

# TUBERCULOSIS IN JAPAN

ANNUAL REPORT – 2019



Tuberculosis  
Surveillance

UNITED STATES  
J a p a n

## 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 2018. 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.

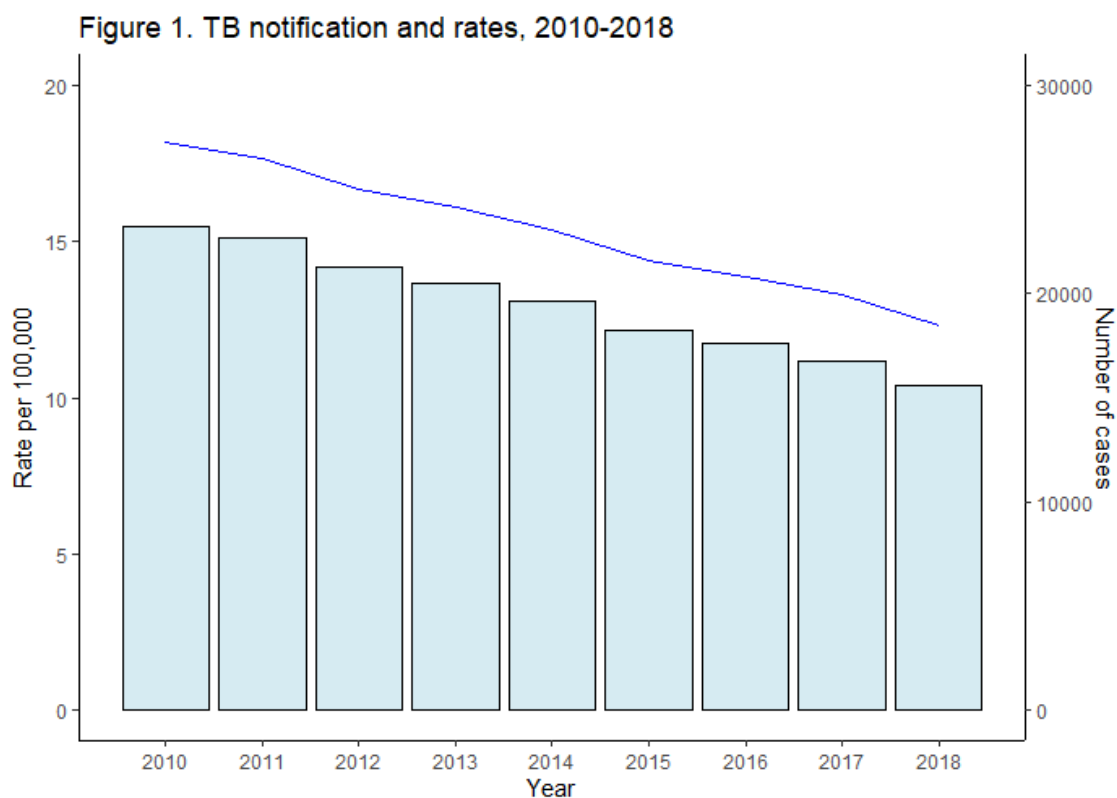
All figures in this report are available for download as a separate slide set also at <http://www.jata.or.jp/rit/ekigaku/en/statistics-of-tb/>.

## Chapter 1: Tuberculosis case report, 2010-2018

### Overall numbers and rates:

In 2018, 15,590 cases of tuberculosis (TB) were newly notified, of which 12,042 were bacteriologically confirmed. Notification rate per 100,000 population was 12.3 for all TB, and 9.5 for bacteriologically confirmed cases.

As shown in Figure 1, 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 (see also Table s1).

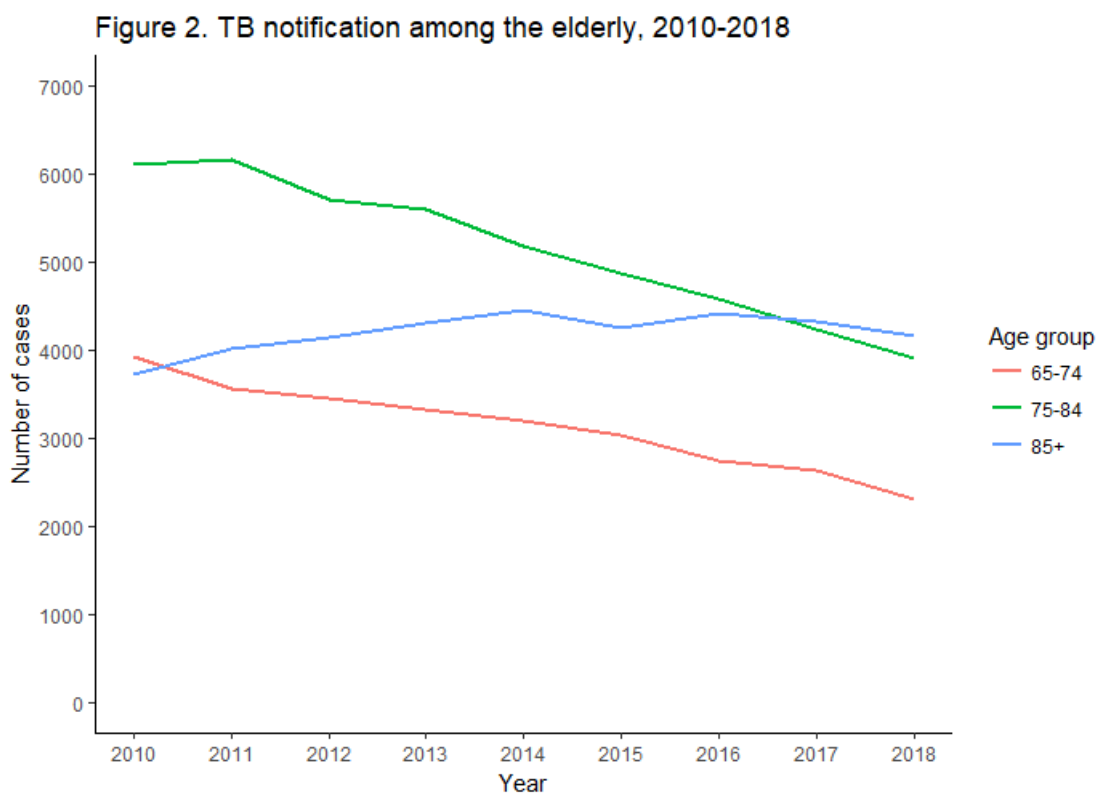


### Age and sex:

In 2018, 59.4% of the notified cases were males (9,263 / 15,590) and 40.6% were females (6,327 / 15,590).

