TUBERCULOSIS IN JAPAN

Annual Report – 2018

Tuberculosis Surveillance Center-RIT/JATA
Japan

About the Tuberculosis Surveillance Center

The Tuberculosis Surveillance Center, located within the Department of Epidemiology and Clinical Research, the Research Institute of Tuberculosis, Japan, is committed to providing technical support for the national computerized tuberculosis surveillance system, as well as compiling annual TB report, analyzing surveillance data and disseminating findings to all those involved in TB control in Japan.

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Notes on the report

This report presents detailed data on TB case notifications made to the Japan TB Surveillance System to the end of 2017. It is largely based on the Book of TB Statistics, published by the Japan Anti-Tuberculosis Association, and available as a printed report in Japanese, however, several additional and original analyses are made for international readers.

All figures in this report are available for download as a separate slide set also at http://www.jata.or.jp/rit/ekigaku/en/statistics-of-tb/.

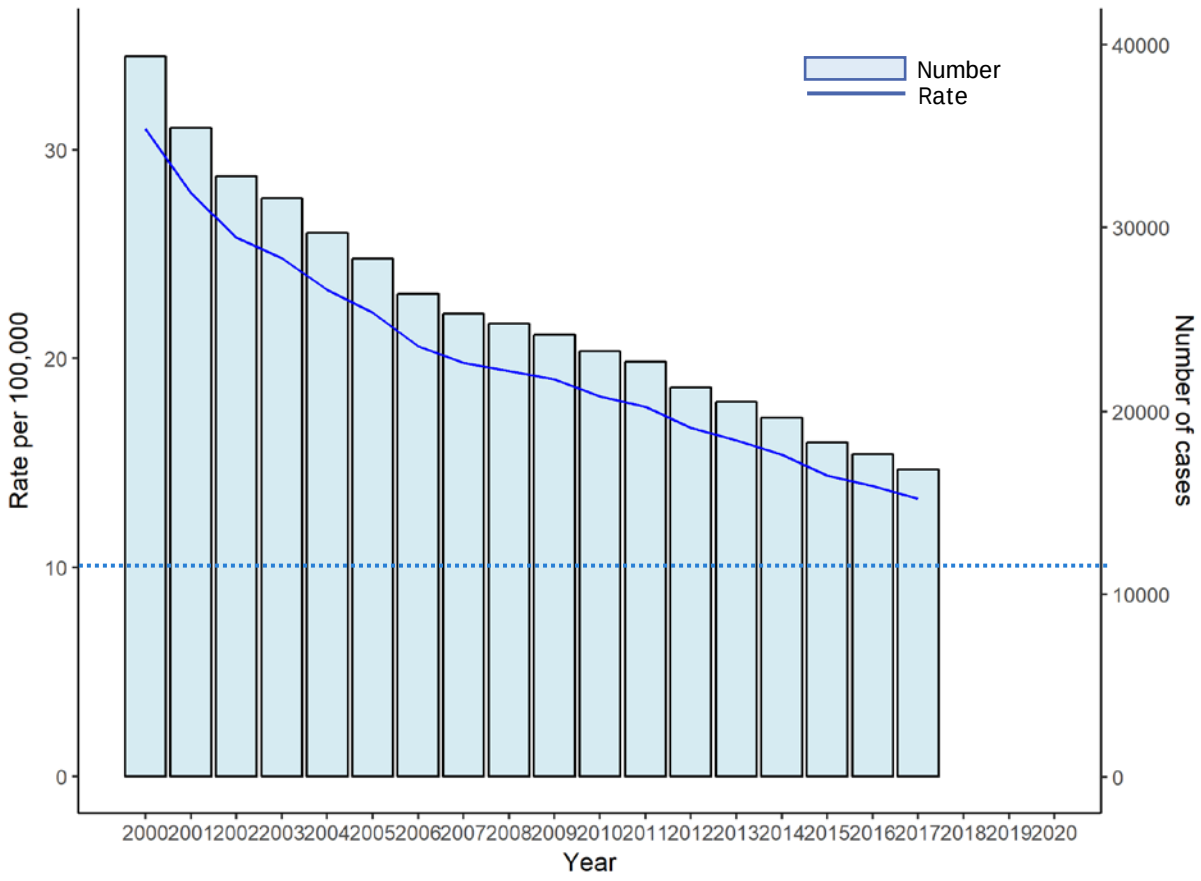
Chapter 1: Tuberculosis case report, 2000-2017

Overall numbers and rates:

In 2017, 16,789 cases of tuberculosis (TB) were newly notified, of which 12,953 were bacteriologically confirmed. Notification rate per 100,000 population was 13.3 for all TB, and 10.2 for bacteriologically confirmed cases.

Both the number of new cases and notification rates per 100,000 have continued to decline steadily towards the national target of below 10 per 100,000 by year 2020, which is indicated by straight blue line in Figure 1 (see also Table s1).

Figure 1. TB notification and rates, 2000-2017



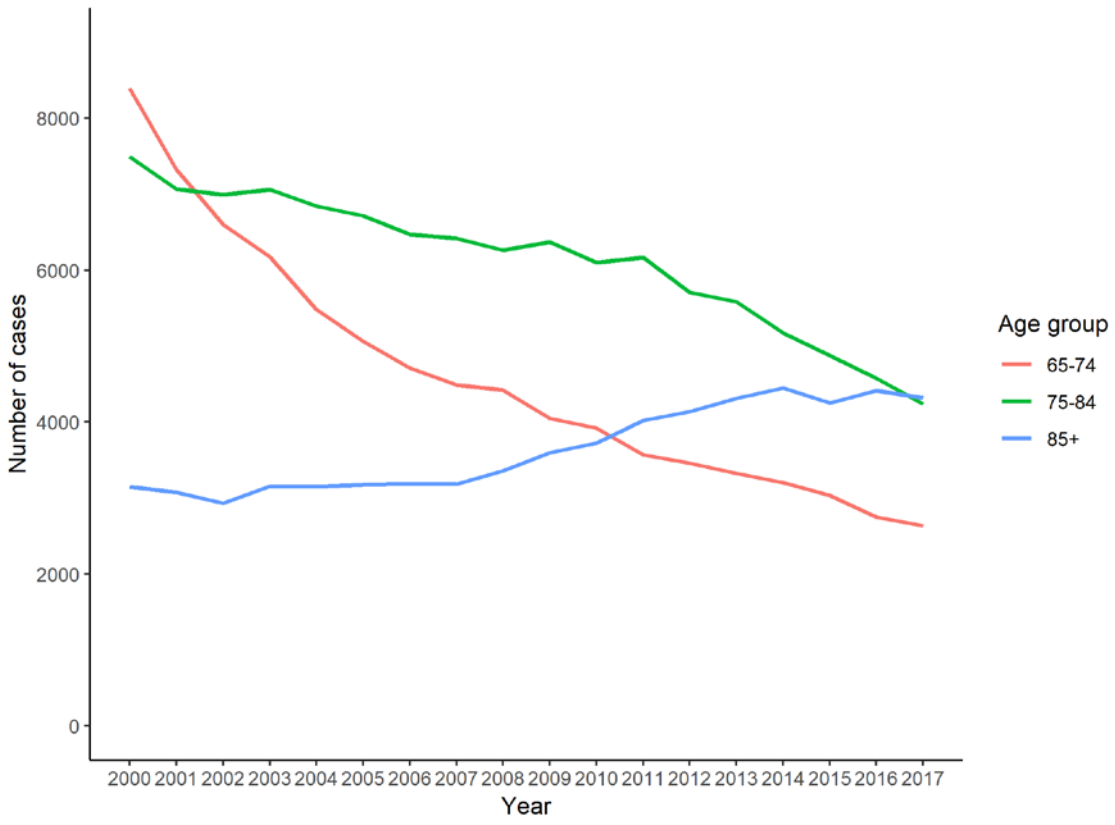
Age and sex:

In 2017, 60.6% of the notified cases were males (10,171 / 16,789) and 39.4% were females (6,618 / 16,789).

The largest number of cases were diagnosed among those aged 85 to 89 (2,414 cases, a rate of 71.1 per 100,000), followed by those aged 80 to 84 (2,408 cases, a rate of 45.5 per 100,000). The rates were consistently higher among males than females in all age groups (see Table s2).

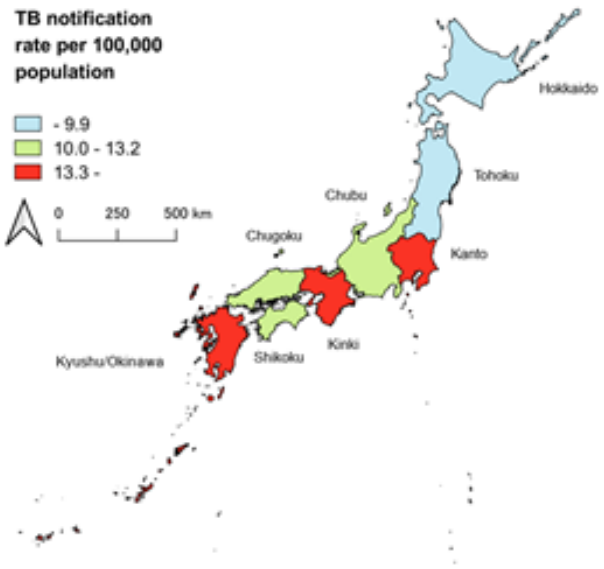
Among the elderly aged 65 and above, only the age group 85 years old and above had continued to increase in the number of cases until 2014 – however, since then, the number appears to be stable (Figure 2, see also Table s3).

Figure 2. TB notification among the elderly, 2000-2017



Geographical distribution:

In terms of regional disparities, large variation existed between the 8 regions of Japan, with the notification rate ranging from 8.3 per 100,000 in Tohoku region to 17.2 per 100,000 in Kinki region (Map 1, Table 1). In two regions, the notification rate per 100,000 has reached the national target of 10 per 100,000.



Map 1: TB notification rate by regions, 2017

Table 1. TB notification rate by regions, 2017

Regions	Population	No.TB cases	Notification per 100,000
Hokkaido	5,320,082	461	8.7
Tohoku	8,836,310	730	8.3
Kanto	43,246,653	5779	13.4
Chubu	21,356,108	2583	12.1
Kinki	22,430,165	3860	17.2
Chugoku	7,368,766	852	11.6
Shikoku	3,788,527	498	13.1
Kyushu/Okinawa	14,359,599	2026	14.1

Occupation:

In 2017, among those aged 25 to 64, 69.7% (3,329 / 4,777) had some sort of job, while 20.7% (991 / 4,777) were unemployed, 2.4% (114 / 4,777) were houseworkers and 3.6% (171 / 4,777) were students. 3.6% (172 / 4,777) were recorded as “job unknown” (see Table s4).

Social risk factors among those aged 25-64:

Social risk factors (SRF) are defined as the following: those either currently homeless or with history of being homeless within one year of diagnosis (“homeless”), those unemployed (“unemployed”), those receiving social welfare benefit at the time of diagnosis (“on social welfare”), and those not covered under any health insurance at the time of diagnosis, including those “covered” but not being able to pay the premiums, and thus practically are not able to access the necessary health services (“no insurance”). “Homelessness”, “unemployed”, and “on social welfare” and “no insurance”, are not mutually exclusive. Among those aged 25 to 64, 8.3% (398 / 4,777) had at least one SRF.

The demographic characteristics of those with each SRF by sex, age groups and country of birth are summarized in Table 2. The proportions of those with SRFs tended to be higher among men than women, except being unemployed, among older than younger patients, and the foreign-born than Japan-born patients (Tables s5.a-s5.d).

Table 2. Number and proportions of those with social risk factors, by sex, age groups and COB*, 2017

	Homeless		Unemployed		On social welfare		No insurance	
	n	%	n	%	n	%	n	%
TOTAL	76	100.0	991	100.0	341	100.0	41	100.0
Male	74	97.4	625	63.1	289	84.8	41	100.0
Female	2	2.6	366	36.9	52	15.2	0	0.0
Age group								
25-34	2	2.6	136	13.7	9	2.6	0	0.0
35-44	6	7.9	145	14.6	26	7.6	4	9.8
45-54	27	35.5	234	23.6	104	30.5	15	36.6
55-64	41	53.9	476	48.0	202	59.2	22	53.7
Country of birth								
Foreign-born	2	2.6	172	17.4	14	4.1	0	0.0
Japan-born	72	94.7	776	78.3	313	91.8	39	95.1
COB* unknown	2	2.6	43	4.3	14	4.1	2	4.9

COB = country of birth

Clinical characteristics:

In 2017, of the 16,789 newly notified cases, 77.5% (13,011 / 16,789) had pulmonary disease, either with or without concomitant extra-pulmonary disease, while 22.5% (3,778 / 16,789) had exclusive extra-pulmonary disease. Of the pulmonary TB cases, 86.3% (11,227 / 13,011) were bacteriologically confirmed, while the proportion was much less at 45.7% (1,726/ 3,778) among those with exclusive extra-pulmonary disease (Table 3).

Of the 13,011 pulmonary cases, history of previous TB was known for 98.6% (12,834 / 13,011). Among newly notified pulmonary cases with known history of previous TB, 94.9% (12,174 / 12,834) were new cases. Of the 3,739 extra-pulmonary cases with known history of previous TB, 95.2% (3,560 / 3,739) were new cases (Table 3).

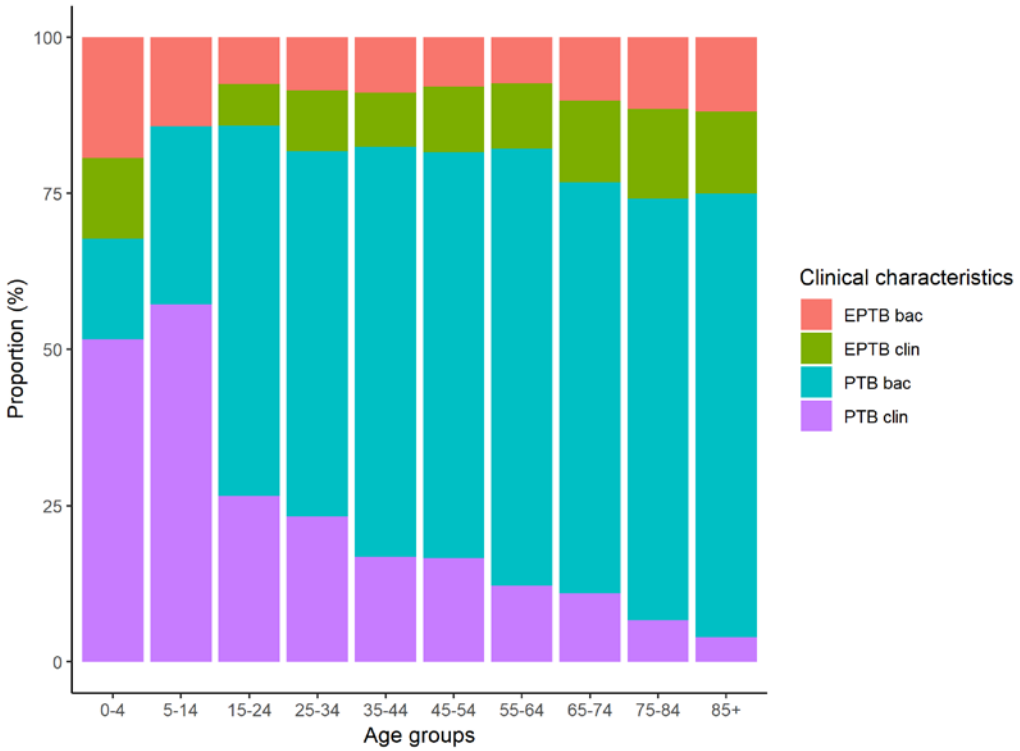
Table 3.Clinical characteristics of newly notified cases by treatment history, 2017

Tx history	PTB bac	PTB clin	PTB TOTAL	EPTB bac	EPTB clin	EPTB TOTAL
New	10,524	1,650	12,174	1,622	1,938	3,560
Retreatment	551	109	660	78	101	179
Unknown	152	25	177	26	13	39
TOTAL	11,227	1,784	13,011	1,726	2,052	3,778

Tx = treatment, PTB=pulmonary tuberculosis, EPTB = extra-pulmonary tuberculosis
clin = clinically confirmed, bac = bacteriologically confirmed

Looking at clinical characteristics by age groups, the proportion of bacteriologically confirmed among the pulmonary cases tended to increase with age, with 23.8% among those aged 0-4 compared with 94.7% among those aged 85 and above. The proportion of bacteriologically confirmed among the extra-pulmonary cases remained relatively constant in all age groups, and was the highest among those aged 0-14 at 60.0%, and the lowest among those aged 15-24 at 53.3%. All cases of extra-pulmonary cases diagnosed among those aged 5-14 were bacteriologically confirmed (Figure 3, see also Table s6).

