with longterm/compulsory admission</li> <li>• Follow-up mainly through radiographic findings</li> <li>• Treatment at private or public institutions</li> <li>• Patient management by public health centers</li> </ul>	<ul style="list-style-type: none"> <li>• Mainly outpatient treatment (directly observed treatment)</li> <li>• Follow-up mainly through microbiological findings</li> <li>• Treatment and patient management by public health centers</li> </ul>
BCG	<ul style="list-style-type: none"> <li>• Skin inoculation (multiple puncture technique) for those with negative tuberculin skin test</li> </ul>	<ul style="list-style-type: none"> <li>• Intradermal (integrated in Expanded Programs on Immunization (EPI))</li> </ul>

Source: Ishikawa, Nobukatsu (1999)

### Box 5-1 The DOTS Strategy

The DOTS (Directly Observed Treatment, Short-course) strategy is a comprehensive tuberculosis control strategy comprising the following 5 elements<sup>22</sup>:

- 1) Strong government commitment to TB control activities
- 2) Case detection by sputum smear microscopy among people with symptoms
- 3) Standardized short course treatment regimen for all detected sputum smear-positive cases, under appropriate supervision (directly observed therapy)
- 4) Regular, uninterrupted supply of all essential anti-TB drugs
- 5) Standardized system of patient records and reporting that allows supervision and assessment of the TB control programs

This strategy was produced by Dr. Arata Kochi, who became the Director of the WHO TB Program in 1989, with the assistance of a number of TB specialists. Dr. Kochi noted that, in developing countries with a weak public health framework, the simple strategy of identifying and treating sputum smear-positive cases, and BCG immunization to newborn babies, was not achieving the desired results. He pointed out, as one factor in this failure, a tendency to concentrate on “what should and could be done,” and not to pay attention to “how to do it.” Then he emphasized a results-orientated approach suited to the region. Successful TB programs in developing countries having been analyzed, guidelines that would be the theoretical basis for the DOTS strategy were presented<sup>23</sup>.

The DOTS strategy places great emphasis on the notion that “Only the introduction of a system of direct observation of treatment can achieve the target cure rate of 85%.” Hence, the first targets set by the WHO for the DOTS strategy is the establishment of a system that will cure 85% of all sputum-smear positive patients, and second is the achievement of 70% detection rate<sup>24</sup>.

<sup>22</sup> Suchi, Masashi (1999) *Sekai no Kekkaku - DOTS Senryaku wo Chushin to shite* [World's Tuberculosis - Focused on the DOTS Strategy] (<http://jata/or.jp/rit/rit/rj/gtc99.html>)

<sup>23</sup> *ibid.*

<sup>24</sup> Ishikawa, Nobukatsu (1994) “*Sekaino Kekkaku Mondai to Nihon no Kosyueisei* [Tuberculosis as a World's Issue and Public Health in Japan]” *Public Health*, Vol. 58, No. 8.

## **2-2 Tuberculosis Control in Developing Countries in the Light of Japan's Experience**

The international mainstream in TB control is the "Framework for Effective Tuberculosis Control" (now known as the "DOTS strategy") announced by WHO. This strategy considerably differs from that used historically in Japan (see Box 5-1 for details of the DOTS strategy). Comparison of TB control activities with those presently used in developing countries (see Table 5-4) shows that Japan invested a great deal of money and personnel in testing entire populations to detect TB cases, and strove to stop the spread of the disease through early detection.

Developing countries place emphasis on treatment rather than on early detection to stop the spread of infectious disease. As the international mainstream of TB control strategy is the DOTS strategy at present, in this essay we will focus on parts of the Japanese post-WWII experience that may be of use for successful execution of DOTS strategy. We will study it particularly in terms of some of five elements of DOTS strategies mentioned in Box 5-1; first, in view of "governmental commitment." Secondly the function of public health centers, activities of public health nurses, and community participation will be studied as a topic of "Appropriate patient management and treatment." Thirdly the function of public health centers and the role of specialized institutions will be reviewed from the viewpoint of element, "System of patient records and reporting, supervision and assessment of the TB control program."

### **2-2-1 Governmental Commitment**

In many developing countries, TB control is not necessarily given high priority, and funding is

not enough. In Japan, on the other hand, it can be noted that the best promoting factor for TB control was that the government tackled its "national disease (TB)" with full commitment<sup>25</sup>. A nationwide program began in Japan with the comprehensive overhaul of the Tuberculosis Prevention Law in 1951. At a time of financial hardship, a significant budget was allocated to provide public funding for preventive and therapeutic programs. For the people in poor countries and regions that suffer a health insurance system with economic inequity, it functions very effectively that all or part of the cost of medical treatment, health checks, and immunization are covered by public expenditure. Also private medical institutions were designated to the core of TB screening and treatment in Japan.

For developing countries to establish a system of the kind of quality present in Japan, the government would have to issue guidelines for screening and treatment, monitor the quality of diagnosis and treatment at medical institutions by inspection agencies, and link public subsidy with the accreditation by these inspection agencies.

### **2-2-2 Appropriate Patient Management and Intensive Treatment**

A fundamental element of the DOTS strategy is appropriate patient management and intensive treatment. According to Shimouchi, prior experience of assistance has shown that the establishment of a system of primary health care (see p. 181) and the cooperation of the community are essential to the most important factor that patients take their medications in compliance with instructions every day<sup>26</sup>. In Japan, the expansion of primary health care was achieved by the reinforcement of the function of public health centers and activities of public health nurses.

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<sup>25</sup> Shimao, Tadao (1996) *Wagakuni no Kekkaku Taisaku* [Tuberculosis Control in Japan] JAATA BOOKS No. 9, Japan Anti-Tuberculosis Association.

<sup>26</sup> Japan International Cooperation Agency (1999) *Primary Health Care wo Yoku Shirutameni - Nihon no Keiken wo Fumaete* [To Understand Primary Health Care - Based on Japan's Experience], Japan International Cooperation Agency.

### (1) Roles of Public Health Centers

In Japan after WWII, public health centers were positioned as main providers of primary health care, and the greatest challenge they faced was TB control. Public health centers adopted a holistic approach to TB that combined public health and primary health care. This approach included the detection, management and treatment of patients, and prevention of contagion through management of sources of infection.

As more private medical institutions were established after WWII, the diagnosis and treatment of TB was entrusted to the private medical sector. It is worthy of note, however, that inspectors from the public health centers played an important role in improving the quality of services offered by private medical institutions. Japan's experience indicates that if private medical institutions are used in TB control programs, a system can be considered whereby a local public

institution plays a supervisory role to ensure the quality of services offered.

### (2) Activities of Public Health Nurses

At the public health centers, public health nurses played an important role in case detection, and the promotion of screening and treatment. In general, it was through their outreach activities that public health nurses sought to detect people with symptoms and oversee treatment for patients, but this system may also be applicable to the DOTS strategy. During the time of the TB epidemic in Japan, public health nurses were able to provide one-on-one care because the population served by each nurse was not so large that they covered all households in their service area. In most developing countries however, the number of public health nurses is not as many as those in Japan. In that case, health volunteers could take on some of the roles filled by Japanese public health nurses. For

#### **Box 5-2 Community Activities in One United Body by the Residents of Okinawa Prefecture**

In Okinawa Prefecture after WWII, there are a number of examples of TB control that made full use of community resources. Public health nurses, the mainstay of community health in Okinawa (see Chapter 8 "Community-based Health Systems"), actively mobilized municipalities and local government administrators (ward chiefs) as well as local organizations such as women's groups, youth groups, and senior citizens' groups. These local groups jointly promoted health education and TB screening in the community.

The "Ryukyu Tuberculosis Prevention Society" was established in 1953 for TB control activities in partnership with the Ryukyu Government. It conducted awareness campaigns, publicity activities, and group screening programs. In 1956, recovered patients took the lead in organizing the "Okinawa Patient's Association" to provide TB patients support including guidance for treatment and daily life, and assist screening and publicity activities for TB control. The Okinawa Patient's Association became a non-profit corporation, and established the "Center for Assistance and Supervision of Recovered Tuberculosis Patients" to aid social rehabilitation activities for TB patients after treatment.

Source: Nakasone, Tadashi (2000) "Kekkaku Taisaku [Tuberculosis Control]," Institute for International Cooperation, *Okinawa no Chiiki Hoken Iryo ni okeru Kaihatsu Keiken to Tojokoku he no Tekiyo Hokokusho* [Okinawa's Experience on Development of Community-based Health Care System and Application toward Developing Countries], JICA

<sup>26</sup> Japan International Cooperation Agency (1999) *Primary Health Care wo Yoku Shirutameni - Nihon no Keiken wo Fumaete* [To Understand Primary Health Care - Based on Japan's Experience], Japan International Cooperation Agency.