The largest number of cases were diagnosed among those aged 85 to 89 (2,364 cases, a rate of 67.3 per 100,000), followed by those aged 80 to 84 (2,170 cases, a rate of 40.6 per 100,000). The rates were consistently higher among males than females in all age groups (see Table s2).

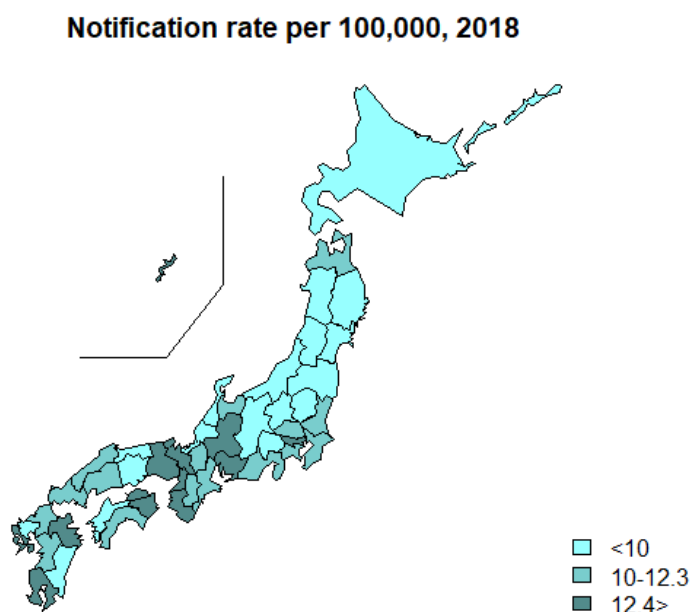
Among the elderly aged 65 and above, only the age group 85 years old and above had continued to increase in the number of cases until 2014 – however, since then, the number has begun to decline (Figure 2, see also Table s3).





### Geographical distribution:

In terms of regional disparities, large variation existed between the 47 prefectures of Japan, with the notification rate ranging from 6.0 per 100,000 in Yamagata prefecture to 20.5 per 100,000 in Osaka prefecture (Map 1, see also Table s4). In 18 of the 47 prefectures, the notification rate has decreased to below the national target of 10 per 100,000.



Map 1: TB notification rate by 47 prefectures of Japan, 2018

### Occupation:

In 2018, among those aged 25 to 64, 71.9% (3,112 / 4,330) had some sort of job, while 19.5% (845 / 4,330) were unemployed, 2.2% (94 / 4,330) were houseworkers and 3.8% (163 / 4,330) were students. 2.7% (116 / 4,330) were recorded as “job unknown” (see Table s5).

## 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 “eligible” 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, 6.9% (298 / 4,330) 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 1. 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 s6.a-s6.d).

Table 1. Number and proportions of those with social risk factors, by sex, age groups and COB\*, 2018

	Homeless		Unemployed		On social welfare		No insurance	
	n	%	n	%	n	%	n	%
<b>TOTAL</b>	61	100.0	845	100.0	238	100.0	47	100.0
Male	55	90.2	497	58.8	202	84.9	40	85.1
Female	6	9.8	348	41.2	36	15.1	7	14.9
<b>Age group</b>								
25-34	4	6.6	112	13.3	6	2.5	1	2.1
35-44	7	11.5	110	13.0	13	5.5	5	10.6
45-54	22	36.1	233	27.6	84	35.3	17	36.2
55-64	28	45.9	390	46.2	135	56.7	24	51.1
<b>Country of birth</b>								
Foreign-born	3	4.9	165	19.5	15	6.3	5	10.6
Japan-born	57	93.4	664	78.6	219	92.0	42	89.4
COB* unknown	1	1.6	16	1.9	4	1.7	0	0.0

COB = country of birth

## Clinical characteristics:

In 2018, of the 15,590 newly notified cases, 77.2% (12,033 / 15,590) had pulmonary disease, either with or without concomitant extra-pulmonary disease, while 22.8% (3,557 / 15,590) had exclusive extra-pulmonary disease. Of the pulmonary TB cases, 86.3% (10,386 / 12,033) were bacteriologically confirmed, while the proportion was much less at 46.6% (1,656/3,557) among those with exclusive extra-pulmonary disease (Table 2).

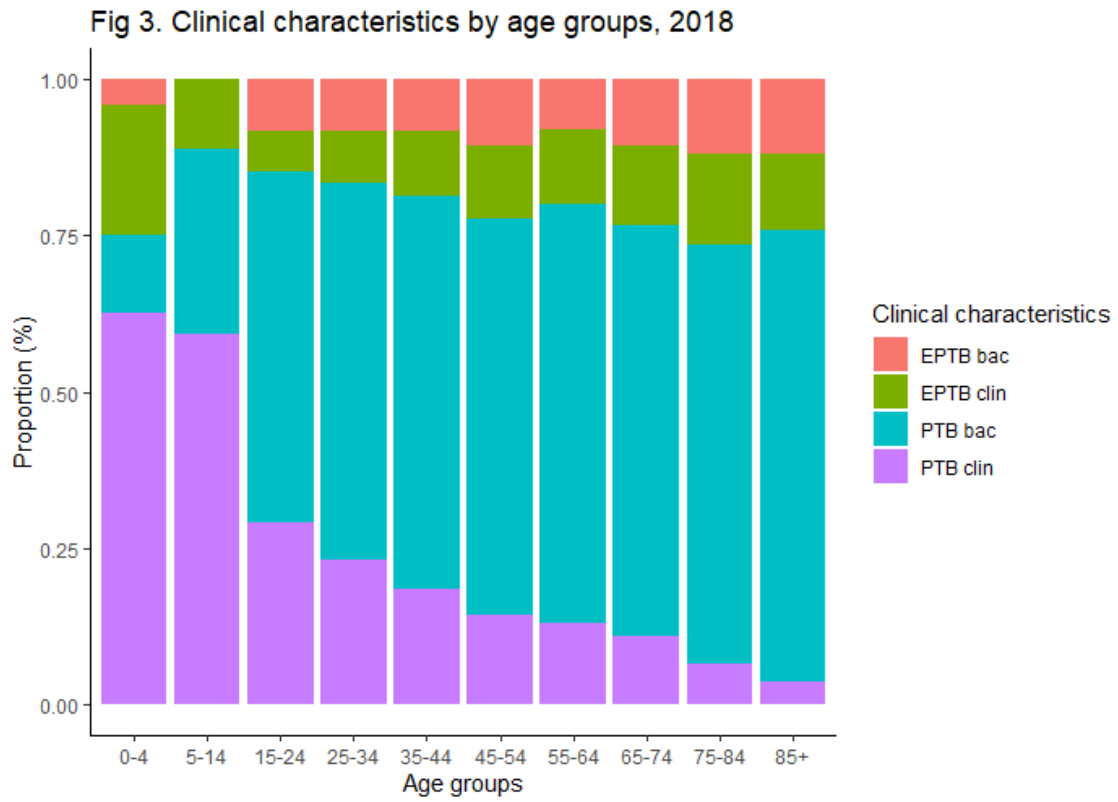
Of the 12,033 pulmonary cases, history of previous TB was known for 98.7% (11,873 / 12,033). Among newly notified pulmonary cases with known history of previous TB, 95.2% (11,298 / 11,873) were new cases. Of the 3,520 extra-pulmonary cases with known history of previous TB, 95.5% (3,363 / 3,520) were new cases (Table 2).