Fig 3. Clinical characteristics by age groups, 2017



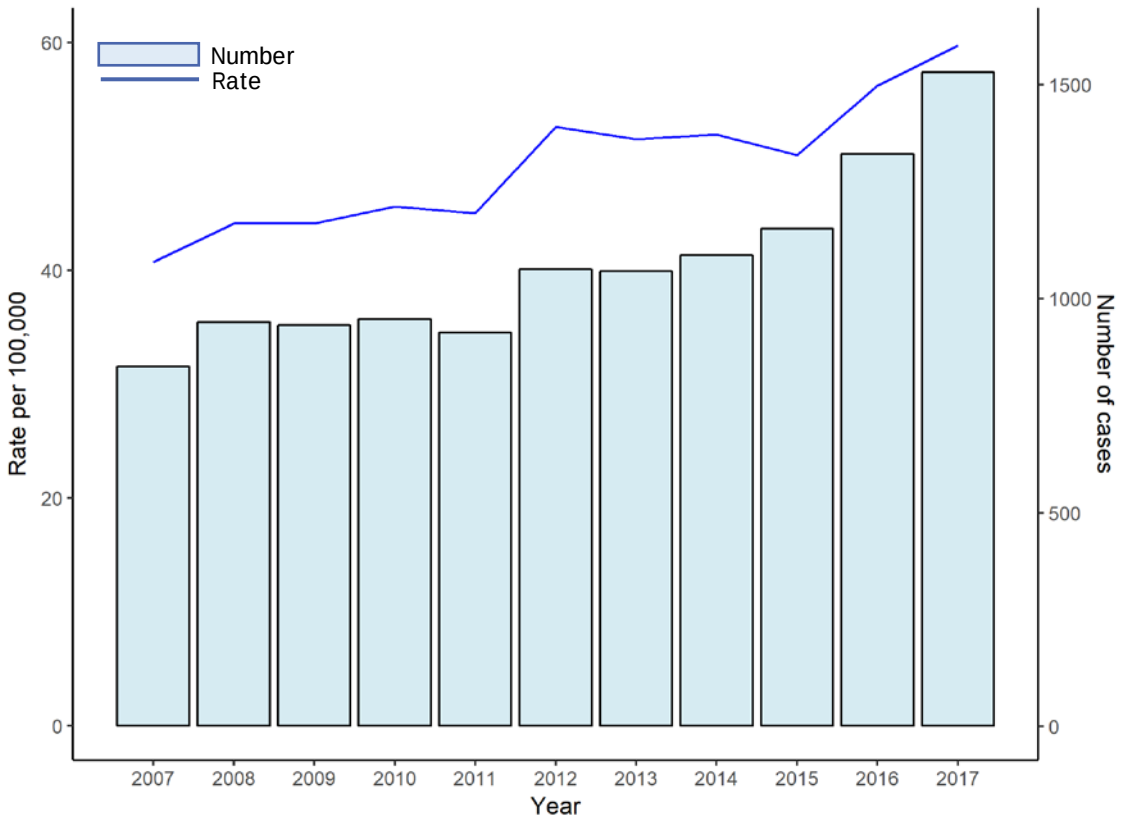
PTB = pulmonary tuberculosis, EPTB = extra-pulmonary tuberculosis
Clin = clinically confirmed, bac = bacteriologically confirmed

Chapter 2: Foreign-born TB, 2007-2017

Overall number and rates:

Information regarding place of birth (Japan-born/foreign-born) was known for 95.7% of the newly notified cases (16,063 / 16,789). Of those cases, 9.5**%** was born outside Japan (1,530 / 16,063). Both the number of case notification per 100,000 have continued to increase (Figure 4, see also Table s7).

Figure 4. Foreign-born TB notification and rates, 2007-2017



Age and sex:

In 2017,52.5% of the foreign-born cases were males (804 / 1,530) and 47.5% were females (726 / 1,530).

The largest number of cases were diagnosed among those aged 25 to 34 (565 cases), followed by those aged 15 to 24 (503 cases). 69.8% (1,068/1,530) of foreign-born persons were aged between 15 and 34 (Table 4).

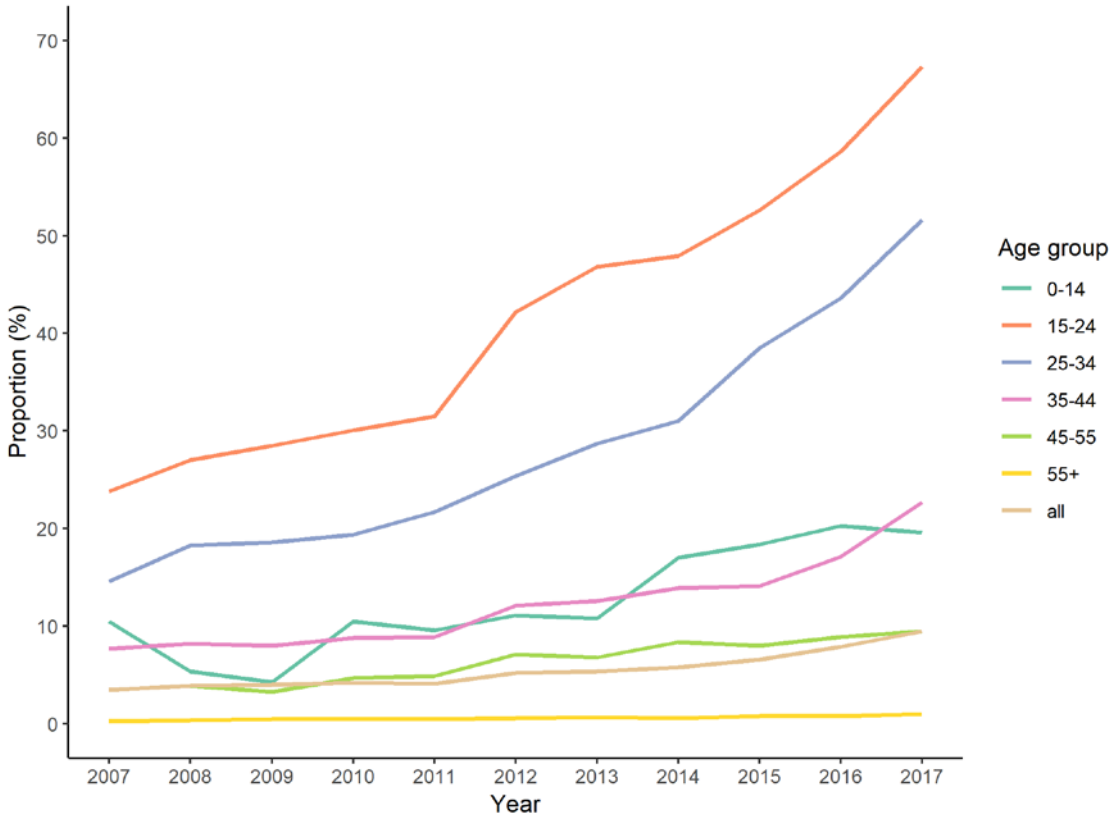
Table 4: Foreign-born TB cases* by sex and age groups, 2017

Age group	Total		Male		Female	
	n	%	n	%	n	%
0-4	1	0.1	1	0.1	0	0.0
5-14	10	0.7	3	0.4	7	1.0
15-24	503	32.9	307	38.2	196	27.0
25-34	565	36.9	296	36.8	269	37.1
35-44	219	14.3	90	11.2	129	17.8
45-54	114	7.5	45	5.6	69	9.5
55-64	65	4.2	29	3.6	36	5.0
65-74	24	1.6	17	2.1	7	1.0
75-84	17	1.1	8	1.0	9	1.2
85+	12	0.8	8	1.0	4	0.6
TOTAL	1,530	100	804	100	726	100.0

*Note: exclude those whose country of birth is unknown

Looking at the trend, the proportion of foreign-born cases among the age group 15-34 has increased dramatically especially since 2011, while that among other age groups have increased steadily (Figure 5, see also Table s8).

Figure 5. Proportion of foreign-born TB notification by age groups, 2007-2017



Country of birth and time of entry to Japan:

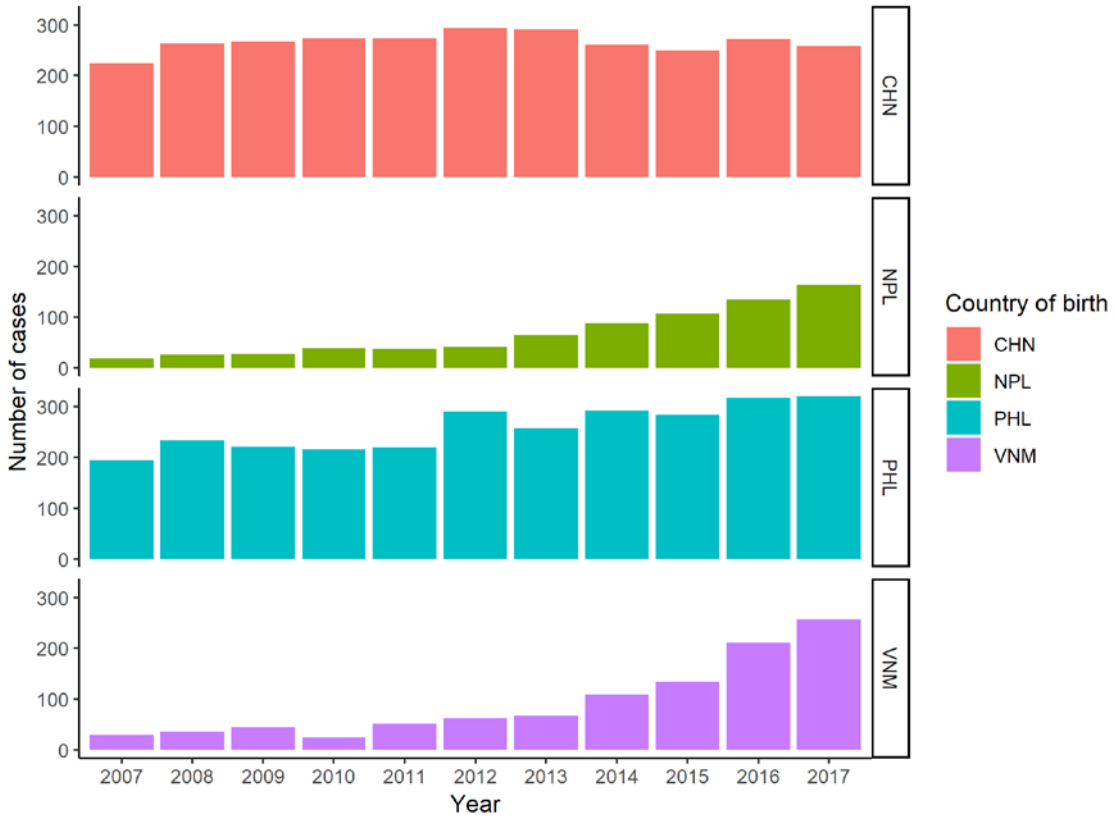
Table 5 summarizes the foreign-born TB cases by county of birth (see also Table s9). The Philippines was the most frequent country of birth for foreign-born cases notified in 2017 (21.0%, 321 / 1,530), followed by China and Vietnam (16.9%, 258 / 1,530 and 16.8%, 257 / 1,530).

Table 5: Foreign-born TB cases by country of birth, 2017

Country name	Cases	Proportion (%)
The Philippines	321	21.0
China	258	16.9
Vietnam	257	16.8
Nepal	164	10.7
Indonesia	121	7.9
Myanmar	80	5.2
Unknown	78	5.1
South Korea	46	3.0
Thailand	36	2.4
India	28	1.8
Cambodia	20	1.3
Others	121	7.9
TOTAL	1,530	100.0

Looking at the trend in the four most frequent countries of birth, while the number of those from China has been relatively constant, those from Vietnam and Nepal have increased dramatically in the recent years (Figure 6, see also Table s10).

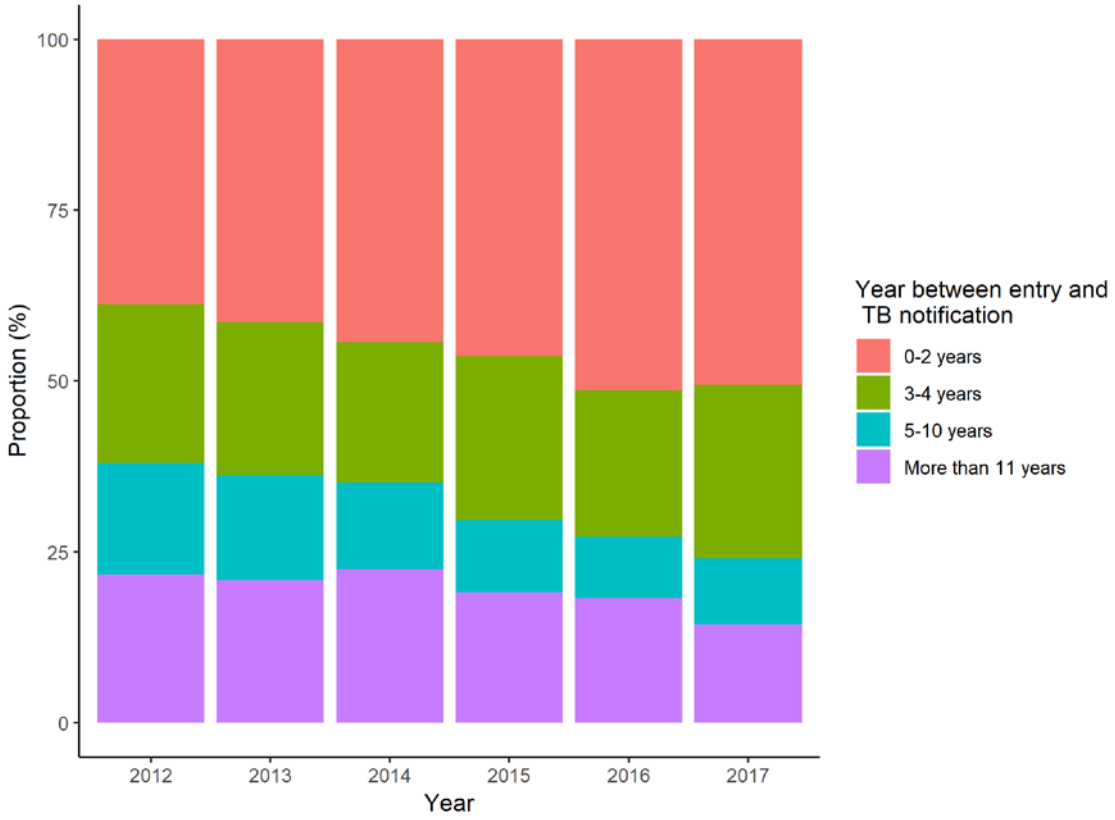
Figure 6. Foreign-born TB notifications in selected countries of birth, 2007-2017



PHL= the Philippines, CHN= China, VNM= Vietnam, NPL= Nepal

Year of entry to Japan has been collected under the JTBS since 2012. Of the 7,266 foreign-born cases notified in Japan between 2012 and 2017, year of entry was known for 62.2% (4,521 / 7,266). In 2017, of the 1,530 foreign-born cases notified, year of entry was known for 63.5% (971 / 1,530). Of which, 50.6% (491 / 971) of foreign-born cases were notified within 2 years of entering Japan. The proportion of those being notified within 2 years of entering Japan has increased steadily since 2012 (Figure 7, see also Table s11).