### Box 5-3 Home-based Approach to Tuberculosis Treatment in Okinawa

Okinawa experienced a major epidemic of TB during the 1950s and 1960s, with 3,000 new patients notified each year during that period. Public health centers and public health nurses played a central role to deal with this situation. In particular, public health nurses conducted sound and comprehensive treatment, which we might be able to call “home-based treatment system,” including detection and registration of cases, guidance for home-based treatment, supervision of drug taking, and health education for the patients’ families (prevention of new infection) through outreach activities in outlying islands and remote villages when there was not a clear legislative framework. This treatment system, initiated by public health nurses in Okinawa in the 1950s, is similar in concept to the DOTS (Directly Observed Treatment, Short-course) strategy espoused by WHO.

In a time of shortages of many things, public health nurses made full use of the resources at hand. As an example, public health nurses were taught that patients should expectorate into a piece of paper tissue and burn it to prevent the spread of TB, but at that time, patients didn’t have even a piece of toilet paper or tissue paper at their houses. The nurses improvised to advise patients to use what is available such as “*yuuna*” leaves, readily available in Okinawa, to substitute for tissue paper and empty cans supplied from the Americans, to fill up with sputum to bury. To avoid the spread of infection they advised families living in narrow “*nagaya*” (row houses with communal sleeping arrangements) to sleep in an alternating head to foot arrangement, and hang up a curtain of clothes, etc. between the patient and the rest of the family. As a result, the spread of TB was kept to a minimum.

Public health nurses could give this sort of guidance because they knew the living conditions and economic status of each patient and had sincere desire for improvement. It is often said “That can’t be done because we don’t have resources” at sites of cooperation projects in developing countries, but the examples in Okinawa give us a powerful reminder of the fundamental principle, “Public health programs can be started with the resources we have now.”

Source: Nakasone, Tadashi (2000) “*Kekkaku Taisaku* [Tuberculosis Control],” Institute for International Cooperation, *Okinawa no Chiiki Hoken Iryo ni okeru Kaihatsu Keiken to Tojokoku he no Tekiyo Hokokusho* [Okinawa’s Experience on Development of Community-based Health Care System and Application toward Developing Countries], JICA

example, as a part of the DOTS strategy in the Philippines and other countries, public health nurses make a partnership with their treatment partners (health volunteers who observe patients taking their daily medicine) to deal with treatment and direct observation of drug taking of each individual patient<sup>27</sup>. In this case, each health volunteer covers the same population size as a public health nurse would in Japan.

If health volunteers are mobilized, an appropriate level of knowledge and skills will be required, and some sort of incentive may be needed. Public health nurses were paid rather well when TB was endemic and they managed their duties with a strong sense of mission, likewise the government provided strong backup. Japan’s experience in this area may be of benefit to developing countries when they consider improving

<sup>27</sup> Suchi, Masashi (1999) *Sekai no Kekkaku - DOTS Senryaku wo Chushin to shite* [World’s Tuberculosis - Focused on the DOTS Strategy] (<http://jata.or.jp/rit/rit/rj/gtc99.html>)



labor conditions of their health services personnel.

**(3) Comprehensive Home-based Tuberculosis Control Approach (For examples in Okinawa, see Boxes 5-2, 5-3)**

It is the reality at present that detection of people with symptoms, compliance with continued treatment, and a stable supply of medication cannot be improved easily in regions lacking in medical institutions and medical services personnel even using DOTS strategy.

Okinawa under American occupation suffered an extreme lack of medical institutions and medical services personnel, but this was resolved to some extent by the establishment of a system of public health nurses who were allowed to provide some medical services. Public health nurses were responsible for all actions on primary health care and played the central role in TB control. They dealt with the lack of medical institutions and medical services personnel by instituting a system of home-based treatment. Drugs and supplies necessary for treatment were kept in the drug cupboard at substations of public health centers, managed by public health nurses to ensure that the necessary drugs were always available. The comprehensive TB control approach seen in Okinawa is a method that can be used for the reliable implementation of the DOTS strategy. As a large amount of budget is not required for this kind of comprehensive TB control, there are a number of aspects that are applicable to areas with limited medical resources. It will be necessary to publish these activities after further analysis and systematization.

**2-2-3 Supervision and Assessment Based on Patient Records and Reporting Systems**

In developing countries the lack of statistical and information management systems is generally an impediment to capacity building in the field of public health and medical services. A system of statistical and information management is essential

in making improvements in any health programs, and it is also considered important in DOTS strategy to improve the program by the assessment of therapeutic results based on the information collected by the patient monitoring system.

The base of TB control in Japan was a patient registration and management system lead by public health centers. The comprehensive patient management of the public health nurses, based on home visits, played a major role in the success of this system. In Japan, the data gathered by the public health nurses was collated at public health centers, and then it contributed to assessment of the situation and policy making in the service area. Furthermore, based on the results of National Tuberculosis Surveys, first conducted in 1953, radical changes were made to subsequent TB control programs.

The establishment of a patient registration and management system, which will form the basis of a system of statistical and information management, requires reinforcement of functions in several different levels. The needs of reinforcement in the first level is the accuracy of data collection from the grass roots level, followed by proper statistical analysis at the middle level (public health centers), and the capability of further analysis and policy formulation at the highest level (the national government). In developing countries, in order to set up a statistical and information management system, an effective first step is to establish a system of patient registration and management out in the field, at public health centers and health posts. The greatest problem in this regard is a lack of personnel in public health centers and health posts. There are few developing countries with sufficient healthcare staff such as public health nurses and general nurses for outreach services to monitor each individual patient and their family. The approach most likely to succeed is to train health volunteers to compensate for the lack of healthcare staff.

**Table 5-5 Global Statistical Overview of Parasitic Disease**

Disease	No. at risk of infestation	No. infested	Yearly no. deaths
Malaria	2,020 million	500 million	1.5 ~ 2.7 million
Dracontiasis	100 million	0.15 million	Rare
Chaga's disease	100 million	18 million	45,000
Schistosomiasis	600 million	200 million	20,000
Intestinal parasites	4,000 million	3,500 million	Pinworm: 135,000 Protozoa: 90,000
Lymphatic filariasis	1,100 million	120 million	High incidence in patients with elephantiasis
Onchocerciasis	120 million	18 million	High incidence in blind patients
Leishmaniasis	350 million	12 million	75,000 ~ 80,000
Trypanosomiasis	55 million	0.3 million	20,000

Source: WHO (2002)

### 3. Parasitic Disease Control

As shown in Table 5-5, parasitic diseases present a major public health problem to developing countries. Soil-borne parasites, because of their relatively low fatality rate, tend to be ignored, becoming the “forgotten parasites.” The fatality rates may be low, but the prevalence of infestation is high, so the actual number of deaths is significant.

Outbreaks of parasitic diseases were also seen in various parts of Japan in the past. During the post-war period of chaos, the health of the people was adversely affected by a series of outbreaks of parasitic diseases, including soil-borne parasites, malaria, filariasis, and schistosomiasis. The infestation rate with soil-borne parasites, such as hookworm and roundworm, were particularly high nationwide. The average hookworm infestation rate nationwide was 62.9% (Ministry of Health and Welfare in 1949). This was a major cause of ill health, with some of those affected requiring hospital admission due to malnutrition, even in some cases leading to death.

Initiatives to combat these soil-borne parasites involved rigorous screening, antihelminthic treatments, and public health education. Subsequent economic development, advances in medical science and treatments, and introduction of the social security system saw parasitic diseases all but wiped out in Japan. The prevalence of soil-borne parasites has fallen to around 0.01%, and

malaria and filariasis are no longer seen, apart from a few cases brought in from overseas each year.

Parasitic disease control initiatives in Japan have not simply aimed to eliminate the parasites, but through education campaigns and community participation have sought to encourage community-based activities. Parasite control has thus been linked to a comprehensive public health campaign, associated with community-based health and an improved standard of living. Japan's experience attracted a great deal of attention in the 1960s from other Asian countries and the WHO as a successful preventive campaign, and even now is worthy of consideration in producing a comprehensive community-based health system.

In this essay, we will present the Japanese parasitic disease control initiatives in the post-war period, followed by a number of examples of international cooperation in this field, and discuss the possibility of future applications of Japan's experience.

#### 3-1 Post-war Measures against Soil-transmitted Parasites

During the post-war period of chaos, when infestations with soil-borne parasites such as hookworm and pinworm were rampant, programs were conducted by government, parasitologists and community groups, each keenly aware of their respective roles.

### 3-1-1 Measures Taken by Government

The Ministry of Health and Welfare reached the conclusion in the late 1950s that, even though the post-war chaos had ended, the rate of infestation with hookworm remained particularly high in rural communities, resulting in considerable damage to health and loss of productivity. In 1950, after the urgent problems of the post-war period had settled down to a certain extent, the Ministry of Health and Welfare held a “Parasitic Disease Control Measures Conference” inviting scientific researchers and public servants. A lively debate ensued over vector control, environmental measures, and infection control measures.