Table 2. Clinical characteristics of newly notified cases by treatment history, 2018

Tx history	PTB bac	PTB clin	PTB TOTAL	EPTB bac	EPTB clin	EPTB TOTAL
New	9,770	1,528	11,298	1,570	1,793	3,363
Retreatment	484	91	575	72	85	157
Unknown	132	28	160	14	23	37
TOTAL	10,386	1,647	12,033	1,656	1,901	3,557

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 16.7% among those aged 0-4 compared with 95.4% among those aged 85 and above. The proportion of bacteriologically confirmed among the extra-pulmonary cases remained relatively constant among those aged 15 years old and above, and was the highest among those aged 15-24 at 55.8%, and the lowest among those aged 55-64 at 40.2%. Out of 9 cases of extra-pulmonary cases diagnosed among those aged 0-14, only 1 was bacteriologically confirmed (Figure 3, see also Table s7).



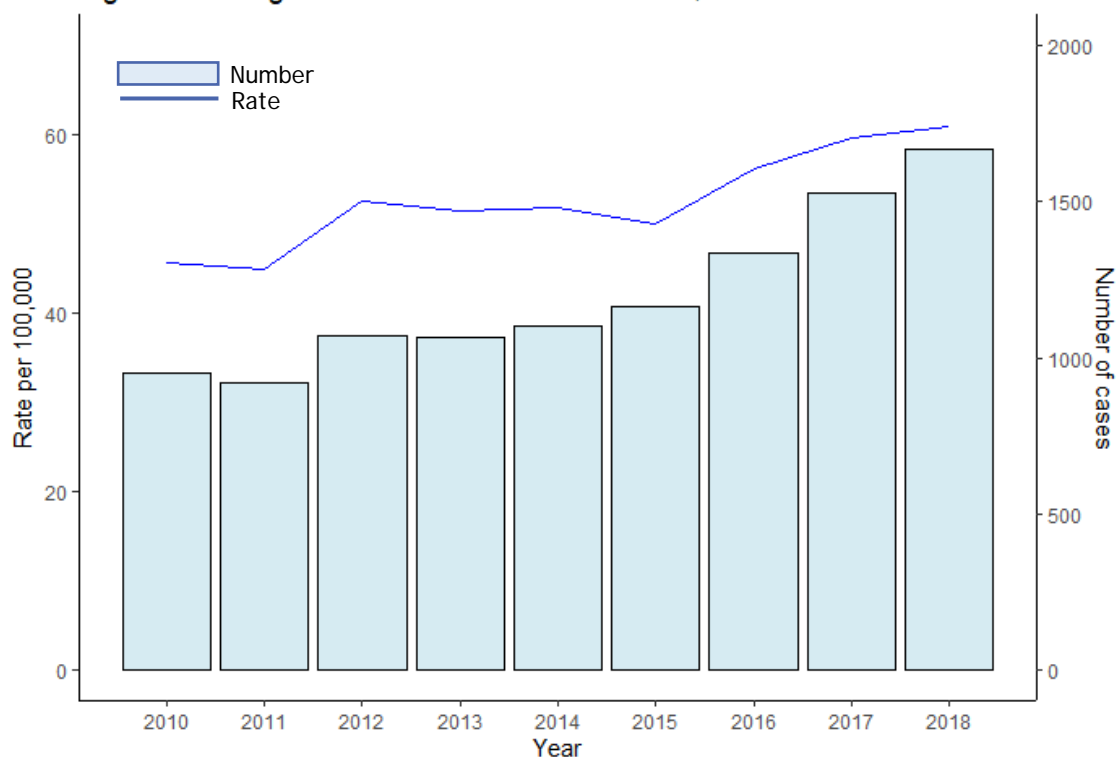
PTB = pulmonary tuberculosis, EPTB = extra-pulmonary tuberculosis  
 Clin = clinically confirmed, bac = bacteriologically confirmed

## Chapter 2: Foreign-born TB, 2010-2018

### Overall number and rates:

Information regarding place of birth (Japan-born/foreign-born) was known for 97.7% of the newly notified cases (15,237 / 15,590). Of those cases, 10.9% was born outside Japan (1,667 / 15,237). Both the number of case notification per 100,000 have continued to increase (Figure 4, see also Table s8).

Figure 4. Foreign-born TB notification and rates, 2010-2018



### Age and sex:

In 2018, 51.6% of the foreign-born cases were males (860 / 1,667) and 48.4% were females (807 / 1,667). The largest number of cases were diagnosed among those aged 25 to 34 (625 cases), followed by those aged 15 to 24 (571 cases). 71.7% (1,196/1,667) of foreign-born persons were aged between 15 and 34 (Table 3).