Fig 7. Year between entry to Japan and TB notification, 2012-2017



Chapter 3: Co-morbidities (HIV and Diabetes mellitus), 2012-2017

HIV/TB cases:

Table 6 summarizes the newly notified TB cases by HIV status. In 2017, HIV test results were known only for 8.9% (1,488 / 16,789), while unknown for 91.1% of the newly notified cases. Of those cases with known test results, 34 (2.3%) were HIV positive and 1,454 (97.7%) were HIV negative.

Table 6: Newly notified cases by HIV test results, 2012-2017

Notification year	HIV positive	HIV negative	HIV test not done	Unknown
2012	62	3,266	4,601	13,354
2013	50	1,890	5,090	13,465
2014	45	1,627	4,970	12,973
2015	40	1,474	4,697	12,069
2016	44	1,556	4,933	11,092
2017	34	1,454	4,753	10,548

Of the 34 HIV positive TB cases, 11 (32.4%) were foreign-born and 23 (67.6%) were Japan-born. The proportion of women was larger among the foreign-born HIV positive TB cases (54.5%, 6 / 11) compared with the Japan-born (26.1%, 6 / 23) cases (Table 7).

Table 7: Characteristics of HIV positive TB patients, 2017 (n=34)

	Foreign-born	Japan-born
Male	5	17
Female	6	6

Proportion of those who were not tested for HIV has been on a gradual increase, from 21.6% in 2012 (4,601/21,283) to 28.3% (4,753/16,789) in 2017.

Diabetes mellitus/TB cases:

Table 8 summarizes the newly notified TB cases by diabetes mellitus (DM) status. The definition of DM under the JTBS is solely dependent on the patient's self-report. In 2017, the status of DM was known for 89.0% of the newly notified cases (14,944/16,789). Of those cases with known DM status, 2,368 had concomitant DM. Proportion of those with DM has continued to increase steadily.

Table 8: Newly notified cases by DM status, 2012-2017

Notification year	With DM	Without DM	Unknown
2012	3,036	15,978	2,269
2013	2,964	15,010	2,521
2014	2,753	14,536	2,326
2015	2,686	13,472	2,122
2016	2,509	13,277	1,839
2017	2,368	12,576	1,845

Of the 2,368 cases with DM, 53 (2.2%) were foreign-born, and 2,216 (93.6%) were Japan-born. While 39.6% (21 / 53) of the foreign-born cases were aged between 35 and 54, 92.2% (2,044 / 2,216) of the Japan-born cases were aged 55 and above (Table 9).

Table 9: Characteristics of cases with DM, 2017 (n=2,368)

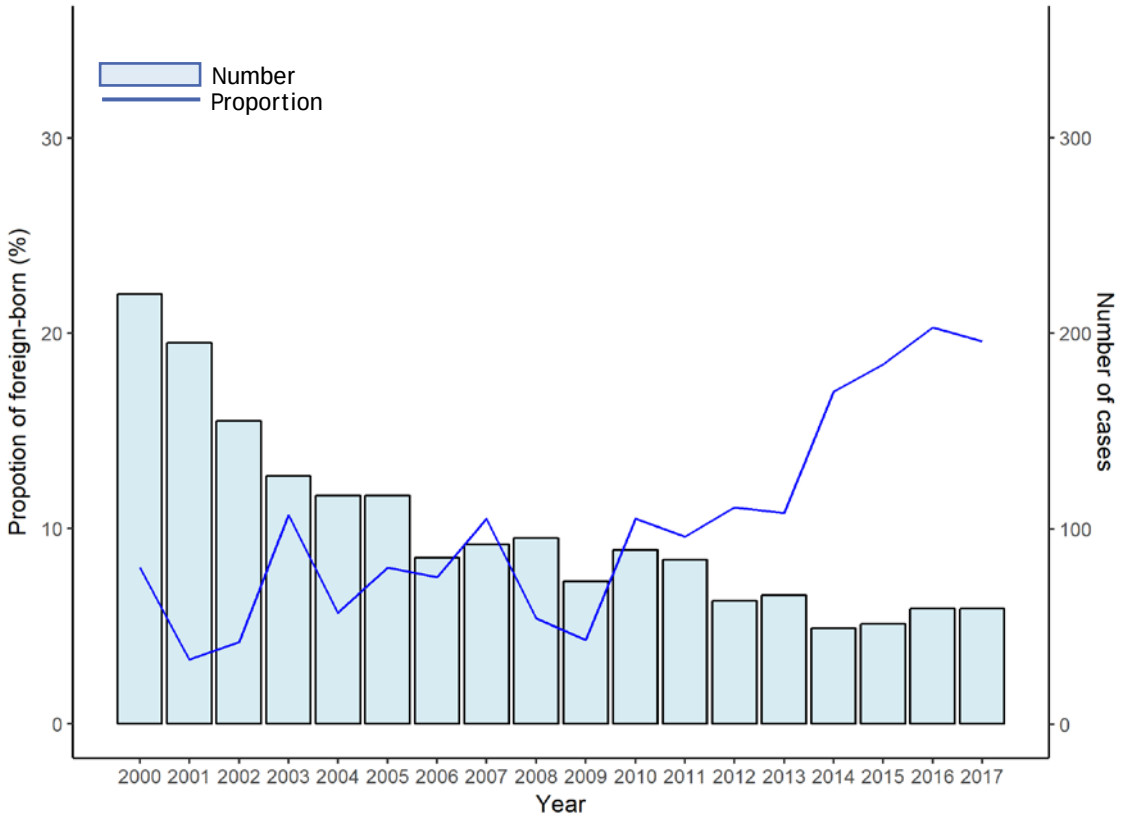
Age group	Foreign-born	Japan-born	Unknown
15-34	8	5	0
35-54	21	167	2
55+	24	2,044	97

Chapter 4: Childhood TB, 2000-2017

In 2017, 59 cases of TB were newly notified among children aged 14 and below, with a rate per 100,000 of 0.4. Of those cases, 55.9% were males (33 / 59) and 44.1% were females (26 / 59). 76.3% (45 / 59) had pulmonary diseases, and 23.7% (14 / 59) had extra-pulmonary disease only. Two case of meningeal and three cases of miliary TB were reported. Although the number of cases have steadily declined until 2013, since then, has shown a slight increase.

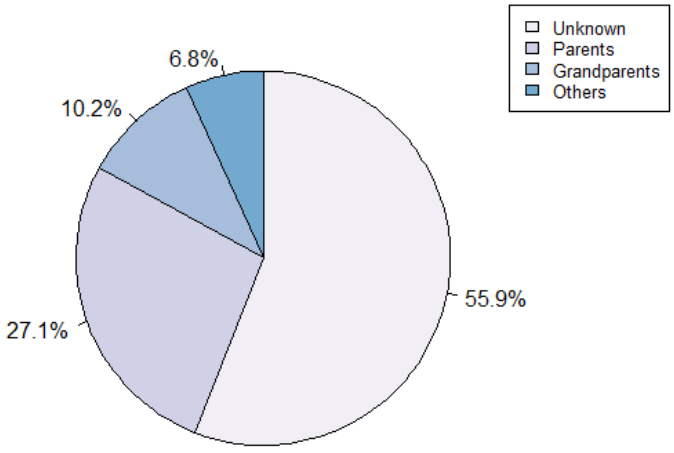
In 2017, 18.6% (11 / 59) of childhood TB cases were foreign-born. The proportion of those foreign-born has been on a gradual increase (Figure 8, see also Table s12).

Figure 8. TB notification among children aged 0-14, 2000-2017



The source of infection was known for 26 of the 59 cases, 22 of whom were Japan-born. 16 were infected by their parents and 6 by their grandparents (Figure 9, see also Table s13.a). Of the 45 Japan-born cases, 55.6% (25/45) were detected via contact investigation and 28.9% (13/45) at hospital setting, with symptoms. On the other hand, of the 11 foreign-born cases, 27.3% (3/11) were detected via contact investigation and 27.3% (3/11) at hospital setting, with symptoms (Table s13.b).

Figure 9. Source of infection of notified childhood TB, 2017



Chapter 5: Laboratory confirmation

Sputum smear status for pulmonary cases:

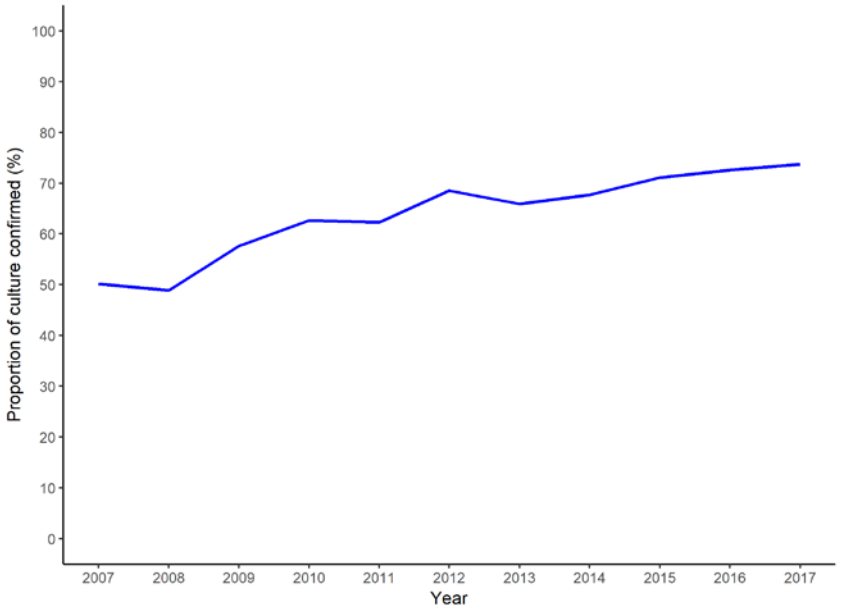
Of the 13,011 pulmonary TB cases notified in 2017, the results of sputum smear status were known for 99.1% (12,889/13,011). Of these cases, 51.9% were positive (6,693/12,889). Sputum smear test was not done for 91 cases, and test results not reported for 31 cases.

Culture confirmation:

Of the 13,011 pulmonary TB cases notified in 2017, the results of culture confirmation were known for 90.4% (11,764 / 13,011). Of these cases, 81.4% (9,580 / 11,764) were culture confirmed. Results were pending for 906 cases, unknown for 105 cases, test was not done for 218 cases and terminated for 18 cases. The proportion of those culture confirmed has steadily increased from 50.2% in 2007 to 73.6% in 2017 (Figure 10, see also Table s14)

Of all TB cases notified in 2017, results of culture confirmation were known for 89.3% (14,672 / 16,431). Of these cases, 74.2% (10,886 / 14,672) were culture confirmed. Results were pending for 1,247 cases, unknown for 151 cases, test was not done for 338 cases and terminated for 23 cases.

Figure 10. Proportion of culture confirmed among PTB, 2007-2017

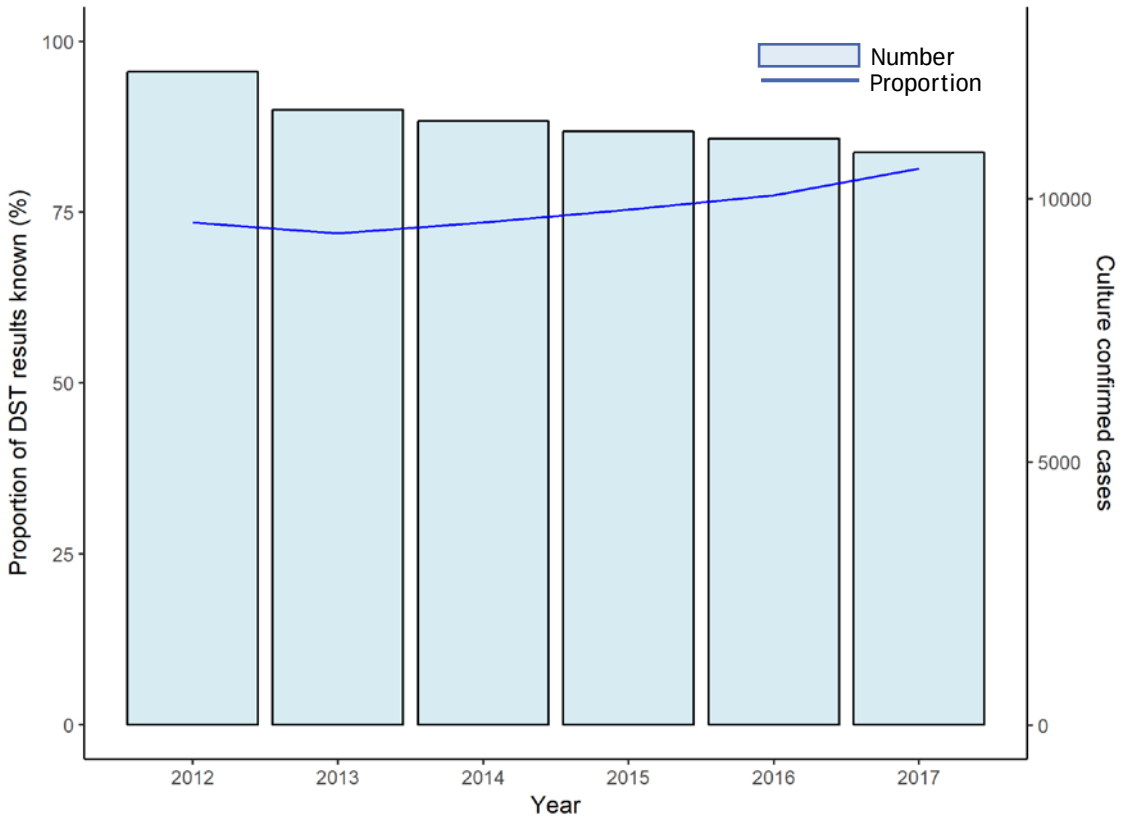


Chapter 6: Drug-resistant TB (including treatment outcomes)

Drug susceptibility test for isoniazid and rifampicin:

Of the 10,886 culture confirmed TB cases notified in 2017, drug susceptibility test (DST) results for both isoniazid (INH) and rifampicin (RFP) were known for 81.4% (8,856/ 10,886). The proportion of those with DST results for both isoniazid and rifampicin has, despite gradually, been increasing (Figure 11, see also Table s15).