Two main schools of thought emerged, the first emphasizing the need for improvements in sanitation, indicating that no real solution was possible until the use of night soil as fertilizer was addressed, and the second, led by parasitologists, calling for a mass screening and mass treatment approach. As the first approach would take a great deal of money and a considerable amount of time, the latter approach was adopted as the main initiative in the short term.

The lack of scientific knowledge to back up parasitic disease control measures led to a program of research into the following seven topics:

- 1) development and trialing of antihelminthics;
- 2) epidemiological studies of parasites;
- 3) resistance by parasite eggs and methods of killing eggs;
- 4) distribution of parasite eggs in the environment;
- 5) parasite eggs adherent to vegetables, and how to remove them;
- 6) parasite eggs in night soil and ways to treat them; and
- 7) identification of the optimum methods for mass screenings.

The results of these researches were successively incorporated into parasitic disease

control measures<sup>28</sup>.

At the same time, hookworm infestations were also considered a serious problem, so the Ministry of Health and Welfare conducted a nationwide survey through the public health centers to assess the actual extent of the situation. The results were released in 1960, revealing a 10.2% positive rate among the 95,490 surveyed. Another survey by the Japan Association of Parasite Control (JAPC, see following section) showed a number of regions with higher infestation rates, some exceeding 50%.

The Ministry of Health and Welfare provided a budget of ¥37 million in the 1963 financial year for hookworm control measures. Programs of testing and extermination were initiated in Ibaraki and five other prefectures, as well as the application of pesticides (to kill eggs) to the night soil from rural homes. This national assistance project continued until 1969, and in response, the prefectures developed their own projects along the same lines. Of the national assistance programs, some 70% of the stool examination programs were entrusted to the local parasite control associations<sup>29</sup>.

### 3-1-2 Involvement of Community Groups

#### (1) Tokyo Association of Parasite Control (TAPC)

Before the national government first engaged in parasitic disease control initiatives in earnest, the only public institution dealing with parasites in the national capital was the “Tokyo Parasitic Disease Clinic” that conducted stool examinations on a fraction of the Tokyo residents. Public health centers at that time had their hands full with infectious disease control measures, in particular TB, and did not have the capacity to deal with parasitic diseases. A number of small-scale groups arose in the community to conduct stool examinations for parasites, but there were no standards or regulations governing their activities.

<sup>28</sup> Kunii, Ayumi (1998) *Hoken Kaikan Monogatari -Jo-kan* [Story of Health Center] Hoken Kaikan.

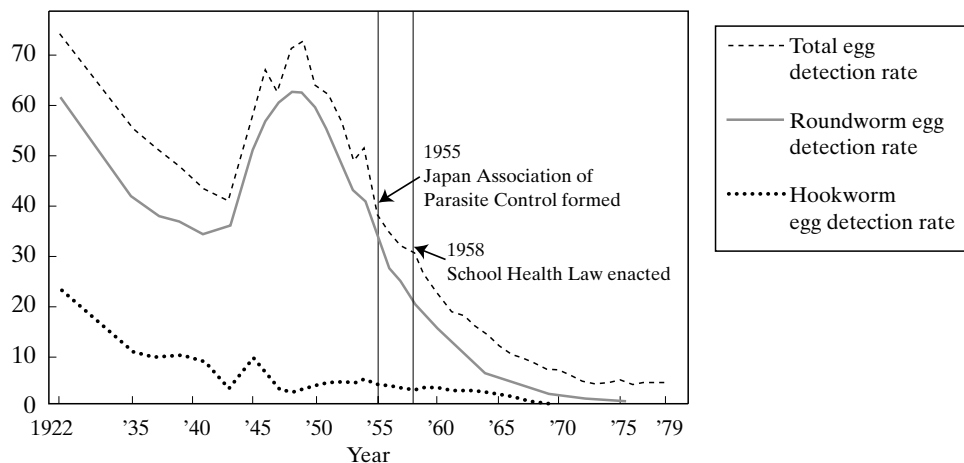
<sup>29</sup> Kunii, Ayumi (2000) *Hoken Kaikan Monogatari -Chu-kan* [Story of Health Center] Hoken Kaikan.

The Tokyo Public Hygiene Association was established in 1949 (name changed to the Tokyo Association of Parasite Control the following year), with the assistance of the leading figure in parasitology at the time, Professor Koizumi of the Department of Parasitology at the Keio University School of Medicine. The Association commenced a campaign of stool examinations at primary and junior secondary schools. This project was later expanded to include businesses and major corporations covered by government health insurance programs, and the TAPC assumed the position of the national leader in conducting stool examinations and antihelminthic treatments. At this time, the Ministry of Health and Welfare and Municipality of Tokyo began a system of parasite control measures at public expense. Effective antihelminthic medications were not available in quantity at that time, so the challenge was how to exterminate the parasites after a positive stool examination. The TAPC lobbied the national and Tokyo metropolitan governments for antihelminthics to be manufactured in Japan in bulk, and strove to encourage accurate prescribing. The Association established its own clinic in 1951, at which it revolutionized antihelminthic

treatments, for example developing a method of eradicating hookworm in only one day, where it had previously taken one week.

The TAPC also conducted awareness campaigns, producing various information pamphlets, spreading the message to the general populace about disease caused by parasites and how to exterminate them. It published a monthly journal "Parasite Control" that was distributed to schools within the Tokyo metropolitan area with the assistance of education committees and ward offices. During Parasite Control Week, booths positioned outside department stores and train stations provided free advice, stool examinations, and distributed antihelminthics. As part of this awareness campaign, people looked at their own stool sample under the microscope, confirmed what sort of parasite it was, and then took the appropriate antihelminthic medication in the correct manner. Prior newspaper, television and radio advertising was effective for this campaign, with large numbers lining up to participate, thus increasing the publicity effect. This campaign became the model for subsequent infectious disease awareness campaigns, on the streets or in business premises.

**Figure 5-2 Trends in the Prevalence of Roundworm and Hookworm Infestations**



Source: based on data from Ministry of Health and Welfare and Japan Association of Parasite Control

#### **Box 5-4 The Okinawan Zero Parasite Campaign**

In Okinawa, parasitic disease control programs only began in earnest with the establishment of the private “Ryukyu Parasite Testing Center” in 1961 by a non-governmental organization concerned at the delay in the official response to the high levels of parasite infestation in rural villages. The “Okinawa Association of Parasite Control” grew out of the Center in 1963, with the aim of raising public awareness of parasitic infestation as a social problem. A total of nine “Zero Parasite Campaigns” were run over a 5 year period (1965~1969), with outstanding results. Three distinguishing characteristics of these campaigns were: 1) they were led by a NGO; 2) effective use of the mass media; and 3) the emphasis on information provision to the public (participation of doctors and public health nurses). As a result, the community became more and more vocal, urging government to participate, with the result that a succession of local governments allocated funds for the campaigns. Assistance was also forthcoming from the American Government, expanding the budget further.

In 1964, before the first campaign commenced, a “Parasite Symposium” was held at the Okinawa Medical Association general meeting. The accumulated results of studies performed in Okinawa by Tokyo University, Nagasaki University and Kagoshima University were announced, demonstrating to the people of Okinawa the need for parasite control measures. The Symposium also provided an opportunity for researchers, testing groups and medical services personnel to meet and share knowledge and techniques.

A non-governmental organization led the Zero Parasite Campaign, but it should not be overlooked that the program required the cooperation of doctors, public health nurses and laboratory technicians from both the public and private sectors.

Nakasone (2000) identifies six steps, followed repeatedly to identify parasite egg carriers, which can be utilized by developing countries to yield results similar to the Zero Parasite Campaign. They are: public education about parasitic diseases; testing (stool examination); explanation of results; treatment of detected cases; retesting; and health education and retreatment based on the results of the local campaign. Worthy of note is the system of local meetings where testing technicians and medical services personnel explain the test results to the local residents, making clear the significance of the program. These meetings further empowered the community to find ways of solving their own health problems themselves.

Source: Institute for International Cooperation, Japan International Cooperation Agency (2000) *Okinawa no Chiiki Hoken Iryo ni Okeru Kaihatsu Keiken to Tojokoku he no Tekiyo Hokokusho* [Okinawa's Experience on Development of Community-based Health Care System and Application toward Developing Countries], JICA

**Box 5-5 Schistosoma Japonicum**

The microscopic larval forms (cercaria) of *Schistosoma Japonicum* (oriental blood fluke) are found in open water, such as ditches in ricefields, in certain areas. They enter the bodies of humans, cows and horses through the skin; invade the liver and blood vessels, sometimes leading to death. The first medical reference to disease caused by this parasite was in 1847. The signs and symptoms were described in detail, although the cause was unknown, and there was no treatment. Subsequent studies demonstrated the existence of a new trematode, named *Schistosoma Japonicum* in 1904<sup>30</sup>.