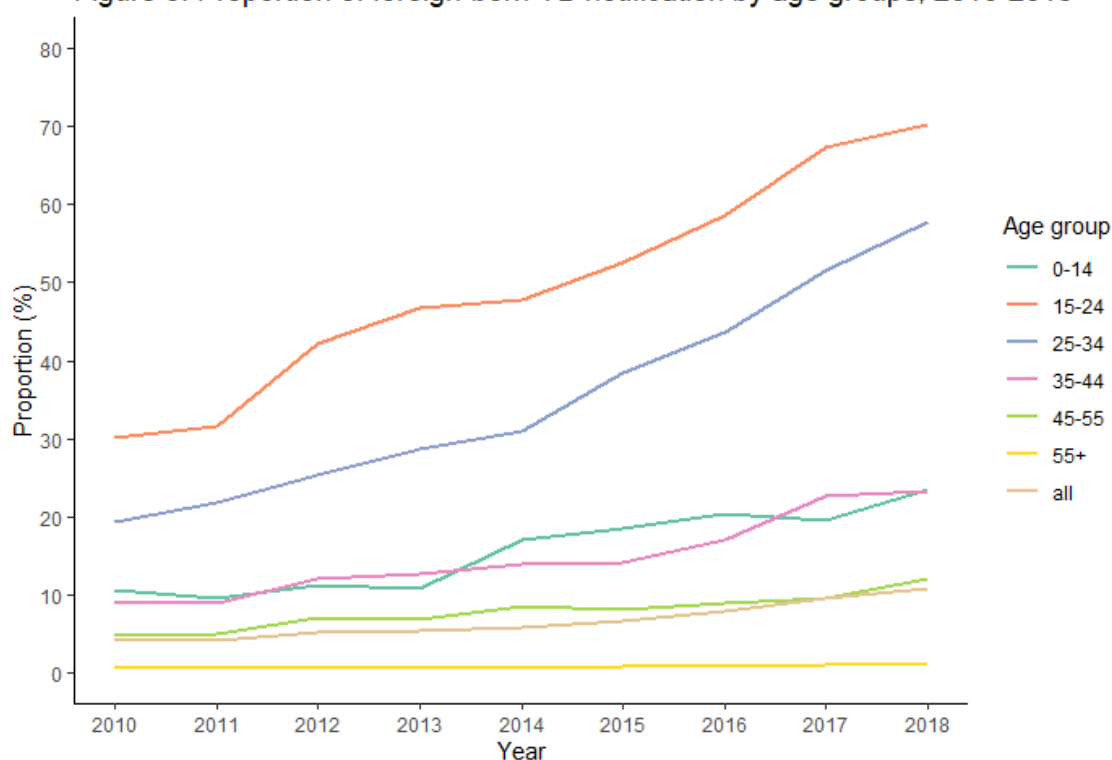
Table 3: Foreign-born TB cases\* by sex and age groups, 2018

Age group	Total		Male		Female	
	n	%	n	%	n	%
0-4	3	0.2	1	0.1	2	0.2
5-14	9	0.5	6	0.7	3	0.4
15-24	571	34.3	329	38.3	242	30.0
25-34	625	37.5	331	38.5	294	36.4
35-44	200	12.0	78	9.1	122	15.1
45-54	139	8.3	53	6.2	86	10.7
55-64	56	3.4	24	2.8	32	4.0
65-74	27	1.6	13	1.5	14	1.7
75-84	18	1.1	13	1.5	5	0.6
85+	19	1.1	12	1.4	7	0.9
TOTAL	1,667	100.0	860	100.0	807	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 s9).

Figure 5. Proportion of foreign-born TB notification by age groups, 2010-2018



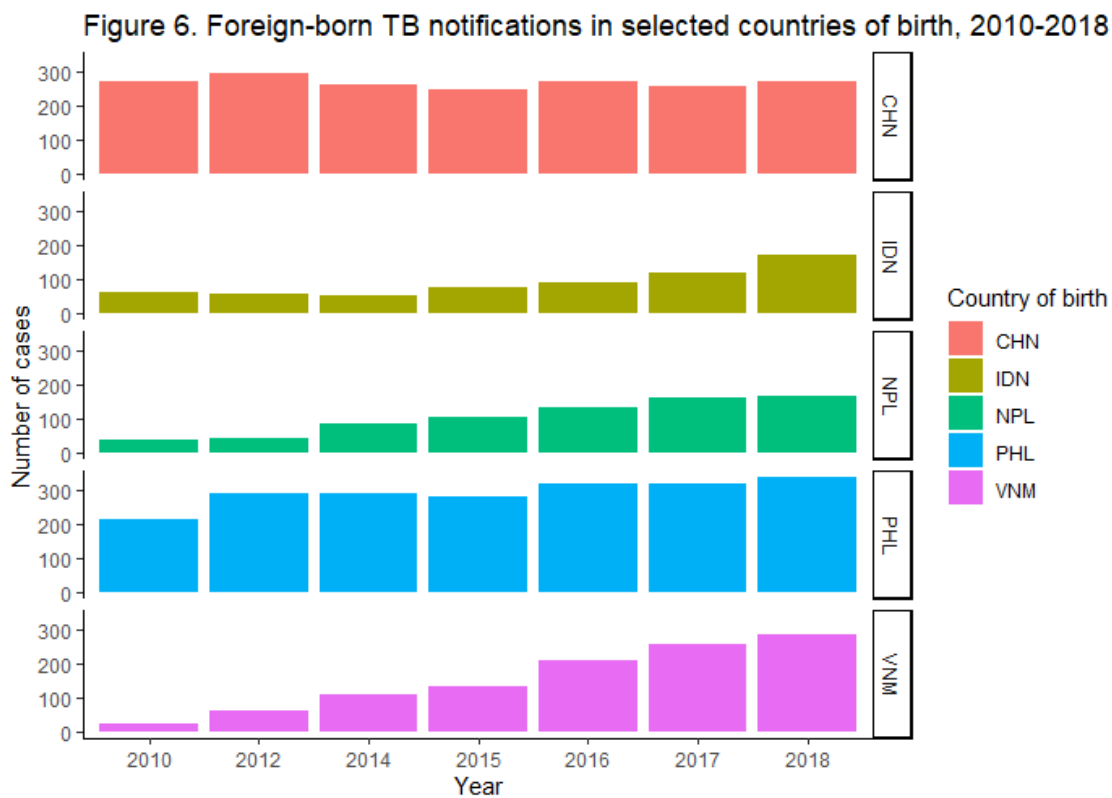
## Country of birth and time of entry to Japan:

Table 4 summarizes the foreign-born TB cases by major countries of birth (see also Table s10). The Philippines was the most frequent country of birth for foreign-born cases notified in 2018 (20.4%, 340 / 1,667), followed by Vietnam and China (17.3%, 289 / 1,667 and 16.4%, 274 / 1,667).

Table 4: Foreign-born TB cases by country of birth, 2018

Country name	Cases	Proportion (%)
the Philippines	340	20.4
Vietnam	289	17.3
China	274	16.4
Indonesia	171	10.3
Nepal	170	10.2
Myanmar	101	6.1
Unknown	46	2.8
South Korea	43	2.6
India	27	1.6
Thailand	26	1.6
Peru	23	1.4
Mongolia	21	1.3
Others	136	8.2
Total	1,667	100.0