Figure 11. Proportion of DST results known of culture confirmed TB, 2012-2017



Multidrug resistant TB (MDR-TB):

Of the 8,856 cases with DST results known, 0.6% (55 / 8,856) had multi-drug resistance (MDR) with resistance to at least isoniazid and rifampicin. The proportion of those with MDR resistance has remained constantly higher among the foreign-born, compared with Japan-born (3.6% vs 0.3% in 2017). (Figures 12a-12c, see also Table s16)

Figure 12a. Number and proportion of MDR resistant TB (all), 2012-2017

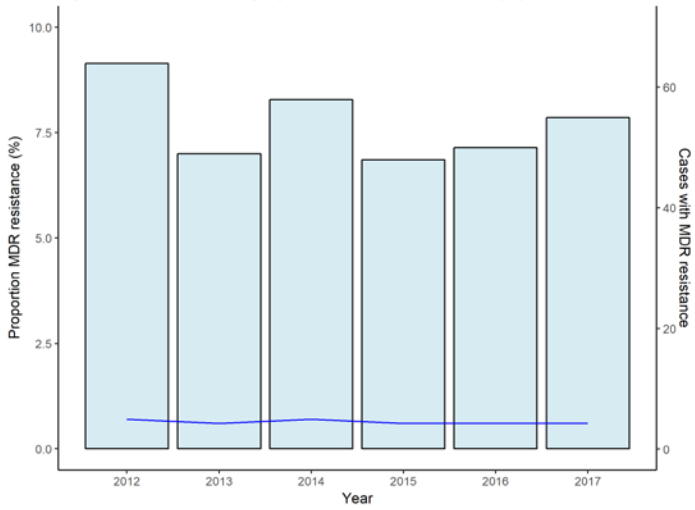


Figure 12b. Number and proportion of MDR resistant TB (foreign-born), 2012-2017

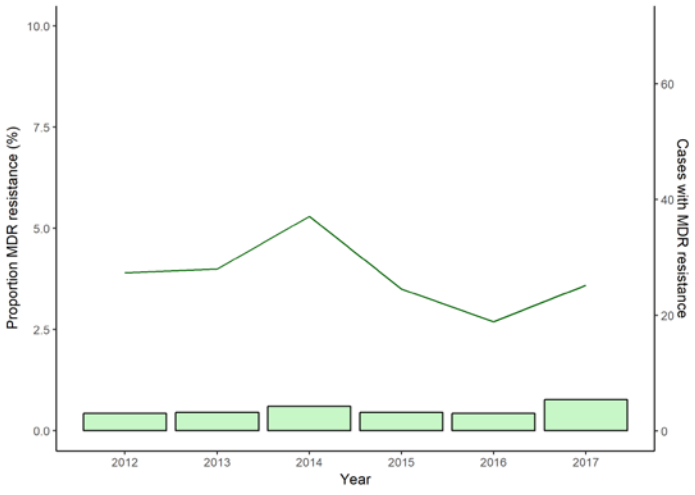
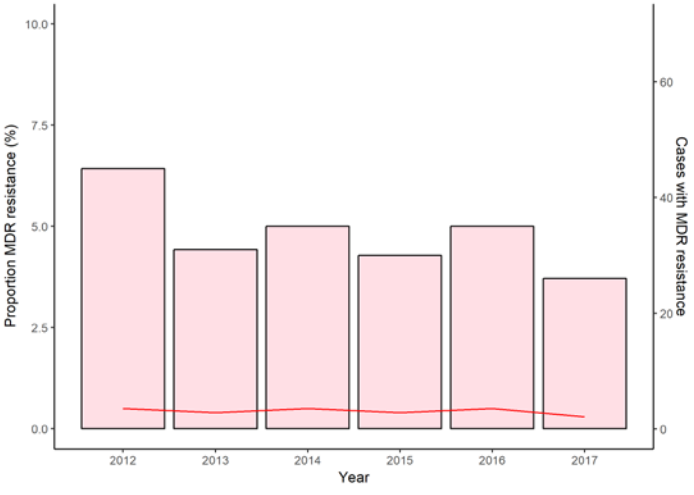


Figure 12c. Number and proportion of MDR resistant TB (Japan-born), 2012-2017



Bar = number, line = proportion, RR = rifampicin resistance, MDR = multi-drug resistance

Isoniazid resistance without MDR-TB:

Of the 8,856 cases with DST results known, 4.1% (364 /8,856) were resistant to isoniazid (INH) without MDR. The overall number of cases with INH resistance has remained relatively constant over the past5 years. However, looking at the cases by country of birth, the number of INH resistant cases have increased among the foreign-born cases (Figures 13a-13c, see also Table s17). Of the 54 foreign-born patients with INH resistance notified in 2017, 21 were from Vietnam, 12 from China, and 5 from the Philippines.

Figure 13a. Number and proportion of INH resistant TB (all), 2012-2017

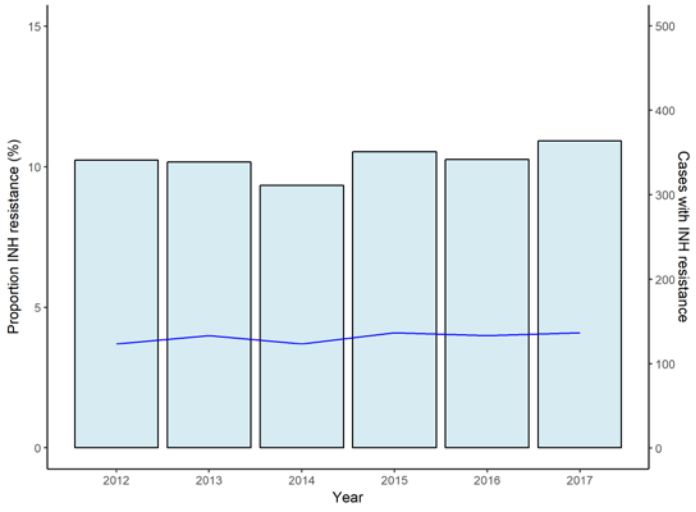


Figure 13b. Number and proportion of INH resistant TB (foreign-born), 2012-2017

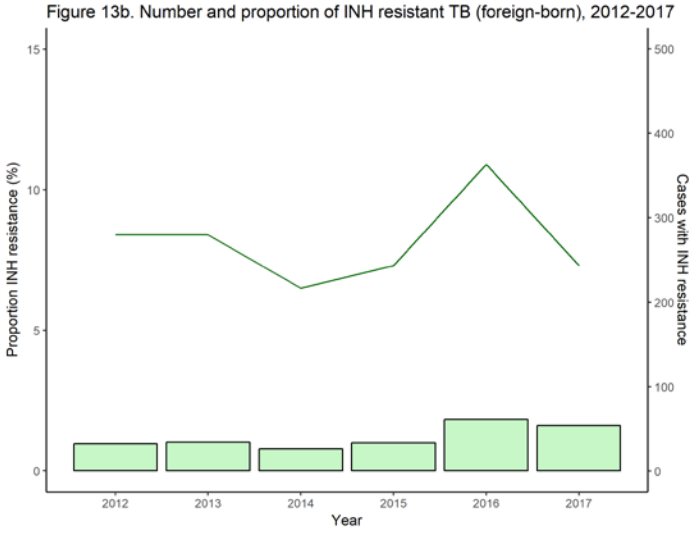
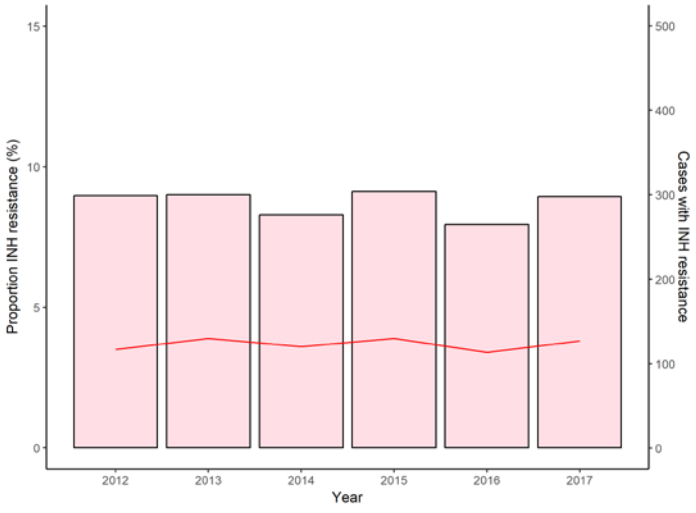


Figure 13c. Number and proportion of INH resistant TB (Japan-born), 2012-2017



Bar = number, line = proportion, INH = isoniazid

Table 10 summarizes the characteristics of those cases with MDR and INH mono-resistance notified in 2017. The proportions of males were greater among those with MDR and INH mono-resistance. The proportions of those aged 55 and above were the largest among all cases, reflecting the age structure of TB patients in Japan. The proportions of foreign-born were much higher than the proportion of foreign-born among the overall TB cases (9.5% in 2017). The proportion of retreatment was higher among those with MDR compared with those with INH mono-resistance.

Table 10. Characteristics of cases with MDR and INH mono-resistance, 2017

	MDR		INH mono-resistance	
	n	%	n	%
Sex				
Male	35	63.6	242	66.5
Female	20	36.4	122	33.5
Age group				
0-14	0	0.0	1	0.3
15-34	21	38.2	66	18.1
35-54	13	23.6	57	15.7
55+	21	38.2	240	65.9
Country of birth				
Japan-born	26	47.3	298	81.9
Foreign-born	27	49.1	54	14.8
COB unknown	2	3.6	12	3.3
Tx history				
New	44	80.0	328	90.1
Retreatment	9	16.4	29	8.0
Unknown	2	3.6	7	1.9
TOTAL	55	100	**364**	100.0

COB= country of birth, Tx=treatment

Outcomes of MDR-TB cohort

The JTBS underwent a system revision in 2017 – on of the major changes included assessment of treatment outcomes. Prior to the revision, the JTBS only summarized the treatment outcomes of pulmonary TB, as according to the computerized algorithm. The new change now enables PHCs to enter treatment outcomes of all TB, including extrapulmonary and MDR-TB, individually. This year, the treatment outcomes of MDR-TB patients notified in 2016 are presented (i.e. treatment outcomes at the end of 24 months). Next year, the treatment outcomes at the end of 48 months will be presented. (Table 11).

Table 11. Outcomes of MDR-TB cohort, notified in 2016, at the end of 2017

Tx outcomes	n	%
Cured	10	15.4
Completed	4	6.2
Died	12	18.5
Tx failed	0	0.0
LTFU	4	6.2
Transferred-out	8	12.3
Still on tx	25	38.5
Unknown	2	3.1
Total	65	100.0

Tx = treatment, LTFU = lost to follow-up

Chapter 7: Delay

Delay among symptomatic pulmonary TB

Under the JTBS, a patient delay is defined as the time between onset of symptoms and initial doctor visit being longer than 2 months, a doctor delay as the time between initial doctor visit and diagnosis being longer than 1 month, and total delay as the time between onset of symptoms and TB diagnosis being longer than 3 months.

Of the 9,445 symptomatic pulmonary TB cases, information regarding patient delay was known for 66.6% (6,295 / 9,445), doctor delay for 91.1% (8,602 / 9,445), and total delay for 67.0% (6,328 / 9,445). Patient delay was observed in 20.8% (1,312 / 6,295), doctor delay in 21.7% (1,870 / 8,602) and total delay in 21.2% (1,342 / 6,328) (Table 12).

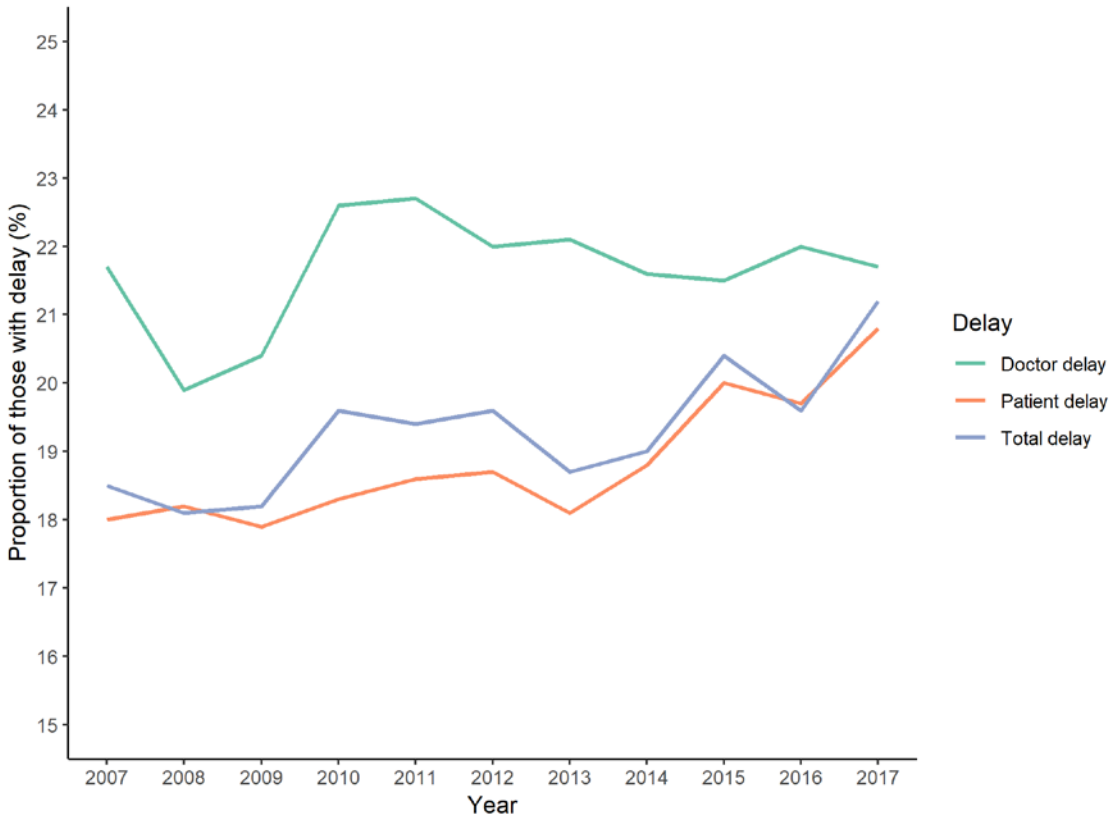
Table 12. Number and proportion of those with delay, 2017

Type of delay	Total no. symptomatic PTB*	Cases with delay	
		n	%
Patient delay	6,295	1,312	20.8
Doctor delay	8,602	1,870	21.7
Total delay	6,328	1,342	21.2

*Note: exclude those whose information on delay is unknown

The proportions of those with delay appear to be gradually increasing, with the proportion of those with doctor delay constantly being higher than patient delay (Figure 14, see also Table s18).