Schistosomiasis, or Katayama Fever, was known to be endemic in a small number of regions in Japan. *Schistosoma* extermination campaigns were conducted in these regions with assistance from national, prefectural, and local governments. They comprised group screening programs and treatment of carriers, as well as campaigns to exterminate the snails that act as intermediate hosts<sup>31</sup>.

As a result of these initiatives, the last detected case excreting Schistosomal eggs was in 1977, and snails infested with *Schistosoma Japonicum* have not been detected since 1976. Such results could be achieved in Japan because the distribution of endemic areas was limited compared to other affected countries, making snail extermination feasible, and because the residents of the endemic areas were anxious to eliminate Katayama Fever, and worked enthusiastically to that end.

**(2) Japan Association of Parasite Control (JAPC)**

Similar movements were seen in all parts of Japan, with the formation of the “Public Health Association” in Aichi Prefecture, and the “Osaka Association of Parasite Control” in Osaka. Parasite control bodies were also formed within universities, including Hokkaido University Medical School, Kyoto Prefectural University of Medicine, Niigata Medical College, and Chiba Medical University, as well as Prefectural Bureaus of Prevention, such as in Kanagawa and Fukuoka.

As of 1954, there were 13 parasite control associations around the country, conducting parasite control programs with guidance from parasitologists from the local university, with independent budgets and receiving no assistance from anywhere. In 1955, the Japan Association of Parasite Control was established, effectively uniting all the regional associations in a confederation under the leadership of the Tokyo Association of Parasite Control. The ethos of the JAPC was to

conduct public health activities, and raise the standard of testing in particular. The directors of the new Association were parasitologists, representatives of community organizations, and public servants responsible for parasite control from the Ministry of Health and Welfare. In effect, the JAPC was the operational organization for Ministry of Health and Welfare parasite control projects, responsible for the three main arms of group screening, treatment and prevention awareness campaigns.

The JAPC ran regular technical study exchanges to improve testing techniques, and to make up for the lack of technicians able to conduct testing, also conducted training programs for technicians limited to performing only parasite testing (recognized by the JAPC). JAPC also provided training in parasite screening to school health education and science teachers. Thus trained, the teachers conducted testing at their own schools, and some went on to become leaders in

<sup>30</sup> Tsuji, Moriyasu (1991) “*Nihon ni okeru Zyuketu Kyuchu Sho no Genjo* [Schistosomiasis in Japan]” *Kagaku Ryoho no Ryoiki* [Area of Chemotherapy], 7, 5, pp. 869-875.

<sup>31</sup> Details of the discovery of *Schistosoma Japonicum*, and control measures, are to be found in Tanaka (1999)

parasite control programs in their local area. JAPC was instrumental in setting up microscopes and other equipment in each prefecture. JAPC developed the simple but highly sensitive methods of detecting intestinal parasites, the cellophane thick smear technique. This was adopted by the Ministry of Health and Welfare as an official stool examination method. Based on the belief that a non-governmental organization can only act independently when it has its own budget, JAPC trains personnel responsible for planning and management in each regional organization (promoters and supervisors).

### 3-1-3 Contributions by Parasitologists

Post-war Japanese soil mediated parasite control programs were enacted by JAPC and other non-governmental organizations, with valuable assistance from parasitologists. In particular, the Department of Parasitology at the Keio University School of Medicine, the leader in parasitology at that time, collaborated with the JAPC in determining the best stool sample testing and treatment methods, developed a series of new antihelminthic agents and methods of administration, and established a system of prevention and treatment of parasitic diseases for the entire country. Recognizing at an early stage that parasite control measures are a part of public health education, again in collaboration with the JAPC the Keio team produced public health educational pamphlets and books for the general populace, thereby increasing public awareness. It would not be an overstatement to say that these contributions by Japanese parasitologists formed the backbone of parasitic diseases control initiatives.

### 3-1-4 Characteristics of Japan's Initiatives

As we have seen above, parasitic disease control initiatives in Japan were conducted through cooperation between non-governmental organizations and university-based parasitologists, with full governmental support. Awareness and publicity activities run by non-governmental groups evolved into nationwide campaigns. Schools and businesses

participated wholeheartedly, bearing the costs for group parasitic disease control initiatives, starting with stool examination programs, as part of health management for their students and employees. The results of these initiatives can be seen in Figure 5-2. The roundworm infestation rate, 62.9% in 1949, plummeted to 8.2% 14 years later in 1963, showing that Japanese parasitic disease control initiatives achieved excellent results within a short period.

Consideration of the characteristics of Japanese initiatives in parasitic disease control that may be applicable to other countries yields the following 7 points:

- 1) Despite widespread morbidity, the response lacked urgency.
- 2) Complicated and high level techniques and equipment were not needed.
- 3) Only a modest budget was needed.
- 4) The public welcomed the rapid results that could be confirmed visually.
- 5) Stool examination and treatment programs were instituted at schools and businesses.
- 6) Awareness and publicity activities brought about a nationwide campaign.
- 7) There was cooperation from experts, and new techniques were developed.

## 3-2 Control of Parasitic Disease in Developing Countries in the Light of Japan's Experience

At present, although parasitic diseases still present a major health problem in many developing countries, control programs are often not given a high priority. Japan managed to bring the level of roundworm infestation down to zero in a short period of time through a program of regular mass antihelminthic treatment, and this experience is already being applied in many countries in various ways. Japan's experience attracted much attention from the WHO and other Asian countries in the 1960s, and excellent results were achieved from technical cooperation with South Korea commencing in 1966, followed by Taiwan in 1969. We will now discuss the lessons that can be learned from Japan's post-war experience, as well as the

experience already gained in international cooperation, that are applicable to future parasite control programs in developing countries.

### **3-2-1 Identification of Needs and Awareness**

#### **Campaigns**

The background to soil-mediated parasitic disease control programs in Japan was the needs of the population, with a considerable number of people whose health was adversely affected. It is therefore of vital importance in developing countries before commencing control programs to first elucidate the needs of the population, determining the extent of infestation in the community and then eliciting the extent of attendant impairment to health.

Compared to some other diseases, parasitic disease control programs are fortunately relatively easily to detect and treat. The immediacy of results is known to be most appealing to the public. Programs run by non-governmental organizations such as the Tokyo Association of Parasite Control and the JAPC began with visits to schools and businesses, stressing the importance of stool examinations and treatment, gradually increasing the proportion of the population covered by screening programs. Through these grassroots awareness campaigns and the results that could be clearly seen by anyone, parasitic disease control programs gradually gained acceptance by the entire Japanese population.

The results achieved by community-based organizations also persuaded governments to provide funding, so that in the end the non-governmental organization became the operational groups for government projects. In addition to local grassroots awareness campaigns, in Japan large-scale publicity campaigns were also effective in promoting stool examinations and treatment to the entire nation. Led by community-based groups formed in each district to conduct parasitic disease control programs,

massive publicity campaigns were run at regular intervals to great effect, with the cooperation of the mass media (television, radio, newspapers).

### **3-2-2 Activities of Community Groups**

In Japan's case, non-governmental organizations were ahead of government in recognizing the parasitic disease problem, and consistently led the way in conducting parasite control initiatives. In developing countries with high levels of parasitic infestation, it is difficult for governments alone to conduct programs of screening and treatment, in terms of finances and personnel. It will therefore be necessary for a public-spirited non-governmental organization to step in, and take on the task in the government's stead. It is a fortunate characteristic of parasite control initiatives that they do not require complicated techniques or expensive equipment, and it is relatively easy to assemble personnel, as non-medical staff will suffice for many of the tasks involved.

### **3-2-3 Collaboration with Experts**

In developing countries, it is often the case that even where the prevalence of soil-mediated parasitic infestation, such as roundworm, hookworm, or pinworm, is high, parasitologists tend to concentrate on the serious parasitic diseases endemic to that country, and to cutting-edge medicine, and ignore the soil-mediated parasites. Japan's experience tells us, however, that the contributions by parasitologists are important in developing appropriate techniques. Japan has already trialed measures to educate parasitologists as part of assistance programs in developing countries.

An example is the establishment of the Asian Parasite Control Organization (APCO), initially comprising mainly parasitologists from Japan, South Korea and Taiwan<sup>32</sup>. The APCO contributes to training in parasitology, by means of the

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<sup>32</sup> The Philippines, Indonesia, Malaysia, Thailand, Bangladesh and Sri Lanka joined the APCO in 1974, and the first general meeting was held in Tokyo that year. With the addition of further representatives from Asia, Latin America and Africa, the number of member nations has risen to 24, and the WHO and other international organizations also attend meetings as observers.



following: 1) collection and dissemination of information regarding parasites in each member country; 2) epidemiological research, elucidation of routes of infection, development of techniques appropriate to each region, research into standardization of stool examination techniques; and 3) education of professionals in parasite control. At the invitation of JICA, the JAPC has held an “International Seminar on Parasite Control Administration” every year since 1980.