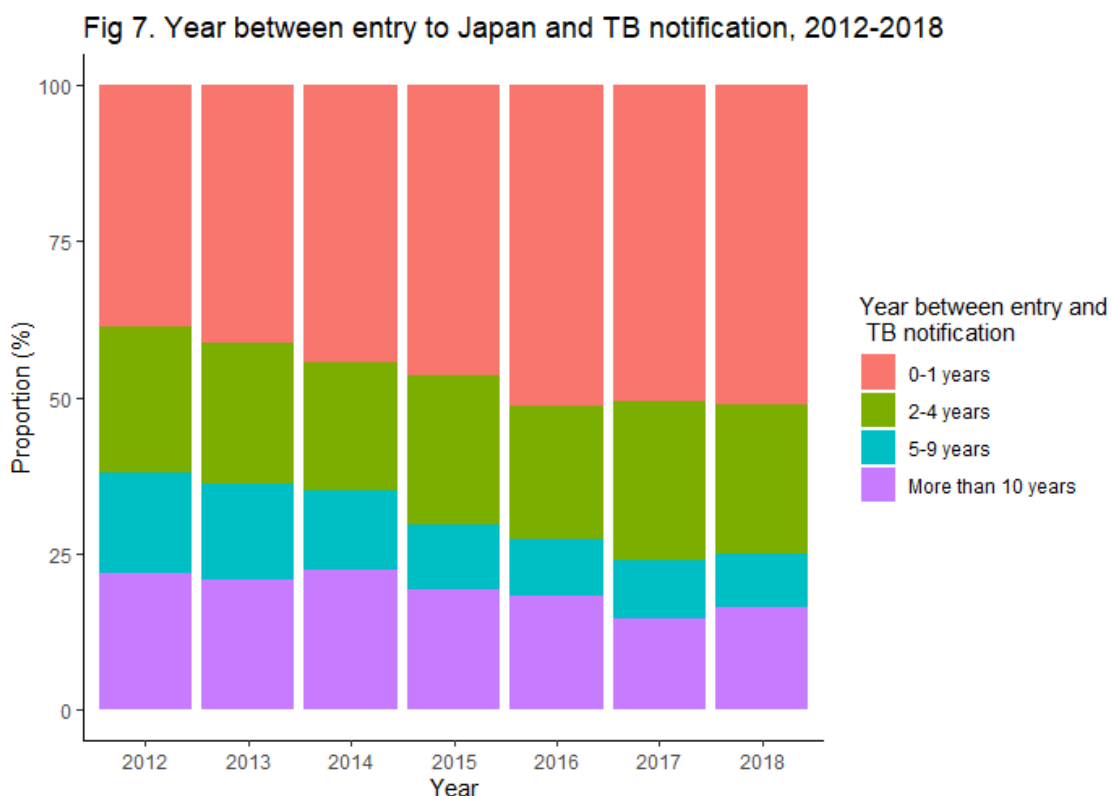
Looking at the trend in the five most frequent countries of birth, while the number of those from China has been relatively constant, those from Vietnam, Nepal and Indonesia have increased dramatically in the recent years (Figure 6, see also Table s11).



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



Year of entry to Japan has been collected under the JTBS since 2012. Of the 8,933 foreign-born cases notified in Japan between 2012 and 2018, year of entry was known for 63.8% (5,695 / 8,933). In 2018, of the 1,667 foreign-born cases notified, year of entry was known for 70.4% (1,174 / 1,667). Of which, 51.2% (601 / 1,174) 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 s12)



## Chapter 3: Co-morbidities (HIV and Diabetes mellitus), 2012-~2018

### HIV/TB cases:

Table 5 summarizes the newly notified TB cases by HIV status. In 2018, HIV test results were known only for 8.3% (1,295 / 15,590), while unknown for 91.7% of the newly notified cases. Of those cases with known test results, 44 (3.4%) were HIV positive and 1,251 (96.6%) were HIV negative.

Table 5: Newly notified cases by HIV test results, 2012-2018

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
2018	44	1,251	4,757	9,538

Of the 44 HIV positive TB cases, 16 (36.4%) were foreign-born and 27 (61.4%) were Japan-born. The proportion of women was slightly larger among the foreign-born HIV positive TB cases (25.0%, 4 / 16) compared with the Japan-born (22.2%, 6 / 27) cases (Table 6).

Table 6: Characteristics of HIV positive TB patients, 2018 (n=44)

	Foreign-born	Japan-born	Unknown
Male	12	21	0
Female	4	6	1

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 30.5% (4,757/15,590) in 2018.

## Diabetes mellitus/TB cases:

Table 7 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 2018, the status of DM was known for 88.8% of the newly notified cases (13,840/15,590). Of those cases with known DM status, 2,210 had concomitant DM. Proportion of those with DM has continued to increase steadily.

Table 7: Newly notified cases by DM status, 2012-2018

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
2018	2,210	11,630	1,750

Of the 2,210 cases with DM, 52 (2.4%) were foreign-born, and 2,110 (95.5%) were Japan-born. While 53.8% (28 / 52) of the foreign-born cases were aged between 35 and 54, 91.9% (1,940 / 2,110) of the Japan-born cases were aged 55 and above (Table 8).

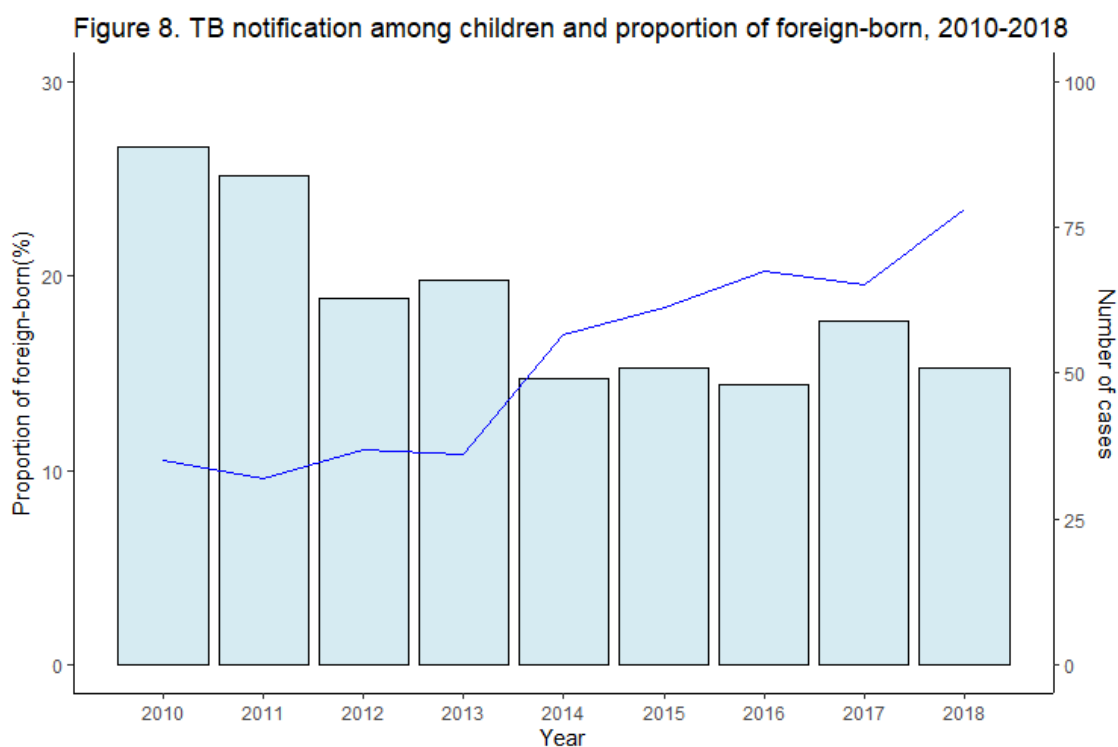
Table 8: Characteristics of cases with DM, 2018 (n=2,210)