Figure 14. Proportions of those with delay, 2007-2017



Characteristics of those with delay

Proportions of those with each delay among selected characteristics are summarized in Table 13. Proportions of those with patient delay was higher among males compared with females, while vice versa for doctor delay. Proportions of those with patient delay was higher among the age groups 0-64 while of those with doctor delay higher among the age groups 65 and above. Proportion of patient delay was higher among the foreign-born compared with the Japan-born, and among the homeless and those with no insurance – however, it must be noted that age distribution of Japan- and foreign-born patients significantly differ. Proportion of total delay was the highest among the homeless, followed by those with no insurance, and those aged 45-54.

Table 13. Proportions of those with delay among selected characteristics, 2017

	Patient delay			Doctor delay			Total delay		
	Total	**With delay**	**Proportion of those with delay (%)**	**Total**	**With delay**	**Proportion of those with delay (%)**	**Total**	**With delay**	**Proportion of those with delay (%)**
Sex									
Male	3,990	846	21.2	5,469	1140	20.8	4,009	835	20.8
Female	2,305	466	20.2	3,133	730	23.3	2,319	507	21.9
Age group									
0-4	5	0	0.0	5	0	0.0	5	0	0.0
5-14	8	1	12.5	8	1	12.5	8	1	12.5
15-24	189	48	25.4	292	45	15.4	190	48	25.3
25-34	372	102	27.4	511	96	18.8	373	97	26.0
35-44	370	102	27.6	497	121	24.3	372	117	31.5
45-54	423	116	27.4	585	117	20.0	423	128	30.3
55-64	486	154	31.7	685	134	19.6	489	158	32.3
65-74	966	229	23.7	1,316	313	23.8	971	236	24.3
75-84	1,690	309	18.3	2,272	549	24.2	1,698	307	18.1
85+	1,786	251	14.1	2,431	494	20.3	1,799	250	13.9
Country of birth									
Foreign-born	425	108	25.4	623	105	16.9	426	105	24.6
Japan-born	5,580	1157	20.7	7,597	1689	22.2	5,610	1190	21.2
COB unknown	290	47	16.2	382	76	19.9	292	47	16.1
Social risk factor									
Homeless	78	27	34.6	104	12	11.5	79	22	27.8
Unemployed*	371	110	29.6	545	100	18.3	371	115	31.0
On social welfare	521	120	23.0	688	148	21.5	524	123	23.5
No insurance	37	14	37.8	51	2	3.9	37	12	32.4

COB = country of birth

*Unemployed among those aged between 25 and 64

Chapter 8: Treatment outcomes in the non-MDR cohort at the end of 12 months

TB outcomes in the non-MDR cohort

In 2016, a total of 17,575 non-MDR cases were reported. As aforementioned, because of the systems revision of the JTBS, the treatment outcome of all TB is reported from this year. Treatment outcome at the end of 12 months was available for 99.4% (17,474 / 17,575) and is summarized in Table 14.

Table 14. Treatment outcomes at 12 months for drug sensitive cases notified in 2016

Tx outcomes	n	%
Cured	3,897	22.3
Completed	8,302	47.5
Died	3,833	21.9
Failed	21	0.1
LTFU	386	2.2
Still on tx	600	3.4
Transferred-out	368	2.1
Not evaluated	67	0.4
Total	17,474	100.0

Tx = treatment, LTFU = lost to follow-up

As approximately two-thirds of the cases in Japan are aged 65 and above, the treatment outcomes of the younger age groups were re-analyzed. Of the 5,821 cases aged 64 and below, whose treatment outcomes at the end of 12 months were available, 85.5% (4,979 / 5,821) had either completed treatment or were cured (Table 15).

Table 15. Treatment outcomes 12 months for drug sensitive cases (aged 0-64) notified in 2016

Tx outcomes	n	%
Cured	1,565	26.9
Completed	3,414	58.6
Died	177	3.0
Failed	7	0.1
LTFU	127	2.2
Still on tx	386	6.6
Transferred-out	121	2.1
Not evaluated	24	0.4
Total	5,821	100.0

Tx = treatment, LTFU = lost to follow-up

TB outcomes for the HIV positive cohort

Of the 44 HIV positive cases (including one MDR case), whose treatment outcomes at the end of 12 months were available, 56.8% (25 / 44) had either completed treatment or were cured (Table 16).

Table 16. Treatment outcomes at 12 months for HIV positive drug sensitive cases notified in 2016

Tx outcomes	n	%
Cured	9	20.5
Completed	16	36.4
Died	2	4.5
Failed	0	0.0
LTFU	3	6.8
Still on tx	4	9.1
Transferred-out	8	18.2
Not evaluated	2	4.5
Total	44	100.0

Tx = treatment, LTFU = lost to follow-up

Characteristics of those who have died (non-MDR cohort)

Characteristics of those who have died among the non-MDR cohort are summarized in Table 17a. 63.3% (2,425 / 3,833) were males, 95.4% (3,656 / 3,833) were aged 65 and above, and 95.3% (3,651 / 3,833) were Japan-born. Proportions with the social risk factors among those aged between 25 and 64, and who have died (n=177) were also calculated: 12.5% (13 / 104) were homeless, 52.0% (92 / 177),were unemployed and 23.7% (42 / 177) were receiving social welfare.

Table 17a. Characteristics of those who have died among the entire drug sensitive cohort in 2016

	n	%
Sex		
Male	2,425	63.3
Female	1,408	36.7
Age groups		
0-14	0	0.0
15-64	177	4.6
65+	3,656	95.4
Country of birth		
Japan-born	3,651	95.3
Foreign-born	18	0.5
COB unknown	164	4.3
Social risk factor (aged 25-64, n=177)		
Homeless*	13	12.5
Unemployed	92	52.0
On social welfare	42	23.7
No insurance	8	4.5

*Note: total of homeless excludes those whose information on the state of homelessness is unknown, i.e. total n=104

Proportions of those who have died (non-MDR cohort)

Proportions of those who have died by selected characteristics are summarized in Table 17b. It was slightly higher among males than females (23.1% vs 20.2%). By age groups, it was the highest among those aged 65 years old and above (31.4%), and by country of birth, highest among those whose country of birth was unknown (27.3%). The proportion of those who have died among those without insurance was also high (17.4%).

Table 17b. Proportions of those who have died among the entire drug sensitive cohort in 2016

	No. patients	Of which died	% of those who have died
Sex			
Male	10,501	2,425	23.1
Female	6,973	1,408	20.2
Age groups			
0-14	58	0	0.0
15-64	5,821	177	3.0
65+	11,653	3,656	31.4
Country of birth			
Japan-born	15,538	3,651	23.5
Foreign-born	1,335	18	1.3
COB* unknown	601	164	27.3
Social risk factor aged 25-64			
Homeless	2,593*	13	0.5
Unemployed	1,054	92	8.7
On social welfare	379	42	11.1
No insurance	46	8	17.4

*Note: total of homeless patients excludes those whose information on the state of homelessness is unknown
COB = country of birth

Characteristics of those who were lost to follow-up (non-MDR cohort)

Characteristics of those who were lost to follow-up among the entire drug sensitive cohort are summarized in Table 18a. 56.7% (219 / 386) were males, 67.1% (259 / 386) were aged 65 and above, and 88.1% (340 / 386) were Japan-born. Proportions with the social risk factors among those aged between 25 and 64, and who were LTFU (n=106) were also calculated: 8.7% (6 / 69) were homeless, 22.6% were unemployed (24 / 106), and 5.7% (6 / 106) were receiving social welfare.

Table 18a. Characteristics of those lost to follow-up among the entire drug sensitive cohort in 2016

	n	%
Sex		
Male	219	56.7
Female	167	43.3
Age groups		
0-14	0	0.0
15-64	127	32.9
65+	259	67.1
Country of birth		
Japan-born	340	88.1
Foreign-born	29	7.5
COB unknown	17	4.4
Social risk factor (aged 25-64, n=106)		
Homeless*	6	8.7
Unemployed	24	22.6
On social welfare	6	5.7
No insurance	3	2.8

*Note: total of homeless excludes those whose information on the state of homelessness is unknown, i.e. total n=69
COB = country of birth

Proportions of those who were lost to follow-up (non-MDR cohort)

Proportions of those who were lost to follow-up by selected characteristics are summarized in Table 18b. It was slightly higher among females than males (2.4% vs 2.1%). It was not different by age groups, and by country of birth, it was highest among those whose country of birth was unknown (2.8%). The proportion of those who were lost to follow-up was the highest among those without insurance (6.5%).

Table 18b. Proportions of those lost to follow-up among the entire drug sensitive cohort in 2016

	No. patients	Of which LTFU	% of those LTFU
Sex			
Male	10,501	219	2.1
Female	6,973	167	2.4
Age groups			
0-14	58	0	0.0
15-64	5,821	127	2.2
65+	11,653	259	2.2
Country of birth			
Japan-born	15,538	340	2.2
Foreign-born	1,335	29	2.2
COB* unknown	601	17	2.8
Social risk factor aged 25-64			
Homeless*	2,593	6	0.2
Unemployed	1,054	24	2.3
On social welfare	379	6	1.6
No insurance	46	3	6.5

*Note: total of homeless patients excludes those whose information on the state of homelessness is unknown
COB = country of birth

Chapter 9: Latent tuberculosis Infection

Notification of latent tuberculosis infection (LTBI) has been mandatory since 2006. In 2017, 7,255 cases of LTBI were newly notified. The number of new cases has reached a peak in 2011 and decreased in the next two years. However, it has remained relatively stable since 2013. On the other hand, proportion of foreign-born among the total LTBI cases notified has been increasing, notably from 2011 (Figure 15, see also Table s19).

Figure 15. LTBI notification, 2007-2017

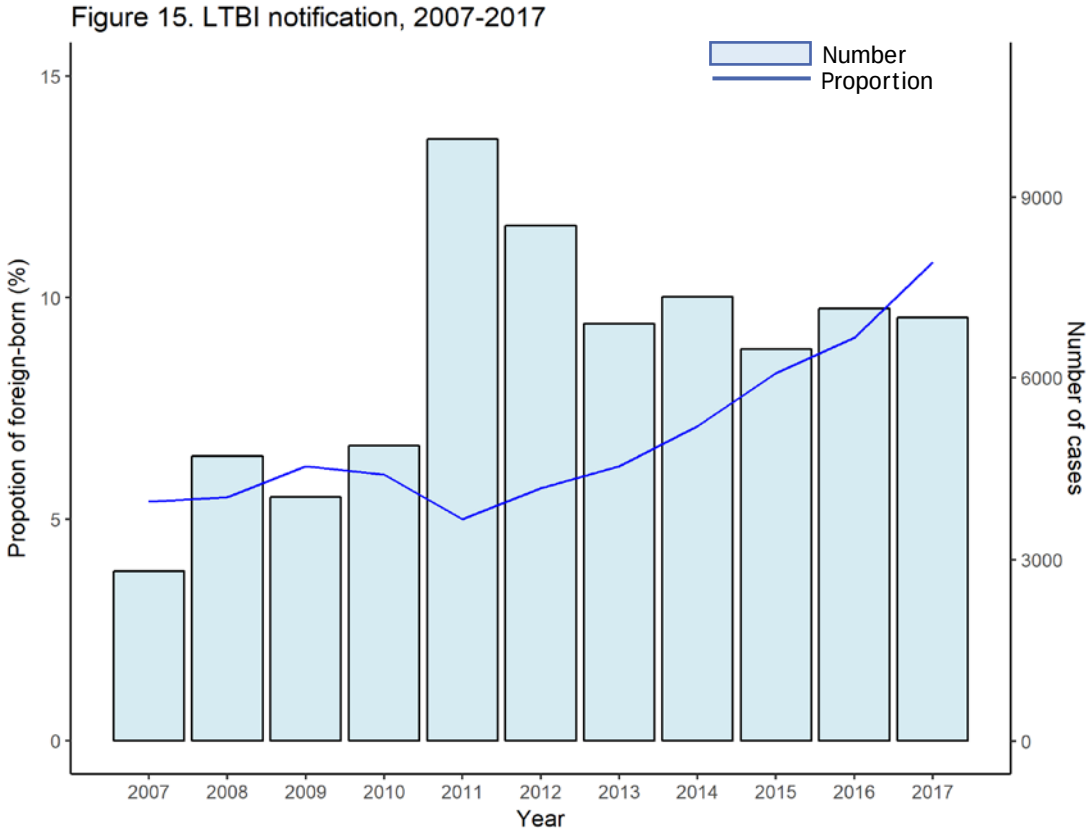


Table 19 summarizes the LTBI case notifications by sex and age groups. Breaking down the cases by age groups, the largest number of cases were diagnosed among those aged 65-74 (1,199 cases), followed by those aged 45-54 (1,111 cases). More LTBI is notified among female, especially among those aged 25-54.

Table 19. LTBI notification by age and sex, 2017

Age groups	Total		Male		Female	
	n	%	n	%	n	%
0-4	439	6.1	195	5.8	244	6.3
5-14	192	2.6	95	2.8	97	2.5
15-24	480	6.6	229	6.8	251	6.5
25-34	829	11.4	381	11.3	448	11.5
35-44	906	12.5	361	10.7	545	14.0
45-54	1,111	15.3	464	13.8	647	16.7
55-64	1,018	14.0	455	13.5	563	14.5
65-74	1,199	16.5	632	18.7	567	14.6
75-84	825	11.4	453	13.4	372	9.6
85+	256	3.5	109	3.2	147	3.8
TOTAL	7,255	100	3,374	100	3,881	100.0

Mode of detecting LTBI

While 62.4% (4,524 / 7,255) of the notified LTBI cases were detected upon contact investigation (Figure 16, see also Table s20), its proportion out of the total cases has been declining, while the proportion of those detected at hospital settings (i.e. during medical check-up for other diseases) has increased from 6.9% in 2007 to 26.1% in 2017 (Figure 17a & 17b, see also Table s21).