These seminars provide opportunities to pass on to researchers and administrators from developing countries the knowledge and techniques gained in Japan since parasite control programs began in the chaotic post-war period<sup>33</sup>.

### **3-2-4 Linkage with School Health Programs**

In many developing countries, national programs (vertical programs) in the field of infectious diseases, such as tuberculosis, malaria, and preventive vaccination, often commence as collaborative initiatives with comprehensive programs (horizontal programs) in fields such as community-based health, primary health care (PHC), and maternal and child health. Global recognition of school health as an example of a horizontal program is presently increasing.

Parasitic disease control programs in Japan concentrated on primary and junior secondary schools, with excellent results. The Japanese experience of combining parasite control with school health to develop a community-based health program, and further linking this with regional development, should be useful in finding solutions to community-based health problems presently faced by developing countries. This system used in Japan, of linking improvements in areas such as school health, family planning or community-based health with parasite control measures, is not to be seen in

the experience of any other developed countries. As described in Chapter 9 “School Health,” Japan commenced international parasitic disease control initiatives based on the “Hashimoto Initiative.” In one of these, the “Asian Centre of International Parasite Control” (ACIPAC) Project (see Chapter 9 Box 9-1), run in conjunction with the Mahidol University in Thailand as counterpart, programs combining parasite control with school health are in progress in the four surrounding countries of Cambodia, Burma (Myanmar), Laos and Vietnam.

### **3-2-5 Public Hygiene Approach with Control of Parasitic Disease as a Point of Introduction**

In order to improve the health status of a community, it is preferable to first develop a relationship of trust between medical services personnel and the community. This will produce opportunities for the two parties to discuss health issues and work together in public health activities suited to the needs of the community. These early activities will in turn lead to better understanding on the part of community residents of the need for public health programs, and increase their participation. Recognition of the benefits will lead to residents tackling public health problems of their own initiative, and participating in fundraising activities to keep programs going.

Programs to prevent soil-mediated parasitic disease were incorporated into general public health improvement initiatives in Japan, and were used as a means of establishing a system of primary health care. A characteristic of these projects was that the aim was not merely prevention of disease by the target parasites, but rather the true objective was to link parasite control with other public health problems, and using success in the prevention of parasitic disease as the foundation for other preventive health activities. Examples where extermination of parasites has produced a

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<sup>33</sup> Training of parasitologists in developing countries is important, but Japan is also experiencing problems in this regard, with fewer researchers with field experience in the control of soil-mediated parasites, and a lack of opportunities to gain hands-on experience, such as field trips. Future cooperation may take the form of field work in developing countries, and South-South cooperation.

relationship of trust between medical services personnel and villagers, leading to a new enthusiasm in tackling other public health problems, can be seen in Japan's experience and in Japanese cooperation in developing countries. The Japanese Organization for International Cooperation in Family Planning (JOICFP) is presently conducting an "Integration Project (IP)" linking parasite control with family planning. Taking inspiration from the success of parasite control initiatives in Japan, a program to prevent soil-

mediated parasitic disease, where the cause is readily seen and understood, and the results of treatment are quickly seen, was chosen as the introductory part of this IP. Hygiene education was provided to the community residents, and once the trust of the community had been achieved, family planning activities were commenced with community participation. This IP has been conducted in a number of developing countries; attracting favorable impressions (see Chapter 4 "Family Planning" and Box 5-6 for details of this IP). This IP demonstrates

**Box 5-6 Japanese Organization for International Cooperation in Family Planning  
Integration Project (IP) in China  
(also see Chapter 4 "Family Planning" and Box 4-6)**

Characteristic of the JOICFP Integration Project (IP) in China was the choice of a parasite control program as the introductory part, in light of community needs and the rapidity of results. It was therefore welcomed by the residents of the project regions, and was able to bring about comprehensive village reconstruction through incentives to improve lifestyles and raise living standards. Another end product was a marked improvement in reproductive health.

Activities associated with this project included training in promotion for each level (government, village committees, primary school headmasters and class teachers), education in parasite control as part of school health, and education in family health via children and outreach. Where needed, water towers were constructed to ensure a safe supply of drinking water, flushing toilets were introduced (methane gas from septic tanks used to produce electricity and cooking gas for stoves), and assistance for women's groups raising livestock, tree planting and starting small businesses selling food and drink. Worthy of note are the following points: ownership of this project was entirely in Chinese hands; extremely detailed, highly accurate and multifactor evaluation is being performed on this project (detailed baseline assessment was performed to allow accurate assessment of results); and high level of interest and cooperation from Chinese officials, academia and the community, particularly academics (15 have published papers: the depth of interest can be gauged by the number ).

The Chinese have made this IP completely their own and plan to achieve the "triple combination: family planning, prosperity through the work of the farmers, and building cultured and happy families." This project will continue using an integrated approach, aiming to achieve happiness through public health activities, and can serve as a model for a global public health approach.

Source: Japanese Organization for International Cooperation in Family Planning (2000) *2001 nendo Gaimusho Kaigai Gijutsu Kyoryoku Suishin Dantai ni yoru Jinko, Kazoku Keikaku Moderu Purojekuto Suishin Jigyo—Chugoku Purojekuto Hyoka Chosa Hokokusho—Hainansho Konhaishi to Shanshisho Dariken Purojekuto* [Evaluation Report on Population and Family Planning Model Projects in Qionghai City of Hainan Province and Dali County of Shaanxi Province in China undertaken through a Ministry of Foreign Affairs FY2001]  
----- (2002) *Jinko Kazoku Keikaku Ripurodadutibu Herusu Bunya Kokusai Kyoryoku Jigyo Chugoku IP Hyoka Ronbunshu* [International Cooperation Activities in Population, Family Planning and Reproductive Health—Report of Evaluation and Research on China's IP]

the effectiveness of the approach whereby “diseases” and “problems” common to a community are discovered, and the program to combat this “condition” is linked to improvements in public health and regional development.

#### 4. Immunization Program

The aim of immunization is to prevent each individual from contracting vaccine preventable diseases through immunity as well as to prevent the group of people from epidemic of infectious diseases by maintaining a high level of immunity in the group (herd immunity)<sup>34</sup>. Immunization is considered an extremely effective public health measure, and in 1974 the WHO and the United Nations Children’s Fund (UNICEF) jointly initiated the Expanded Program on Immunization (EPI) to prevent infectious diseases in childhood. They have made an effort to reduce the burden of vaccine preventable diseases through immunization originally on six EPI targeted diseases: diphtheria, pertussis, tetanus, poliomyelitis, measles and TB, to which hepatitis B, yellow fever, and haemophilus influenzae type B were added later in some areas. The WHO heralded its intention to eradicate poliomyelitis globally by the year 2005, and the American Region, the Western Pacific Region, and the European Region have been certified as polio-free. International organizations such as the WHO and UNICEF, and a number of donor countries, invested considerable effort in vertical programs in the EPI through the 1990s, but not all countries have achieved as high immunization coverage as expected.

In Japan, immunization programs have yielded excellent results, including the extermination of smallpox and poliomyelitis. In this essay, we will discuss several activities in Japan that may be applicable to developing countries in promoting their own immunization programs.

#### 4-1 Immunization Programs in Japan

##### 4-1-1 Trends in Programs

###### 1) Pre-WWII Programs (~1944)

Japan has a long history of immunization programs stretching back 150 years. In response to the large numbers of deaths from smallpox, in 1876 the “Smallpox Prevention Regulations” were promulgated. With no effective methods of prevention and treatment available at the time, smallpox vaccination was made compulsory with penalties for those not undergoing immunization by the Regulations.

The “Communicable Disease Prevention Regulations” promulgated in 1880 were a pioneer for a modern infectious disease prevention policy. They required doctors to report patients with any of six infectious diseases (cholera, typhoid fever, dysentery, diphtheria, epidemic louse-borne typhus, and smallpox), and patients to be isolated if necessary. In principle local governments (municipality level) were designated for implementation bodies for infectious disease control. In 1897, with the enactment of the “Communicable Disease Prevention Law,” two new diseases (scarlet fever and bubonic plague) were added as target diseases. Moreover the roles of the national and local governments, individuals, and doctors were made clearer as were their respective financial obligations.

Despite these programs combining case identification, treatment and prevention, spread of infectious diseases could not be stopped. There were frequently large epidemics of smallpox in the late 19th century and the outbreak in 1908 killed 17,832 people. In response, the government enacted the “Immunization Law” in 1909. This law reinforced the system of smallpox vaccinations to clarify that local governments were responsible for implementation of vaccination and to prescribe the procedure, methods, and management based on family registers.