Age group	Foreign-born	Japan-born	Unknown
25-34	4	4	0
35-54	28	166	4
55+	20	1,940	44

## Chapter 4: Childhood TB, 2010-2018

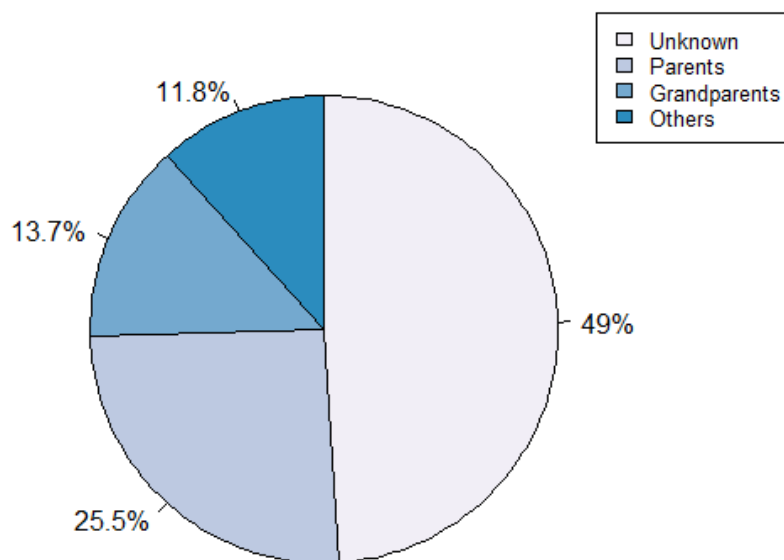
In 2018, 51 cases of TB were newly notified among children aged 14 and below, with a rate per 100,000 of 0.3. Of those cases, 62.7% were males (32 / 51) and 37.3% were females (19 / 51). 82.4% (42 / 51) had pulmonary diseases, and 17.6% (9 / 51) had extra-pulmonary disease only. One case of meningeal and one case of miliary TB were reported. Although the number of cases have steadily declined until 2013, since then, has shown a slight increase.

In 2018, 23.5% (12 / 51) of childhood TB cases were foreign-born. The proportion of those foreign-born has been on a gradual increase (Figure 8, see also Table s13).



The source of infection was known for 26 of the 51 cases, 21 of whom were Japan-born. 13 were infected by their parents and 7 by their grandparents (Figure 9, see also Table s14.a). Of the 39 Japan-born cases, 56.4% (22/39) were detected via contact investigation and 23.1% (9/39) at hospital setting, with symptoms. On the other hand, of the 12 foreign-born cases, 33.3% (4/12) were detected via contact investigation and 25.0% (3/12) at hospital setting, with symptoms (Table s14.b).

**Figure 9. Source of infection of notified childhood TB, 2018**



## Chapter 5: Laboratory confirmation

### **Sputum smear status for pulmonary cases:**

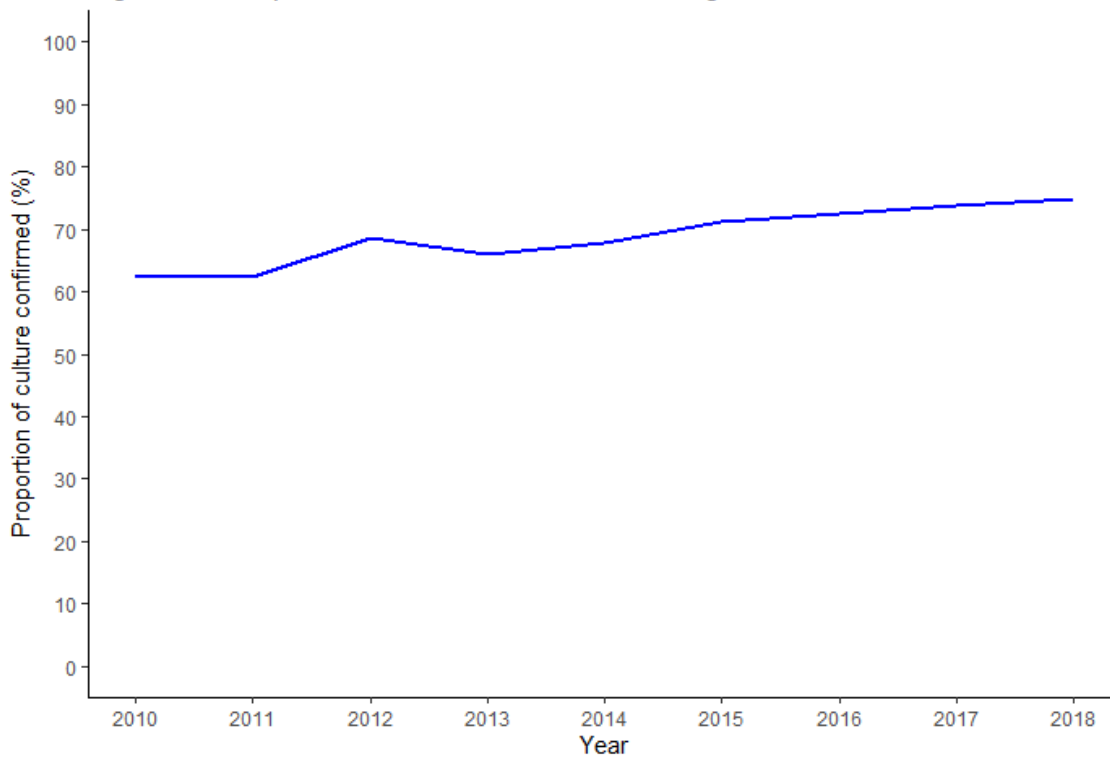
Of the 12,033 pulmonary TB cases notified in 2018, the results of sputum smear status were known for 99.1% (11,925/12,033). Of these cases, 50.9% were positive (6,064/11,925). Sputum smear test was not done for 87 cases, and test results not reported for 21 cases.