Figure 16. Mode of detection of notified LTBI, 2017

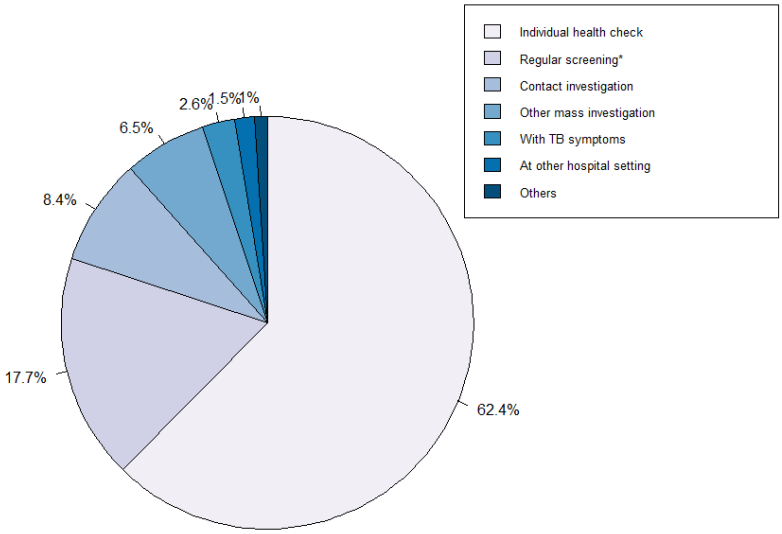


Figure 17a. Mode of detection of notified LTBI, 2007-2017

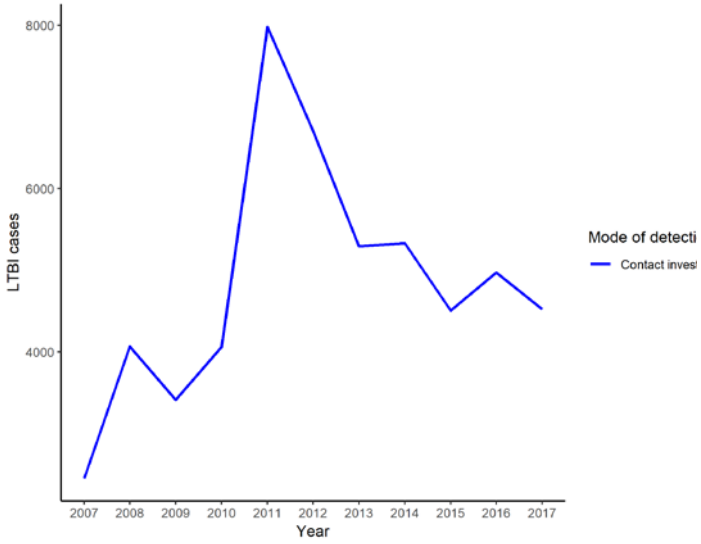
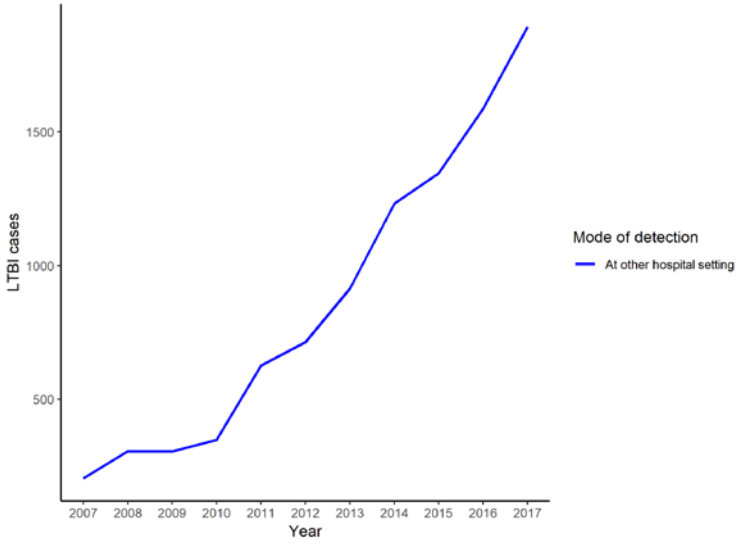


Figure 17b. Mode of detection of notified LTBI, 2007-2017



Outcome of LTBI treatment (2016 cohort)

As mentioned earlier, the JTBS has undergone a system revision and treatment outcome for 2016 cohort is now available for all TB, including LTBI.

In 2016, 7,477 LTBI cases were newly notified, of which treatment outcome was available for 99.7% (7,454 / 7,477). Of the 7,454 cases, 98.3% (7,329 / 7,454) had started treatment. Upon notification, 7,121 had initiated the treatment with isoniazid monotherapy. Treatment outcomes of the 7,329 cases are summarized in Table 20.

Table 20. Outcomes at 12 months of LTBI cases notified in 2016

Tx outcomes	n	%
Completed	6,240	85.1
Died	156	2.1
Tx failed	25	0.3
LTFU	679	9.3
Transferred-out	178	2.4
Still on tx	25	0.3
Unknown	51	0.7
Total	7,329	100.0

Tx = treatment

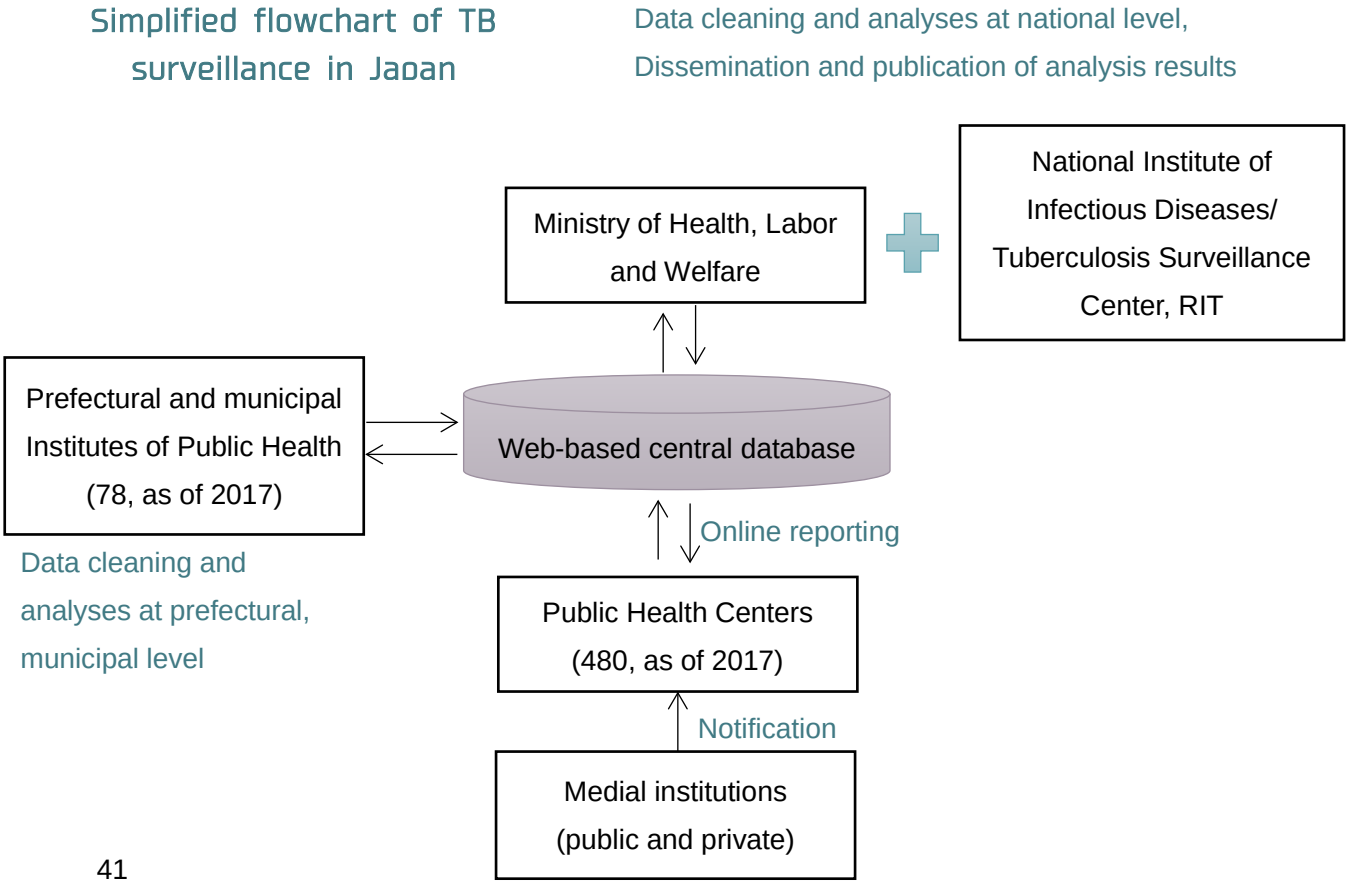
Appendix I: Notes on TB surveillance system in Japan

Both TB and LTBI (those diagnosed as being infected but not with active TB, and who were judged as requiring preventive therapy) are notifiable diseases under the Infectious Diseases Control Law. All physicians who diagnose TB or LTBI are requested to report to the local public health centers as soon as it is possible.

Local public health centers (PHCs), which are local government authorities responsible for public health in Japan, are responsible for compiling the reports and reporting to the Ministry of Health, Labour and Welfare of Japan.

Japan introduced the first nationwide computerized TB surveillance system, the Japan Tuberculosis Surveillance (JTBS) in 1987. The data, once entered into JTBS, is updated every month, and major findings are published annually, and also made available on-line, in Japanese. Treatment outcome is reported for the cohort notified in the previous year.

Simplified flowchart of TB surveillance in Japan



Appendix II: Methods

Notification rates:

Notification rate per 100,000 is calculated using the population estimates from the annual “Current Population Estimates” as of October 1st each year (Statistics Bureau, Ministry of Internal Affairs and Communications, Japan), unless in the year of population census. The population census is conducted every five year, and in the year of census the notification rates are calculated using the data from the census.

Notification rate among the foreign-born was calculated using the population estimates of foreign residents from the “Foreign residents’ statistics” as of 31 December each year (Immigration Bureau, Ministry of Justice, Japan).

Terms of definitions and reporting years:

The overall trend is analyzed from 2000. However, the JTBS underwent a major system restructuring in 2007 with new or changed categories for several key items. Thus, all other trends are analyzed from 2007, unless otherwise noted as below:

Country of birth

Information regarding nationality (either “Japanese” or “non-Japanese”) was added to JTBS in 1998, and country name and the year of entry (either “within five years”, or “more than five years” or “unknown”) in 2007. In 2012, the category of nationality was changed to country of birth (either “Japan-born”, “foreign-born” or “unknown”), and the year of entry to the exact year of entry to Japan. In this report, the trend since 2007 is analyzed, however, the “foreign-born” includes those classified as “non-Japanese” prior to 2007. As for the time between entry to Japan and TB notification, trend since 2012 is analyzed.

Occupation

Service industry refers to those whose work involves face-to-face interactions with an unspecified large number of customers.

Other healthcare workers include co-medical workers, including care workers of elderly institutions.

Teachers include teachers of nursery and kindergarten school, primary, secondary, high-schools and universities, as well as of private classes and schools of non-compulsory education.

Full-and part-time employed refers to those with stable income other than service industry, healthcare workers, and teachers, and, and is differentiated from temporary employed (including day laborers) whose income is irregular.

Houseworkers refer to housewives and househusbands, and not paid workers e.g. maids.

Unemployed include all those without regular and/or irregular job, including the elderly who has retired.

HIV/DM

Information regarding HIV co-infection and DM was added to JTBS in 2007. HIV and DM data are self-reported, and are not matched with other database in any way. Information regarding HIV had been entered as “HIV positive”, “HIV negative” and “unknown” until 2011. Since 2012, a new category of “HIV test not done” was added. Information regarding DM is entered as “with DM”, “without DM” and “unknown”. Both for HIV and DM, the trend since 2012 is analyzed.

Mode of detection

Regular screening refers to mandatory screening conducted at schools, workplaces and other institutions including social welfare institutions and prison institutions.

Other mass investigation refers to mass screening programs organized by local authorities, targeting specific high-risk population groups such as homeless and foreign-born students.

At hospital setting refers to a case whereby he or she is diagnosed while seeking medical attention for TB symptoms, for diseases other than TB, or during medical examination while being hospitalized for diseases other than TB.

During follow-up for TB refers to a case whereby he or she is diagnosed during the two-year follow-up after competing treatment for TB/LTBI.

Treatment outcomes of drug susceptible TB

The definitions of the treatment outcomes for active TB are in line with latest definitions of the WHO. Due to the system restructuring of JTBS as mentioned earlier, the treatment outcomes for the 2017 cohort are evaluated differently from the cohort from the previous years. The outcomes are not directly comparable, and thus the trends are not analyzed.

LTBI

Information regarding LTBI was added to JTBS in 2006. However, due to questionable accuracy of the data reported in 2006, trend since 2007 is analyzed.

Treatment outcomes of LTBI

Completed treatment: An LTBI patient who has undergone treatment of sufficient duration as recommended by the Japanese guideline of LTBI treatment (i.e. 6 or 9 months of INH, or 4 or 6 months of RFP)

Died: An LTBI patient who has died from any cause during treatment.

Lost to follow-up: An LTBI patient whose treatment was interrupted and not restarted.

Transferred out: An LTBI patient who has moved out of the catchment area of a public health center during treatment, and whose final treatment outcome could not be identified by the public health center.

Still on treatment: An LTBI patient who is still on treatment at month 12.

Not evaluated: An LTBI patient who patient whose treatment outcome could not be evaluated by the public health center.

Appendix III: Data quality

Data quality is ensured via the system's automatic verification program, as well as regular meetings at local levels attended by staffs from hospitals and PHCs. Periodic refresher trainings on data entry are also provided to PHC nurses as well as administrative staff across the nation.

Data capture rate for selected variables is summarized in Table iii.a. The capture rate was defined and calculated for each variable as follows:

$$\text{Country of birth:} \quad \frac{\text{All active TB – country of birth unknown}}{\text{All active TB}} \times 100$$

$$\text{Occupation} \quad \frac{\text{All active TB – occupation unknown}}{\text{All active TB}} \times 100$$

$$\text{Homelessness:} \quad \frac{\text{All active TB – (homeless unknown+ no data entered)}}{\text{All active TB}} \times 100$$

$$\text{Treatment history:} \quad \frac{\text{All active TB – treatment history unknown}}{\text{All active TB}} \times 100$$

$$\text{Previous treatment regimen:} \quad \frac{\text{All active retreatment TB – regimen unknown}}{\text{All active retreatment TB}} \times 100$$

$$\text{Total delay:} \quad \frac{\text{All symptomatic PTB – delay unknown}}{\text{All symptomatic PTB}} \times 100$$

$$\text{DM:} \quad \frac{\text{All active TB – DM unknown}}{\text{All active TB}} \times 100$$

$$\text{HIV status:} \quad \frac{\text{All active TB – (HIV positive + HIV negative)}}{\text{All active TB}} \times 100$$

$$\text{HIV testing status:} \quad \frac{\text{All active TB – (HIV positive + HIV negative+ test not done)}}{\text{All active TB}} \times 100$$

$$\text{Culture known TB: } \frac{\text{(Culture positive+ Culture negative)}}{\text{All active TB}} \times 100$$

$$\text{Culture known PTB: } \frac{\text{(Culture positive+ Culture negative)}}{\text{All active PTB}} \times 100$$

$$\text{DST known TB } \frac{\text{(INH negative + positive) + (RFP negative + positive)}}{\text{All culture positive TB}} \times 100$$

$$\text{DST known PTB } \frac{\text{(INH negative + positive) + (RFP negative + positive)}}{\text{All culture positive PTB}} \times 100$$

The denominators are summarized in Table iii.b.