<sup>34</sup> Suzuki, Shosuke and Hisamichi, Shigeru eds (2003) *Shinpuru Eisei Koshueisei-gaku 2003* [Simple Hygiene and Public Health 2003] Nanko Do.

**Table 5-6 Immunizations and the Target Disease**

	Vaccination type	Target disease	Notes
Immunization Law	Routine (recommended) immunization Category I	Diphtheria (D) Pertussis (P) Tetanus (T)	Generally, DTP in Phase I, and DT in Phase II
		Poliomyelitis Measles Rubella Japanese Encephalitis	Poliomyelitis vaccine is usually administered twice a year, once in spring and once in fall
	Category II	Influenza	Elderly aged over 65, and other groups
	Temporary schedule	No diseases under this category at present	The Prefectural Governor designates diseases as specified by the Minister of Health, Labour and Welfare
Tuberculosis Prevention Law		Tuberculosis	BCG is administered to people with a negative Mantoux (tuberculin) test
Voluntary immunizations		Mumps Chickenpox Hepatitis B Other	As part of the Hepatitis B Mother to Child Transmission Prevention Project, pregnant women are tested for hepatitis B. Newborn children of HBsAg* positive mothers are administered hepatitis B vaccine, covered by health insurance.

Source: Suzuki, Shosuke and Hisamichi, Shigeru eds (2003) p. 59

\*Hepatitis B surface antigen

#### **Box 5-7 The Effect of Suspension of the Vaccination Program on the Prevalence of Pertussis**

The reason that the response to adverse effects after immunization became necessary was the controversy over adverse reactions (encephalitis, encephalopathy) of continued smallpox vaccinations that had not been detected since 1955 in Japan. Similarly, adverse reactions of DPT (diphtheria, pertussis, and tetanus) vaccines became a social problem in the 1970s. Measures taken by some local governments, such as the use of DT toxoid excluding the pertussis component, lowered the pertussis immunization rate. Some deaths caused by DPT vaccines were confirmed, thereafter the Ministry of Health and Welfare officially suspended DPT for a 2 month period in 1975. Although the suspension was only for 2 months, the recommended age of administration of pertussis vaccine was raised from less than 3 months to less than 24 months, and even after the recommencement, some local governments continued to substitute DT toxoid for DTP.

These factors and a loss of enthusiasm for vaccinations in general led to the vaccination completion rate falling to below 20% the following year, 1976, in the official statistics (statistics from the public sector only). This led to a massive increase in notified cases of pertussis from 1,084 in 1975 to 13,105 in 1979. In response to this increase in the incidence of pertussis, the whole cell DPT vaccine was replaced in 1981 by the acellular DTP vaccine causing a relatively lower incidence of adverse reactions. The subsequent recovery of the vaccination rate caused the incidence of pertussis to fall sharply, and it has remained low to the present day. This experience shows us just how much cases of diseases will increase if the immunization rate falls.

Source: Kimura (1987, 1988)

Following epidemics of influenza and typhoid fever, the national government directed local governments to conduct immunization for these diseases. However, the lack of scientific evidence concerning effectiveness of immunization for these two diseases disturbed the establishment of a system of routine immunization.

## **2) Establishment of an Immunization Program after WWII (1945~1969)**

The Japanese economy and society were exhausted by the World War II, and post-war epidemics of infectious diseases such as typhoid fever were major problems. The government, under orders from GHQ, expanded its immunization program. New scientific evidence of the efficacy of vaccines for diseases such as typhoid fever and epidemic louse-borne typhus gave further impetus to the evidence-based immunization program. The “Immunization Law” prescribing that local governments administered routine immunization for six diseases (smallpox, diphtheria, typhoid fever, paratyphoid fever, pertussis and tuberculosis) was enacted in 1948. The role of immunization at this time was thought to be “protection of society” through limiting the spread of diseases.

## **3) Transition from Compulsory to Recommended Immunization (1970~present)**

Although smallpox had almost disappeared in Japan by the 1970s, continuation of the vaccination with the risk of adverse reactions became a nationwide controversy. This led to a wider discussion of the possibility, although rare, of adverse reactions by immunizations resulting in disability, or even death. The 1977 revisions to the Immunization Law made the national government responsible for compensation for health damage caused by adverse events following immunizations.

The decade of 1990s saw improvements in living and hygiene standards, advances in medical science, and also changes in the way of thinking of

the people. In response to these changes in society, further revisions to the Immunization Law in 1994 made immunization become no longer compulsory, but rather recommended by the national government. The system of compensation for damage caused by adverse reactions was also strengthened. The way of thinking regarding infectious disease control shifted from protection of society to individual protection; consequently having its accumulated effect as the protection of society.

The rate of influenza vaccination fell sharply after the 1994 revisions of Immunization Law. It resulted in increased numbers of deaths from influenza among the elderly. Public subsidy for influenza immunizations for the elderly was therefore introduced in 2001.

## **4-1-2 Kinds and Delivery System of Immunizations at Present**

Immunizations presently offered in Japan can be divided into three categories, those stipulated in the “Immunization Law” revised in 1994 and “Tuberculosis Control Law,” and “Voluntary Immunizations.” Following the 2001 revisions to the “Immunization Law,” immunizations were further classified as routine and temporary schedules, and the routine immunizations subdivided into Category I and II diseases. Immunizations for the seven Category I diseases aim to prevent the spread of infections within the community, whereas immunizations for Category II diseases aim to prevent disease in individuals, indirectly reducing the spread of infections within the community. When the “Law Concerning the Prevention of Infectious Diseases and Patients with Infectious Diseases” (Infectious Diseases Law) was enacted in 1998 (enforced in 1999), only tuberculosis was not integrated with other infectious diseases. The BCG continues to be administered in accordance with the Tuberculosis Control Law, and is recommended for children<sup>35</sup>.

These laws stipulate the age at which

<sup>35</sup> Suzuki, Shosuke and Hisamichi, Shigeru eds (2003) *Shinpuru Eisei Koshueisei-gaku 2003* [Simple Hygiene and Public Health 2003] Nanko Do.

vaccinations are to be given, the timing and method of administration, and the responsibility for adverse reactions. Vaccinations other than the regular and temporary schedules are all considered to be voluntary immunizations.

Before vaccinations are administered, the health status of recipients is confirmed by medical history and examination. The law set provisions independently for those who should not receive routine scheduled immunizations as contraindications and those who require special precautions upon administrations. Polio and BCG immunizations are administered in group sessions, but the other immunizations are administered individually usually by family doctors.

Immunizations are administered under the responsibility of municipalities that identify children (immunization recipients) who require vaccinations from their residents rolls, and notify recipients which vaccinations are to be undertaken and where. On receipt of the notification, recipients attend the designated institution (including private medical institutions), and receive immunizations individually. Immunization institutions report the result to the municipality, which uses the information to derive immunization rates.

Each municipality also determines when group polio and BCG immunizations should be held, and informs the recipients of the date. These group immunizations are often held at public health centers. Immunizations are administered not only in public health centers and public medical institutions but also in designated private medical institutions. The immunization cost in private institutions as well as public institutions is free of charge to qualified recipients defined by the regulation. Parents are encouraged to bring their Maternal and Child Health Handbooks when their children receive vaccinations for administering institutions to record the details (date, type of vaccine and Lot Number). The Handbook is also used as a resource to schedule subsequent

vaccinations, and know details in the case of adverse reactions.

#### **4-1-3 Infectious Disease Surveillance Program**

An infectious disease surveillance program was commenced for 18 diseases including tuberculosis in 1981. It aimed to monitor the spread of infectious diseases, provide information to healthcare providers, and assist in the provision of appropriate preventive measures such as vaccinations. Under this program, infectious diseases that have been diagnosed at specified medical institutions (includes private institutions, and not only public institutions such as national hospitals) are notified to the relevant public health center, and these notifications are collated by the Ministry of Health, Labour and Welfare. Weekly infectious disease bulletins are published by the Infectious Diseases Surveillance Center of the National Institute of Infectious Diseases, and information is available on demand over the internet. This system collects observations from fixed sites (sentinel surveillance), so it does not have all cases, but it does enable assessments of trends (time and place) in the spread of infectious diseases<sup>36</sup>.

#### **4-1-4 National Movement to Obtain Supplies of Poliomyelitis Vaccine**

A worldwide epidemic of poliomyelitis in 1952 mobilized many countries to promote research and development of a preventive vaccine. In Japan, however, despite increasing numbers of poliomyelitis patients after 1955, the government did not put vigorous effort into a response to this disease. An outbreak of poliomyelitis in Hachinohe City, Aomori Prefecture, occurred in July 1959, but the government failed to import a sufficient number of vaccines from the U.S. In response to strong demand from mothers, the "New Japanese Medical Association" requested emergency vaccine supply from the Soviet Union, resulting in a delivery of 600 liters of vaccines. At first, the government refused

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<sup>36</sup> Nakatani, Sano, and Iuchi (2002)

to allow this vaccine to be used, citing a lack of facilities. The ensuing public outcry led to the eventual release of the imported vaccine. Some 27,000 doses of vaccine were administered, covering 90% of those eligible in a mass campaign, and no outbreaks of polio have occurred in Japan since 1960, the following year.