### **Culture confirmation:**

Of the 12,033 pulmonary TB cases notified in 2018, the results of culture confirmation were known for 92.0% (11,070 / 12,033). Of these cases, 81.4% (9,016 / 11,070) were culture confirmed. Results were pending for 653 cases, unknown for 81 cases, test was not done for 208 cases and terminated for 21 cases. The proportion of those culture confirmed among pulmonary TB has steadily increased from 62.7% in 2010 to 74.9% in 2018 (Figure 10, see also Table s15)

Of all TB cases notified in 2018, results of culture confirmation were known for 90.5% (13,807 / 15,258). Of these cases, 74.7% (10,319 / 13,807) were culture confirmed. Results were pending for 980 cases, unknown for 113 cases, test was not done for 331 cases and terminated for 27 cases.

Figure 10. Proportion of culture confirmed among PTB, 2010-2018

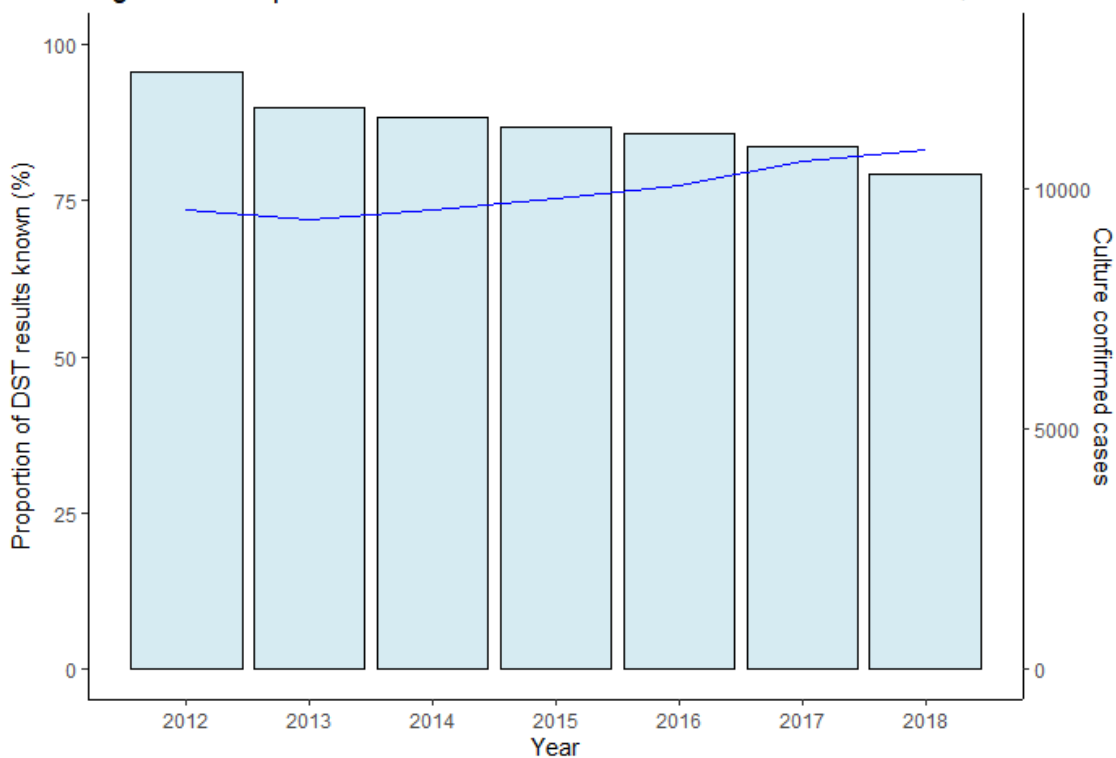


## Chapter 6: Drug-resistant TB (including treatment outcomes)

### Drug susceptibility test for isoniazid and rifampicin:

Of the 10,319 culture confirmed TB cases notified in 2018, drug susceptibility test (DST) results for both isoniazid (INH) and rifampicin (RFP) were known for 83.2% (8,584/ 10,319). The proportion of those with DST results for both isoniazid and rifampicin has, despite gradually, been increasing (Figure 11, see also Table s16)

Figure 11. Proportion of DST results known of culture confirmed TB, 2012-2018





### Multidrug resistant TB (MDR-TB):

Of the 8,584 cases with DST results known, 0.7% (60 / 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 (3.7% vs 0.4% in 2018). (Figures 12a-12c, see also Table s17)

Figure 12a. Number and proportion of MDR resistant TB (all), 2012-2018

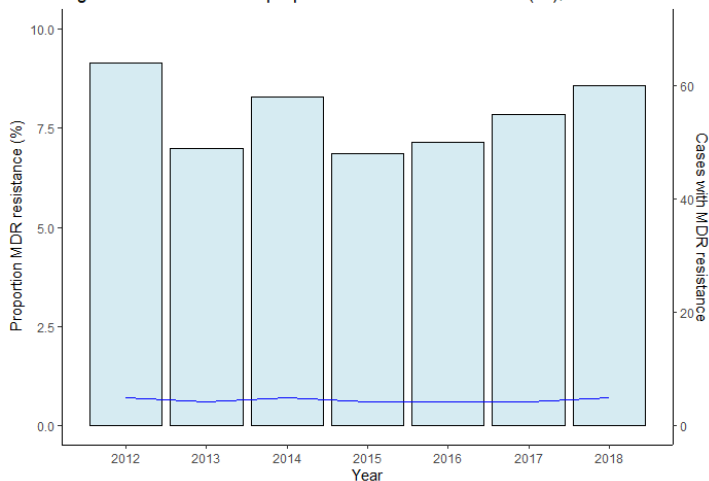


Figure 12b. Number and proportion of MDR resistant TB (foreign-born), 2012-2018

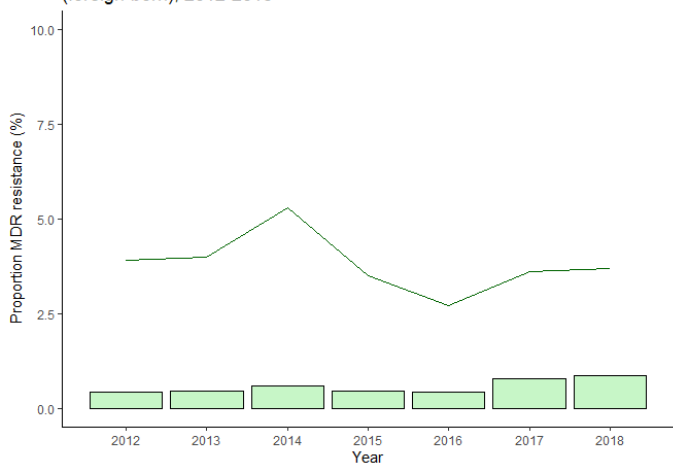
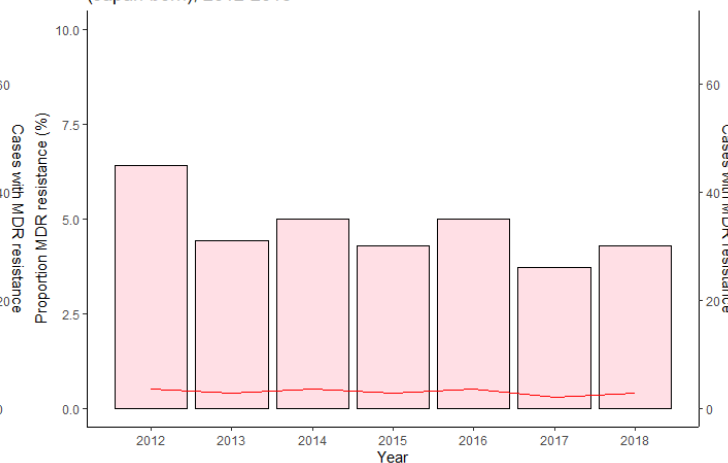