Table iii.a
Data capture rate, 2017

Prefecture	Country of birth	Occupation	Homeless-ness	Treatment history	Previous treatment regimen	Total delay
1	98.5	98.5	27.3	99.1	64.7	83.5
2	100.0	99.4	43.5	98.7	90.9	53.1
3	91.8	98.2	40.9	97.3	100.0	61.2
4	100.0	100.0	52.7	96.4	57.1	58.6
5	100.0	100.0	37.5	96.3	100.0	37.2
6	100.0	98.8	80.2	96.3	70.0	88.6
7	99.3	99.3	84.1	99.3	66.7	76.7
8	100.0	97.8	61.3	98.8	47.1	37.4
9	100.0	97.8	31.6	99.6	100.0	73.1
10	100.0	98.4	70.7	100.0	64.3	93.8
11	95.3	94.2	43.5	99.6	82.4	42.1
12	96.3	97.0	49.7	99.1	75.8	57.7
13	99.5	97.2	66.4	98.4	73.9	64.9
14	93.3	97.1	26.2	97.2	77.8	43.4
15	97.4	100.0	54.2	98.4	64.3	53.3
16	95.8	98.3	31.4	94.9	83.3	50.0
17	100.0	100.0	61.6	97.8	64.7	98.9
18	100.0	100.0	60.0	97.8	40.0	48.1
19	86.8	98.5	50.0	98.5	50.0	55.3
20	100.0	100.0	23.2	99.4	100.0	59.8
21	100.0	99.7	61.3	99.0	77.8	82.3
22	100.0	99.1	53.1	99.5	48.0	57.0
23	99.9	99.1	77.7	99.5	67.7	83.1
24	99.5	99.5	21.5	98.2	66.7	48.7
25	100.0	98.2	13.3	98.8	60.0	19.4
26	99.8	98.8	72.4	99.5	66.7	85.1
27	87.3	93.4	40.6	98.5	63.4	96.5
28	87.5	98.6	44.9	99.9	70.3	72.2
29	100.0	100.0	91.8	100.0	80.0	73.5
30	100.0	100.0	61.9	99.3	100.0	96.3
31	100.0	100.0	16.0	97.3	66.7	22.2
32	93.2	98.6	38.4	98.6	100.0	43.2
33	100.0	98.6	14.2	100.0	83.3	72.8
34	92.2	97.2	33.6	98.4	57.1	27.8
35	97.7	100.0	42.7	98.2	66.7	30.8
36	94.1	94.9	12.7	99.2	100.0	21.7
37	100.0	100.0	64.7	98.6	85.7	64.6
38	100.0	100.0	77.6	99.3	84.6	86.3
39	68.1	97.9	25.5	97.9	80.0	53.7
40	92.1	97.8	35.2	98.8	73.3	83.0
41	79.4	100.0	14.7	98.0	50.0	60.7
42	93.8	99.6	49.3	99.1	66.7	62.6
43	94.1	98.3	40.6	98.3	85.7	34.1
44	100.0	98.6	31.3	99.3	100.0	80.5
45	100.0	100.0	41.7	97.5	100.0	46.3
46	100.0	100.0	49.4	99.1	71.4	60.7
47	100.0	99.1	80.5	97.3	64.7	93.9
Total	95.7	97.6	49.0	98.7	70.7	67.0

(cont.)

Prefecture	DM	HIV statuss	HIV testing status	Culture known TB	Culture known PTB	DST known TB	DST known PTB
1	89.6	37.7	50.3	80.7	88.2	68.6	69.3
2	77.3	0.0	69.5	64.3	69.2	53.2	56.7
3	80.0	0.0	56.4	81.8	83.3	60.6	62.5
4	93.4	1.8	18.0	86.8	88.9	78.2	82.2
5	70.0	1.3	12.5	62.5	59.7	35.9	38.2
6	97.5	0.0	35.8	96.3	100.0	89.7	90.7
7	80.4	0.0	31.9	84.8	90.9	71.9	71.9
8	93.5	1.9	49.8	76.8	77.9	57.2	57.1
9	87.3	20.6	54.4	94.7	98.9	78.3	79.7
10	92.4	1.1	53.3	95.7	99.3	78.4	81.4
11	83.9	4.1	20.2	74.2	76.8	67.1	68.4
12	87.1	0.4	38.6	87.7	89.0	86.3	86.3
13	91.9	44.6	65.6	94.4	96.6	95.9	96.6
14	79.2	1.1	22.8	90.6	92.6	81.5	81.9
15	82.6	3.2	64.7	77.4	86.9	60.8	60.2
16	66.9	0.8	14.4	74.6	80.5	57.6	58.0
17	97.1	0.7	19.6	96.4	97.1	93.6	98.9
18	100.0	0.0	3.3	96.7	98.5	91.8	94.7
19	67.6	4.4	48.5	94.1	94.2	80.0	81.6
20	85.1	6.5	34.5	88.1	94.2	77.9	82.8
21	94.2	0.3	6.7	88.5	91.5	74.1	75.4
22	90.8	2.8	20.3	88.0	90.7	68.8	69.0
23	89.6	3.9	31.8	97.1	98.4	93.6	94.2
24	83.1	1.4	16.9	75.8	80.8	49.6	50.0
25	92.8	0.6	27.7	77.1	81.3	69.9	65.3
26	92.7	0.5	30.7	95.4	96.1	85.7	86.7
27	92.7	2.1	50.5	94.9	96.2	92.7	93.4
28	92.0	1.0	30.8	91.0	95.3	88.3	90.1
29	97.1	0.6	47.4	100.0	100.0	95.4	95.8
30	98.6	0.0	45.3	97.8	100.0	98.0	98.9
31	97.3	0.0	24.0	49.3	49.2	14.7	13.8
32	90.4	0.0	12.3	87.7	90.6	69.4	73.2
33	94.8	0.5	38.7	92.9	95.8	84.8	86.5
34	80.1	9.0	33.0	74.8	78.4	42.4	46.0
35	88.3	1.2	38.6	75.4	81.0	53.0	55.3
36	78.0	0.0	4.2	74.6	73.6	82.6	81.0
37	83.5	5.0	29.5	90.6	93.8	77.3	81.6
38	96.6	0.0	55.8	83.0	87.4	73.6	74.7
39	90.4	0.0	3.2	73.4	76.1	49.0	50.0
40	89.3	1.0	7.1	82.7	86.8	77.9	75.6
41	64.7	0.0	3.9	77.5	79.5	73.3	74.5
42	95.2	1.8	24.7	69.2	74.4	70.6	71.7
43	91.6	11.3	23.0	69.0	75.3	44.3	42.6
44	93.2	1.4	61.2	88.4	89.3	87.2	87.2
45	90.0	0.8	51.7	80.8	98.8	88.9	93.1
46	91.4	0.9	29.6	71.7	77.0	74.4	76.6
47	97.3	0.4	31.0	86.7	92.9	70.9	71.3
Total	89.0	8.9	37.2	87.4	90.4	81.4	82.4

Table iii.b Denominators used to calculate the capture rate, 2016

Prefecture	Active TB	Total PTB	Active TB, retreatment cases	Symptomatic PTB	Culture positive PTB	Culture positive TB
1	518	373	23	306	261	291
2	171	131	6	109	81	88
3	131	95	5	75	77	92
4	185	142	8	118	114	126
5	86	66	2	45	51	57
6	80	60	4	44	53	60
7	163	123	13	98	101	116
8	354	283	20	191	179	196
9	218	180	6	138	126	139
10	183	144	12	111	122	133
11	979	778	46	612	472	516
12	906	702	36	476	487	554
13	2,340	1,878	127	1,236	1,438	1,614
14	1,192	947	36	669	699	782
15	216	164	22	128	104	114
16	117	91	7	68	78	93
17	126	97	6	76	80	90
18	87	66	4	52	44	49
19	72	48	3	33	35	43
20	165	114	10	93	91	111
21	329	243	16	168	181	209
22	425	332	27	251	238	255
23	1,270	969	73	737	815	927
24	241	177	18	123	93	101
25	152	116	11	78	73	82
26	410	299	23	215	215	252
27	1,945	1,595	119	1,194	1,159	1,271
28	844	614	42	497	494	587
29	191	160	15	124	128	142
30	131	94	6	76	78	91
31	66	51	2	27	19	22
32	87	63	3	43	47	58
33	208	162	7	114	115	127
34	324	242	18	195	159	188
35	178	126	6	89	68	79
36	120	85	3	70	64	75
37	138	101	8	82	90	98
38	133	104	15	80	67	75
39	92	67	5	52	53	64
40	720	521	34	363	361	419
41	106	87	2	73	56	61
42	218	168	10	143	108	123
43	232	176	12	138	82	93
44	185	149	5	113	109	120
45	143	111	9	85	93	103
46	245	185	10	156	129	146
47	203	129	13	99	91	119
Total	17,625	13,608	908	10,063	9,878	11,151

Appendix IV: Supplementary tables

Table s1. Number of all active TB notifications, 2000-2017

Notification year	No.cases	Percentage change in cases	Notification rate per 100,000	Percentage change in rate
2000	39,384	NA	31.0	NA
2001	35,489	9.9	27.9	10.0
2002	32,828	7.5	25.8	7.5
2003	31,638	3.6	24.8	3.9
2004	29,736	6.0	23.3	6.0
2005	28,319	4.8	22.2	4.9
2006	26,384	6.8	20.6	7.1
2007	25,311	4.1	19.8	3.9
2008	24,760	2.2	19.4	2.0
2009	24,170	2.4	19.0	2.1
2010	23,261	3.8	18.2	4.2
2011	22,681	2.5	17.7	2.5
2012	21,283	6.2	16.7	5.9
2013	20,495	3.7	16.1	3.6
2014	19,615	4.3	15.4	4.1
2015	18,280	6.8	14.4	6.7
2016	17,625	3.6	13.9	3.5
2017	16,789	4.7	13.3	4.3

Table s2. Number of TB notifications by age group and sex, 2017

Age group	Total		Male		Female	
	n	rate per 100,000	n	rate per 100,000	n	rate per 100,000
0-4	31	0.6	19	0.8	12	0.5
5-9	10	0.2	7	0.3	3	0.1
10-14	18	0.3	7	0.3	11	0.4
15-19	148	2.5	96	3.1	52	1.8
20-24	609	9.8	343	10.7	266	8.8
25-29	622	9.9	334	10.4	288	9.4
30-34	505	7.1	257	7.1	248	7.1
35-39	482	6.1	257	6.4	225	5.8
40-44	525	5.6	305	6.4	220	4.7
45-49	634	6.7	404	8.5	230	4.9
50-54	612	7.5	441	10.8	171	4.2
55-59	656	8.6	436	11.5	220	5.8
60-64	741	9.5	528	13.7	213	5.4
65-69	1,283	12.9	923	19.2	360	7.0
70-74	1,353	17.5	943	26.0	410	10.0
75-79	1,834	27.2	1,176	39.1	658	17.6
80-84	2,408	45.5	1,477	68.5	931	29.7
85-89	2,414	71.1	1,337	114.0	1,077	48.5
90+	1,904	92.7	881	177.7	1,023	65.6
Total	16,789	13.3	10,171	16.5	6,618	10.2

Table s3. Number of TB notification among those aged 65 and above, 2000-2017

Notification year	Age group		
	65-74	75-84	85+
2000	8,393	7,494	3,148
2001	7,323	7,068	3,078
2002	6,598	6,995	2,935
2003	6,174	7,064	3,157
2004	5,482	6,847	3,151
2005	5,067	6,715	3,176
2006	4,715	6,475	3,190
2007	4,490	6,418	3,181
2008	4,420	6,265	3,359
2009	4,050	6,368	3,593
2010	3,918	6,102	3,725
2011	3,566	6,166	4,024
2012	3,459	5,711	4,137
2013	3,322	5,589	4,316
2014	3,205	5,171	4,447
2015	3,037	4,877	4,252
2016	2,747	4,580	4,415
2017	2,636	4,242	4,318

Table s4. Number and proportion of TB notifications by sex and occupation (aged 25-64), 2017

Occupation	Total		Male		Female	
	n	%	n	%	n	%
Doctors	26	100.0	22	84.6	4	15.4
Nurses	193	100.0	13	6.7	180	93.3
Other HCWs	233	100.0	65	27.9	168	72.1
Full- and part-time employed	1,916	100.0	1,458	76.1	458	23.9
Service industry	301	100.0	145	48.2	156	51.8
Teachers	74	100.0	33	44.6	41	55.4
Temporary employed	313	100.0	174	55.6	139	44.4
Self-employed	273	100.0	228	83.5	45	16.5
Houseworkers	114	100.0	1	0.9	113	99.1
Students	171	100.0	100	58.5	71	41.5
Unemployed	991	100.0	625	63.1	366	36.9
Unknown	172	100.0	98	57.0	74	43.0

Table s5.a. Number and proportion of those homeless among TB notifications (aged 25-64), 2017

	Homeless (a)	Not homeless (b)	Unknown (c)	Total (d)*	Total excluding unknown (d-c)	Proportion of homeless (a/(d-c)*100) (%)
Total	76	2,394	530	3,000	2,470	3.1
Sex						
Male	74	1,455	338	1,867	1,529	4.8
Female	2	939	192	1,133	941	0.2
Age group						
25-34	2	592	139	733	594	0.3
35-44	6	507	110	623	513	1.2
45-54	27	615	134	776	642	4.2
55-64	41	680	147	868	721	5.7
Country of birth						
Japan-born	72	1,878	296	2,246	1,950	3.7
Foreign-born	2	485	169	656	487	0.4
COB unknown	2	31	65	98	33	6.1

COB = country of birth
* Homeless status known for 3,000 of 4,777 TB cases aged 25-64

Table s5.b. Number and proportion of those unemployed among TB notifications (aged 25-64), 2017

	Unemployed (a)	Employed (b)	Unknown (c)	Total (d)	Total excluding unknown (d-c)	Proportion of unemployed (a/(d-c)*100) (%)
Total	991	3,614	172	4,777	4,605	21.5
Sex						
Male	625	2,239	98	2,962	2,864	21.8
Female	366	1,375	74	1,815	1,741	21.0
Age group						
25-34	136	957	34	1,127	1,093	12.4
35-44	145	824	38	1,007	969	15.0
45-54	234	958	54	1,246	1,192	19.6
55-64	476	875	46	1,397	1,351	35.2
Country of birth						
Japan-born	776	2,754	105	3,635	3,530	22.0
Foreign-born	172	749	42	963	921	18.7
COB unknown	43	111	25	179	154	27.9

COB = country of birth

Table s5.c. Number and proportion of those on social welfare among TB notifications (aged 25-64), 2017

	On social welfare (a)	Not on social welfare (b)	Unknown (c)	Total (d)	Total excluding unknown (d-c)	Proportion of those on social welfare (a/(d-c)*100) (%)
Total	341	4,344	92	4,777	4,685	7.3
Sex						
Male	289	2,609	64	2,962	2,898	10.0
Female	52	1,735	28	1,815	1,787	2.9
Age group						
25-34	9	1,092	26	1,127	1,101	0.8
35-44	26	965	16	1,007	991	2.6
45-54	104	1,113	29	1,246	1,217	8.5
55-64	202	1,174	21	1,397	1,376	14.7
Country of birth						
Japan-born	313	3,272	50	3,635	3,585	8.7
Foreign-born	14	917	32	963	931	1.5
COB unknown	14	155	10	179	169	8.3

COB = country of birth

Table s5.d. Number and proportion of those without health insurance among TB notifications (aged 25-64), 2017