Outbreaks of polio did occur in more than ten prefectures in 1960 and at the Sixth Mother's Association Congress that year a resolution was passed to promote a poliomyelitis eradication campaign, through the large-scale importation of vaccines and the free vaccination program. This movement prevailed nationwide, and a "Central Committee to Protect Children from Infantile Paralysis" (or Polio Committee) was established. Following a nationwide epidemic in 1961, demands from the Polio Committee for large-scale administration of live vaccines drove a powerful national lobbyism to the national and local governments. In June 1961, the national government decided to import 13 million doses of live poliomyelitis vaccines from the Soviet Union and Canada, and commenced an emergency immunization program. As a result, the number of notified cases of polio fell from 5,606 in 1960 to 2,436 in 1961, then to 389 in 1962 and 140 in 1963, spelling the end to polio outbreaks.

This popular movement demanding live vaccines is a landmark in the history of public health in Japan, changing the way of thinking in the administration of disease prevention, and showing how an organized popular movement based on the demands of mothers changed government policy<sup>37</sup>.

#### **4-2 Immunizations in Developing Countries in the Light of Japanese Experience**

Immunization activities are under way in developing countries, with widespread acceptance

of the Expanded Program on Immunization (EPI) promoted by international organizations including the WHO and UNICEF, and the establishment of the Global Alliance for Vaccines and Immunization (GAVI). However, it cannot be said that all developing countries can implement EPI programs fully as is recommended, and immunization coverage needs to improve more. This will require a strong commitment to immunization programs of national governments, clarification of roles of the administration organs, and reinforcement of the system of immunization delivery. We will discuss below the aspects of Japan's experience on these points.

##### **4-2-1 Commitment and Roles of Governments in Conducting Immunization Programs**

Immunization programs in Japan were initially mandatory in the name of the protection of society. Over the years, advances in medicine for infectious diseases, different patterns of disease outbreaks, and changes in the attitude of society have led to greater respect for individual choices as opposed to obligation. The roles of the national and local governments have also changed accordingly.

In Japan, the Immunization Law stipulates that the costs of all vaccinations specified in the public schedule at the specified time are borne by local governments. Compensation for any serious adverse reactions caused by vaccinations is also stipulated by Cabinet Ordinance, with all related costs paid from the public fund. It is the role of the national government to disseminate information on immunization, so that the people can undergo immunization on the basis of accurate knowledge. This requires active effort from the national and local governments to ensure that the people have access to the right immunization at the right time. The government has duties not only to simply bear the necessary costs of the implementation of

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<sup>37</sup> Hashimoto, Masami (1968) *Chiiki Hoken Katsudo - Koshueisei to Gyosei-gaku no Tachiba kara* [Community Health Activities - From the Standpoint of Public Health and Public Administration], Igaku Shoin and Oguri, Shiro, Kinoshita, Yasuko, Uchibori, Chieko ed. (1984) *Hokenfu no Ayumi to Kosshu Eisei no Rekishi - Kosshu Eisei Jissen Siriizu 2* [The History of Community Public Health Nurses and Public Health - Series of Practice for Public Health]

immunization program, but also to disseminate appropriate information to the populace. This kind of system enabled the promotion of the immunization program from the time when infectious diseases were endemic and resulted in the reduction of the disease burden. The change from compulsory to voluntary immunization, however, has led to a drop in the immunization rates. Although this has not caused an increase in the incidence of disease, clearly there are some other issues to be discussed on the implementation of the immunization program in Japan.

In developing countries, it is probably an effective approach for the government to show strong leadership and compulsion to a degree until the immunization program is accepted at a certain level. At the same time, it would be helpful to provide immunization free of charge, educate the people concerning immunization, and compensate adverse reactions. As was the case in Japan, it is assumed that the time when individual choice is given priority will come sooner or later. In that case, it will be necessary to consider the response to avoid an increase in the incidence of infectious diseases after the reduction of the immunization coverage.

#### **4-2-2 Implementation of Immunization Activities Using Existing Health System**

EPI activities in developing countries generally take the form of mass immunizations through outreach activities. Considering cost and sustainability, it is preferable to utilize existing public health service providers including hospitals and public health centers. This will allow better identification of target groups and vaccine needs, calculation of vaccine coverage, and planning of supplementary immunization activities as necessary.

Immunizations are given in Japan mostly at

two different kinds of locations. They are public health centers, where group vaccinations are given, and the usual healthcare providers (including private medical institutions) for individual vaccinations. In Japan, both public health centers and medical institutions were established soon after the WWII, and immunization programs therefore utilized the existing service providers. Notifications of both infectious diseases and adverse events following immunization follow the same route from medical institutions → public health centers → prefectures → the national government, and are collected in central level. Private medical institutions, as well as public institutions, are involved in the TB and infectious disease surveillance system, and notification system for patients with designated infectious diseases to their local public health centers. In this way, both public and private medical institutions participate in national infectious disease control programs.

Based on Japan's experience, Japanese technical cooperation has concentrated on strengthening EPI through reinforcement of existing public health services (e.g. technical cooperation projects for polio eradication in China and Lao PDR). In developing countries, building the capacity of human resources in the health sector is a serious challenge. However, it cannot be realized in a very short time at local healthcare facilities<sup>38</sup>. Until the 1990s the international aid community made a great deal of effort in the EPI, a vertical program. Now there is recognition that immunization coverage and program effectiveness will not improve until the overall capacity of health personnel is developed, so the need for strengthening the system of delivery of public health services including training for health personnel is also recognized.

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<sup>38</sup> Japan International Cooperation Agency Medical Cooperation Department (2001) Report on Evaluation of Pediatric Infectious Disease Prevention Project in Laos. Etc.

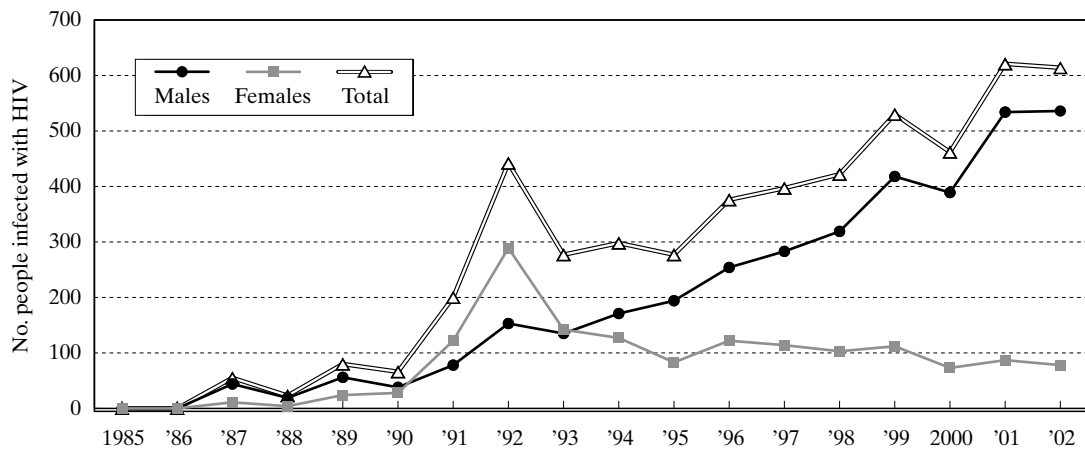


## Appendix 1. HIV/AIDS Control Measures in Japan

In Japan, AIDS (acquired immunodeficiency syndrome) cases were first reported in men who had sex with men and recipients of contaminated blood products (coagulation factor preparations) in 1985, followed by the first female cases in 1987. The number of people newly infected with HIV (human immunodeficiency virus) in 2000 was 789 (including foreign residents in Japan), an eightfold increase over the 97 new cases in 1990. As of

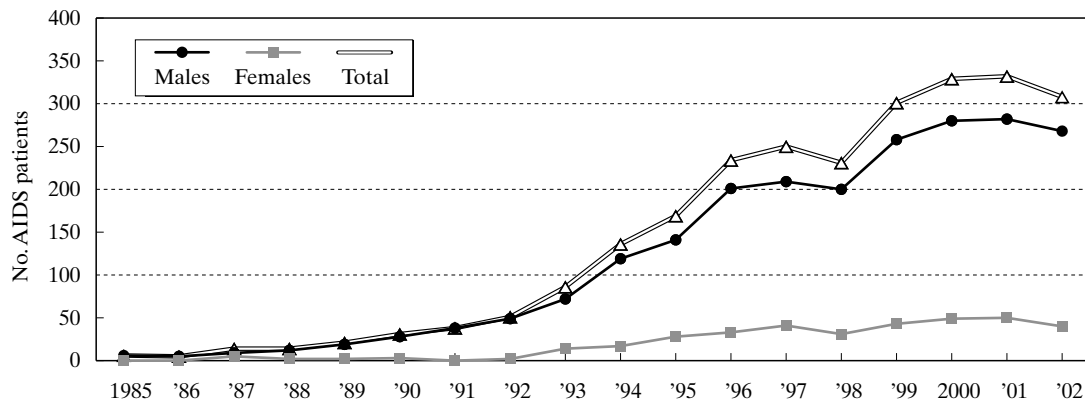
March 2002, there were 4,649 people infected with HIV, and 2,311 AIDS patients in Japan. Sexual transmission accounted for approximately 80% of cases. Although measures to control HIV/AIDS have been introduced, Japan is the only developed country where the number of new HIV cases continues to rise, so the results are not considered satisfactory.