	No insurance (a)	With insurance (b)	Unknown (c)	Total (d)	Total excluding unknown (d-c)	Proportion of those with no insurance (a/(d-c)*100) (%)
Total	41	4,644	92	4,777	4,685	0.9
Sex						
Male	41	2,857	64	2,962	2,898	1.4
Female	0	1,787	28	1,815	1,787	0.0
Age group						
25-34	0	1,101	26	1,127	1,101	0.0
35-44	4	987	16	1,007	991	0.4
45-54	15	1,202	29	1,246	1,217	1.2
55-64	22	1,354	21	1,397	1,376	1.6
Country of birth						
Japan-born	39	3,546	50	3,635	3,585	1.1
Foreign-born	0	931	32	963	931	0.0
COB unknown	2	167	10	179	169	1.2

COB = country of birth

Table s6. Clinical characteristics of TB notifications by age groups, 2017

Age group	EPTB bac	EPTB clin	PTB bac	PTB clin	TOTAL
0-4	6	4	5	16	31
5-14	4	0	8	16	28
15-24	57	50	449	201	757
25-34	96	110	659	262	1,127
35-44	90	87	661	169	1,007
45-54	99	131	809	207	1,246
55-64	103	146	978	170	1,397
65-74	268	346	1,732	290	2,636
75-84	488	611	2,860	283	4,242
85+	515	567	3,066	170	4,318
TOTAL	1,726	2,052	11,227	1,784	16,789

Table s7. Number and rate per 100,000 of foreign-born TB, 2007-2017

Notification year	No.cases	Rate per 100,000
2007	842	40.7
2008	945	44.1
2009	938	44.1
2010	952	45.6
2011	921	45
2012	1,069	52.6
2013	1,064	51.5
2014	1,101	51.9
2015	1,164	50.1
2016	1,338	56.2
2017	1,530	59.7

Table s8 Number and proportion* of foreign-born TB by age group, 2007-2017

* Note: the denominator excludes those whose country of birth is unknown

Notification year	Total		0-14		15-24		25-34		35-44		45-55		55+	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
2007	842	3.5	9	10.5	231	23.8	321	14.6	155	7.7	69	3.5	57	0.3
2008	945	3.9	5	5.4	246	27.0	384	18.3	165	8.2	76	3.9	69	0.4
2009	938	4.0	3	4.3	253	28.5	375	18.6	157	8.0	63	3.3	87	0.5
2010	952	4.2	9	10.5	274	30.1	341	19.4	165	8.8	82	4.7	81	0.5
2011	921	4.1	8	9.6	245	31.5	343	21.7	161	8.9	85	4.9	79	0.5
2012	1,069	5.2	7	11.1	304	42.2	357	25.4	196	12.1	106	7.1	99	0.6
2013	1,064	5.4	7	10.8	319	46.8	361	28.7	177	12.6	97	6.8	103	0.7
2014	1,101	5.8	8	17.0	339	47.9	376	31.0	180	13.9	115	8.4	83	0.6
2015	1,164	6.6	9	18.4	353	52.6	423	38.5	174	14.1	101	8.0	104	0.8
2016	1,338	7.9	12	20.3	471	58.6	478	43.6	175	17.1	107	8.9	95	0.8
2017	1,530	9.5	11	19.6	503	67.3	565	51.6	219	22.7	114	9.5	118	1.0

Table s9. Foreign-born TB by country name, 2017

Country name	No.cases	Proportion (%)
the Philippines	321	21.0
China	258	16.9
Vietnam	257	16.8
Nepal	164	10.7
Indonesia	121	7.9
Myanmar	80	5.2
Unknown	78	5.1
South Korea	46	3.0
Thailand	36	2.4
India	28	1.8
Cambodia	20	1.3
Mongolia	19	1.2
Brazil	17	1.1
Peru	12	0.8
Bangladesh	11	0.7
Pakistan	8	0.5
Taiwan	5	0.3
Sri Landa	4	0.3
Bhutan	3	0.2
UK	3	0.2
Guinea	3	0.2
Bolivia	2	0.1
Hong Kong	2	0.1
Kenya	2	0.1
Laos	2	0.1
Malaysia	2	0.1
North Korea	2	0.1
Romania	2	0.1
Russia	2	0.1
Senegal	2	0.1
Afganistan	1	0.1
Angola	1	0.1
Canada	1	0.1
Chile	1	0.1
Côte d'Ivoire	1	0.1
Cameroon	1	0.1
Columbia	1	0.1
Germany	1	0.1
Ethiopia	1	0.1
Kyrgyzstan	1	0.1
Mozambique	1	0.1
Nigeria	1	0.1
the Netherlands	1	0.1
Portugal	1	0.1
Paraguay	1	0.1
Sierra Leone	1	0.1
Swaziland	1	0.1
USA	1	0.1
Total	1530	100.0

Table s10. Foreign-born TB by selected countries of birth, 2007-2017

Notification year	China	the Philippines	Nepal	Vietnam
2007	225	195	18	29
2008	263	234	27	36
2009	267	221	28	44
2010	273	216	39	24
2011	273	219	38	52
2012	294	290	42	63
2013	292	258	65	68
2014	261	292	88	109
2015	249	284	108	135
2016	272	318	135	212
2017	258	321	164	257

Note: the numbers have been updated since the previous year and may differ from the last year's report for some countries, and for some years

Table s11. Foreign-born TB by year of entry to Japan, 2012-2017

Notification year	0-1 year ago	2-4 years ago	5-9 years ago	More than 10 years ago
2012	250	150	105	140
2013	280	152	104	141
2014	299	138	86	151
2015	333	172	76	137
2016	429	179	76	152
2017	491	247	93	140

Table s12. TB notification among children aged 0-14 by country of birth, 2000-2017

Notification year	Total no. cases	Of which Japan-born	Of which foreign-born	Of which COB unknown
2000	220	183	16	21
2001	195	177	6	12
2002	155	137	6	12
2003	127	100	12	15
2004	117	99	6	12
2005	117	103	9	5
2006	85	74	6	5
2007	92	77	9	6
2008	95	87	5	3
2009	73	66	3	4
2010	89	77	9	3
2011	84	75	8	1
2012	63	56	7	0
2013	66	58	7	1
2014	49	39	8	2
2015	51	40	9	2
2016	59	47	12	0
2017	59	45	11	3

COB = country of birth

Table s13.a. Source of infection of childhood TB by country of birth, 2017

Country of birth	Father	Mother	Grandparents	Others	Unknown	TOTAL
Japan-born	11	4	4	3	23	45
Foreign-born	1	0	1	0	9	11
COB* unknown	0	0	1	1	1	3

COB = country of birth

Table s13.b. Mode of detection of childhood TB by country of birth, 2017

Country of birth	Individual health check	Screening at school	Contact investigation (family)	Contact investigation (casual)	Visit hospital with symptoms	Visit hospital for other diseases	TOTAL
Japan-born	0	0	25	4	13	3	45
Foreign-born	2	3	3	0	3	0	11
COB* unknown	0	0	0	1	2	0	3

COB = country of birth

Table s14. Number of PTB and culture confirmed PTB, 2007-2017

Notification year	PTB	Of which culture confirmed	Proportion of culture confirmed
2007	19,893	9,983	50.2
2008	19,393	9,480	48.9
2009	18,912	10,902	57.6
2010	18,328	11,495	62.7
2011	17,519	10,915	62.3
2012	16,432	11,261	68.5
2013	15,972	10,523	65.9
2014	15,149	10,259	67.7
2015	14,123	10,035	71.1
2016	13,608	9,878	72.6
2017	13,011	9,580	73.6

PTB = pulmonary tuberculosis

Table s15. Number and proportion of cases with DST results to INH and RFP known, 2012-2017

Notification year	**Culture confirmed cases**	**Of which DST results to INH and RFP known**	
		n	%
2012	12,420	9,134	73.5
2013	11,698	8,409	71.9
2014	11,484	8,439	73.5
2015	11,283	8,511	75.4
2016	11,151	8,638	77.5
2017	10,886	8,856	81.4

DST= drug susceptibility test, INH = isoniazid, RFP = rifampicin

Table s16. Number and proportion of cases with MDR by country of birth, 2012-2017

Notification year	DST results known (total)	Of which MDR (total)		DST results known (Japan-born)	Of which MDR (Japan-born)		DST results known (Foreign-born)	Of which MDR (Foreign-born)	
		n	%		n	%		n	%
2012	9,134	64	0.7	8,471	45	0.7	382	15	4.2
2013	8,409	49	0.6	7,692	31	0.6	404	16	4.7
2014	8,439	58	0.7	7,728	35	0.7	397	21	5.5
2015	8,511	48	0.6	7,710	30	0.7	453	16	4.9
2016	8,638	50	0.6	7,692	35	0.7	562	15	3.6
2017	8,856	55	0.6	7,741	26	0.3	741	27	3.6

RR = rifampicin resistant, MDR = multi-drug resistance
Note: total includes those country of birth unknown. No. of DST results known and of which RR/MDR among those country of birth unknown are not shown in the table.

Table s17 Number and proportion of cases with INH resistance by country of birth, 2012-2017

Notification year	DST results known (total)	Of which resistant to INH (total)		DST results known (Japan-born)	Of which resistant to INH (Japan-born)		DST results known (Foreign-born)	Of which resistant to INH (Foreign-born)	
		n	%		n	%		n	%
2012	9,134	341	3.7	8,471	299	3.5	382	32	8.4
2013	8,409	339	4.0	7,692	300	3.9	404	34	8.4
2014	8,439	311	3.7	7,728	276	3.6	397	26	6.5
2015	8,511	351	4.1	7,710	304	3.9	453	33	7.3
2016	8,638	342	4.0	7,692	265	3.4	562	61	10.9
2017	8,856	364	4.1	7,741	298	3.8	741	54	7.3

INH = isoniazid
Note: total includes those country of birth unknown. No. of DST results known and of which RR/MDR among those country of birth unknown are not shown in the table.

Table s18. Number and proportion of those with delay among symptomatic pulmonary TB, 2007-2017

Notification year	Patient delay			Doctor delay			Total delay		
	Total	n	%	Total	n	%	Total	n	%
2007	10,368	1,871	18.0	12,830	2,789	21.7	10,315	1,905	18.5
2008	8,981	1,637	18.2	13,449	2,677	19.9	9,081	1,642	18.1
2009	8,691	1,553	17.9	13,369	2,729	20.4	8,767	1,599	18.2
2010	8,940	1,637	18.3	13,094	2,958	22.6	9,022	1,770	19.6
2011	8,763	1,629	18.6	12,540	2,843	22.7	8,837	1,717	19.4
2012	8,177	1,532	18.7	11,302	2,481	22.0	8,226	1,613	19.6
2013	7,854	1,419	18.1	10,889	2,403	22.1	7,906	1,482	18.7
2014	6,901	1,297	18.8	10,156	2,198	21.6	6,967	1,325	19.0
2015	6,678	1,335	20.0	9,688	2,087	21.5	6,721	1,373	20.4
2016	6,703	1,323	19.7	9,213	2,024	22.0	6,754	1,322	19.6
2017	6,295	1,312	20.8	8,602	1,870	21.7	6,328	1,342	21.2

*Note: total excluding those cases without data on delay

Table s19. Number of LTBI notifications by country of birth, 2007-2017

Notification year	Total no. cases	Of which Japan-born	Of which foreign-born	Of which COB unknown
2007	2,959	2,654	152	153
2008	4,832	4,449	257	126
2009	4,119	3,782	249	88
2010	4,930	4,587	293	50
2011	10,046	9,464	493	89
2012	8,771	8,037	487	247
2013	7,147	6,474	425	248
2014	7,562	6,823	523	216
2015	6,675	5,940	540	195
2016	7,477	6,499	650	328
2017	7,255	6,244	757	254

COB = country of birth

Table s20. Mode of detection of LTBI cases, 2017

Mode of detection	n	%
Individual health check	109	1.5
Regular screening	469	6.5
Contact investigation	4,524	62.4
Other mass investigation	74	1.0
At hospital setting	1,893	26.1
Others	164	2.3
Unknown	21	0.3
During follow-up for TB	1	0.0
TOTAL	7,255	100.0

Table s21.Trend in the mode of detection of LTBI cases, 2007-2017

Notification year	Individual health check		Regular screening		Contact investigation		Other mass investigation		At hospital setting		Others, unknown, during follow-up		TOTAL
	n	%	n	%	n	%	n	%	n	%	n	%	n
2007	25	0.8	79	2.7	2,455	83.0	55	1.9	204	6.9	141	4.8	2,959
2008	74	1.5	153	3.2	4,066	84.1	111	2.3	306	6.3	122	2.5	4,832
2009	84	2.0	183	4.4	3,417	83.0	50	1.2	305	7.4	80	1.9	4,119
2010	93	1.9	241	4.9	4,065	82.5	64	1.3	348	7.1	119	2.4	4,930
2011	219	2.2	660	6.6	7,979	79.4	360	3.6	626	6.2	202	2.0	10,046
2012	149	1.7	817	9.3	6,705	76.4	198	2.3	714	8.1	188	2.1	8,771
2013	106	1.5	552	7.7	5,295	74.1	98	1.4	914	12.8	182	2.5	7,147
2014	98	1.3	605	8.0	5,333	70.5	101	1.3	1,232	16.3	193	2.6	7,562
2015	96	1.4	496	7.4	4,507	67.5	47	0.7	1,345	20.1	184	2.8	6,675
2016	122	1.6	500	6.7	4,974	66.5	99	1.3	1,586	21.2	196	2.6	7,477
2017	109	1.5	469	6.5	4,524	62.4	74	1.0	1,893	26.1	186	2.6	7,255

Appendix V: Supplementary data

Table sd1. Population used to calculate the notification rates, 2017

Age group	Total	Male	Female
0-4	4,908,814	2,512,659	2,396,155
5-9	5,251,177	2,690,021	2,561,156
10-14	5,432,131	2,781,110	2,651,021
15-19	5,995,246	3,078,940	2,916,306
20-24	6,227,681	3,205,002	3,022,679
25-29	6,291,014	3,221,600	3,069,414
30-34	7,112,384	3,616,448	3,495,936
35-39	7,883,690	3,995,972	3,887,718
40-44	9,442,517	4,784,248	4,658,269
45-49	9,457,021	4,776,884	4,680,137
50-54	8,155,803	4,098,151	4,057,652
55-59	7,592,482	3,786,178	3,806,304
60-64	7,804,447	3,846,911	3,957,536
65-69	9,920,996	4,798,051	5,122,945
70-74	7,748,866	3,628,593	4,120,273
75-79	6,738,375	3,008,872	3,729,503
80-84	5,293,272	2,156,677	3,136,595
85-89	3,395,711	1,173,263	2,222,448
90+	2,054,583	495,807	1,558,776
Total	126,706,210	61,655,387	65,050,823

Source: Population as of October 1, 2017. Current population estimates, Statistics Bureau, Ministry of Internal Affairs and Communications http://www.stat.go.jp/data/jinsui/
Note: The age group specific population does not necessarily add up to TOTAL as the numbers are based on population census. For details, please contact the Ministry of Internal Affairs and Communications, Japan.

Table sd2. Population used to calculate the notification rates among the foreign-born, 2007-2017

Notification year	Population of foreign-born
2007	2,069,065
2008	2,144,682
2009	2,125,571
2010	2,087,261
2011	2,047,349
2012	2,033,656
2013	2,066,445
2014	2,121,831
2015	2,323,189
2016	2,382,822
2017	2,561,848

Source: Population of foreign-born residents. Foreign residents' statistics, Ministry of Justice
http://www.moj.go.jp/housei/toukei/toukei_ichiran_touroku.html