**Figure 5-3 Trends in Prevalence of HIV Infection**



N.B. Total of Japanese and foreigner residents in Japan  
Source: Ministry of Health, Labour and Welfare AIDS Surveillance Committee (2002)

**Figure 5-4 Trends in Number of People Living with HIV/AIDS**



N.B. Total of Japanese and foreigner residents in Japan  
Source: Ministry of Health, Labour and Welfare AIDS Surveillance Committee (2002)

- **Response to HIV Infections Caused by Contaminated Blood Products**

In the early 1980s, non-heat treated blood products were imported from the U.S. for the treatment of hemophilia. Some 2,000 patients, or 40% of all hemophiliacs in Japan, were infected with HIV by contaminated coagulation factor preparations. Those affected and their families filed a suit against the Ministry of Health and Welfare and five pharmaceutical manufacturers in Osaka in 1988 and in Tokyo in 1989. It reached a peaceful settlement in 1996.

Following the settlement of the lawsuit, the Ministry of Health, Labour and Welfare has implemented the following measures to deal with people with HIV/AIDS.

- 1) Improvement of the healthcare system: as well as AIDS Clinical Center (ACC), which is a specialized HIV/AIDS research and treatment center, hospitals in eight regional centers were designated to cover the entire country, ensuring all those infected with HIV to receive appropriate treatment. Early approval system of anti-AIDS drugs was set up.
- 2) Assistance to individual patients: persons infected with HIV became eligible for social welfare assistance. The government covers all medical expenses for secondary and tertiary infections from a patient infected via contaminated blood products.
- 3) Condolence measures: counseling will be offered for the families of the deceased.

In addition to the above measures, the Ministry of Health, Labour and Welfare has taken additional steps to ensure the efficacy and safety of pharmaceuticals and medical equipment. This was partly in response to the lawsuit brought by people infected with Creutzfeldt-Jakob Disease (CJD), a serious and untreatable brain Disease, through dura mater grafts. Aiming for smooth implementation of

Good Clinical Practice (GCP), the Ministry is in the process of reinforcing the system of approval of therapeutic goods for increase of efficiency.

- **Awareness and Information Campaigns**

The number of people infected with HIV increased through the late 1980s and early 1990s. AIDS awareness campaigns in the early 1990s using television commercials and posters led to an increase in the number of people undergoing testing for HIV. A temporary increase in the number of cases was seen in 1992, due to the test results of previously untested people, but the number of new cases stabilized afterward, and there have been no further sudden increases. The change in mindset regarding sex resulted in the start of sexual activities at earlier ages. On the other hand, the knowledge about sexually transmitted infections (STIs) did not spread. It caused an increase in the incidence of STIs particularly Chlamydia mainly in young people from the late 1990s. Additionally there was an increase in the number of reported cases of new HIV infections.

There is an example of the attempt at a grassroots level to address STIs problem in young people. Dr. Akaeda, who runs an obstetrics and gynecology clinic in Roppongi, a popular youth spot, became aware that young women were reluctant to see a gynecologist even when they have a sexual problem, citing obstacles such as, "I'm scared of gynecologists"; "I can't ask for the health insurance card from my parents"; "It's not serious enough to see a doctor"; and "Seeing a doctor is too expensive." To counter these objections, Dr. Akaeda started HIV tests for free at live music clubs, where young people gathered. He also set up a free clinic once a week from 9 pm until late at night in a hamburger shop, where young people could bring along their sex-related concerns without hesitation. Delicate and sensitive response to needs like this example are required in STIs control because it relates to the issue of privacy<sup>39</sup>.

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<sup>39</sup> Reference: Akaeda Roppongi Clinic homepage (<http://www.akaeda.com/soudan/index.html>) (Mainichi Newspaper Tokyo Morning Edition 24 May 2002)

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## Appendix 2. Response to Hansen's Disease (Leprosy)<sup>40</sup>

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References to leprosy are found in the “Nihon Shoki” (Chronicles of Japan) from the Nara Period, AD 710 to 784. At that time, it was considered a hereditary disease, a mistake due to its long incubation period ranging from several years to several decades. It was feared an incurable disease since there was no effective treatment. As leprosy causes severe deformities of the skin of the face and limbs, many patients were ostracized by society due to their appearance, and forced to live homeless.

At the first international leprosy conference held in 1897, it was confirmed that leprosy is a communicable disease, and segregation of those afflicted with leprosy was proposed as the best means of prevention. The first survey of all leprosy patients in Japan was conducted in 1900, and it revealed a total of 30,359 patients nationwide (a prevalence of 6.43 per 10,000 population). The first leprosy control measures were implemented in 1907 in accordance with the Statute No. 11 (later the “Leprosy Prevention Law”). Due to the lack of an effective treatment at that time, these measures mainly comprised the isolation and disinfection of patients who had previously been vagrants for socio-economic reasons.

The “Leprosy Prevention Law” was enacted in 1931. The new Law made provisions for leprosy patients to be confined to leprosaria and to be excluded from occupations where there was any danger of transmission of infection, and for the cost of their confinement to be borne by the national or local governments. The more the number of beds in the leprosaria was increased, the more leprosy patients were confined with a strong nationwide anti-leprosy movement to put all leprosy patients under lifetime isolation. The life in the leprosaria was so harsh that patients

were forced to work, forbidden to leave facilities, and vasectomy and abortion were imposed in cases of marriage between patients.

After an anti-leprosy drug was developed, early diagnosis and treatment, and social rehabilitation became standard procedure internationally after WWII. It was also expected in Japan that the patients receive better treatment as respect for fundamental human rights became popular. The Leprosy Prevention Law, however, was revised in 1953 with continuation of existing policy of isolation as a core component. The new Law provided for admission to leprosaria as a recommendation rather than a compulsion, and for the treatment and welfare of patients rather than for patients management. The underlying purpose remained prevention of the spread of infection through segregation of those infected, and leprosy was still regarded as an incurable chronic infectious disease.

It subsequently became clear that leprosy is not highly infectious, and is not transmitted through normal contact at all. This led to a worldwide recognition that isolation of leprosy patients was unnecessary, but the Japanese system of segregation in accordance with the “Leprosy Prevention Law” continued unchanged. Former patients, who used to be confined in leprosaria, continued to protest against faults of the “Leprosy Prevention Law,” yielding gradual improvements to living conditions in leprosaria, and the Law was finally repealed in 1996. Since then, leprosy patients are treated similarly to other patients.

Former patients brought a claim against the national government for compensation for the wrongs committed against them over many years. In 2001, the Kumamoto District Court found the

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<sup>40</sup> Based on material from the Hansen's Disease Museum, and Aoki (2002)

Ministry of Health and Welfare to have been negligent in continuing the policy of segregation and attempting to change social awareness, and the national government at fault for failing to revise the law to improve the situation. In view of a need for a quick settlement due to old age of patients and former patients, the government decided not to appeal to a high court, and a full settlement was reached in 2002.

In this way, the afflicted have finally won the right to live in freedom, but many of them are old and facing difficulty in returning to society after the isolation from outside of leprosia for decades. Even after settlement has been reached on their lawsuit, some 4,000 ex-patients still reside in the leprosia. Accordingly the government introduced measures in 2002 to solve remaining problems with

leprosy quickly and completely by provisions of benefits to promote social rehabilitation for those who left leprosia and to restore the honor of the deceased.

As we have seen, the government's isolation policy caused unnecessary suffering to leprosy patients. In this instance, Japan's experience gives us a lesson that an inappropriate government policy can cause irreparable damage, and the government needs to take careful and prompt actions for improvement. This experience also reminds us of the importance of petitioning from the people to change the national policy, as we see is demonstrated in a change in the governmental response to leprosy brought about by former patients' tireless approaches for law reform.