Figure 12c. Number and proportion of MDR resistant TB (Japan-born), 2012-2018



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

### Isoniazid resistance without MDR-TB:

Of the 8,584 cases with DST results known, 4.1% (353 /8,584) were resistant to isoniazid (INH) without MDR. The overall number of cases with INH resistance has remained relatively constant over the past 5 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 s18). Of the 68 foreign-born patients with INH resistance notified in 2018, 22 were from Vietnam, 12 from China, and 7 from the Philippines.

Figure 13a. Number and proportion of INH resistant TB (all), 2012-2018

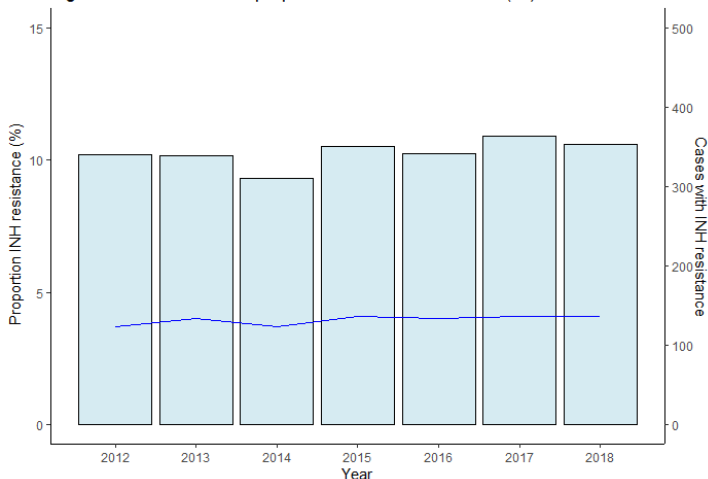


Figure 13b. Number and proportion of INH resistant TB (foreign-born), 2012-2018

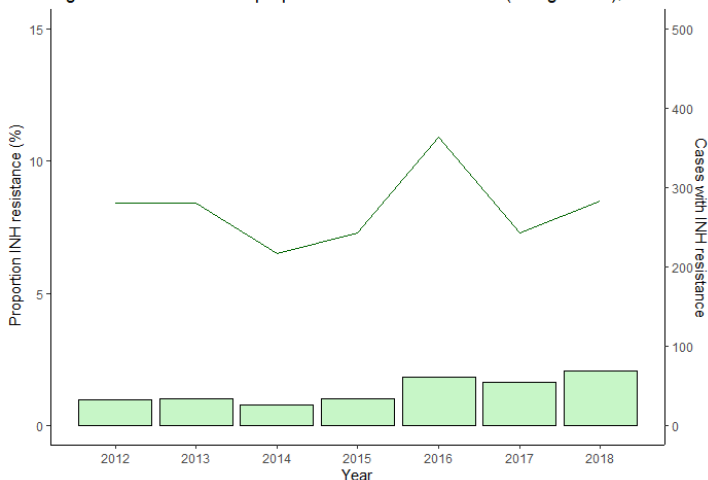
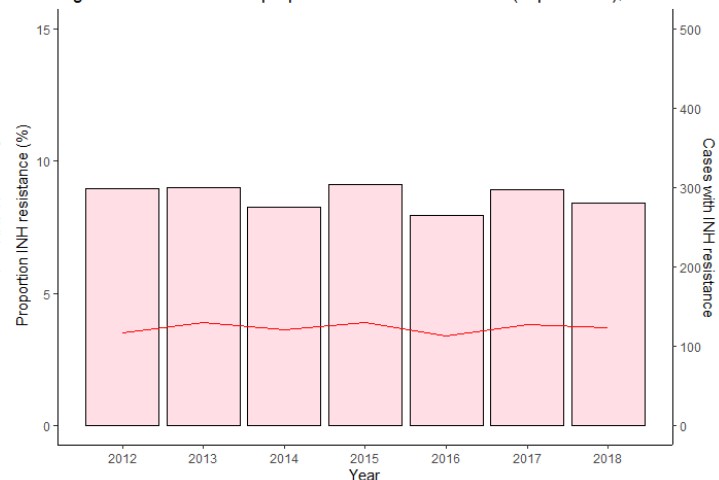


Figure 13c. Number and proportion of INH resistant TB (Japan-born), 2012-2018



Bar = number, line = proportion, INH = isoniazid

Table 9 summarizes the characteristics of those cases with MDR and INH mono-resistance notified in 2018. 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 (10.3% in 2018). The proportion of retreatment was higher among those with MDR compared with those with INH mono-resistance.

Table 9. Characteristics of cases with MDR and INH mono-resistance, 2018

	MDR		INH mono-resistance	
	n	%	n	%
<b>Sex</b>				
Male	32	53.3	223	63.2
Female	28	46.7	130	36.8
<b>Age group</b>				
0-14	0	0.0	0	0.0
15-34	27	45.0	62	17.6
35-54	13	21.7	55	15.6
55+	20	33.3	236	66.9
<b>Country of birth</b>				
Japan-born	30	50.0	281	79.6
Foreign-born	30	50.0	68	19.3
COB unknown	2	0.0	4	1.1
<b>Tx history</b>				
New	46	76.7	320	90.7
Retreatment	11	18.3	31	8.8
Unknown	3	5.0	2	1.0
<b>TOTAL</b>	<b>60</b>	<b>100</b>	<b>353</b>	<b>100</b>

COB= country of birth, Tx=treatment

### Outcomes of MDR-TB cohort:

The JTBS underwent a system revision in 2017 – one 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 48 months). (Table 10).

Table 10. Outcomes of MDR-TB cohort, notified in 2016, at the end of 2018

Tx outcomes	n	%
Cured	14	25.0
Completed	15	26.8
Died	11	19.6
Tx failed	0	0.0
LTFU	7	12.5
Transferred-out	5	8.9
Still on tx	2	3.6
Unknown	2	3.6
Total	56	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.

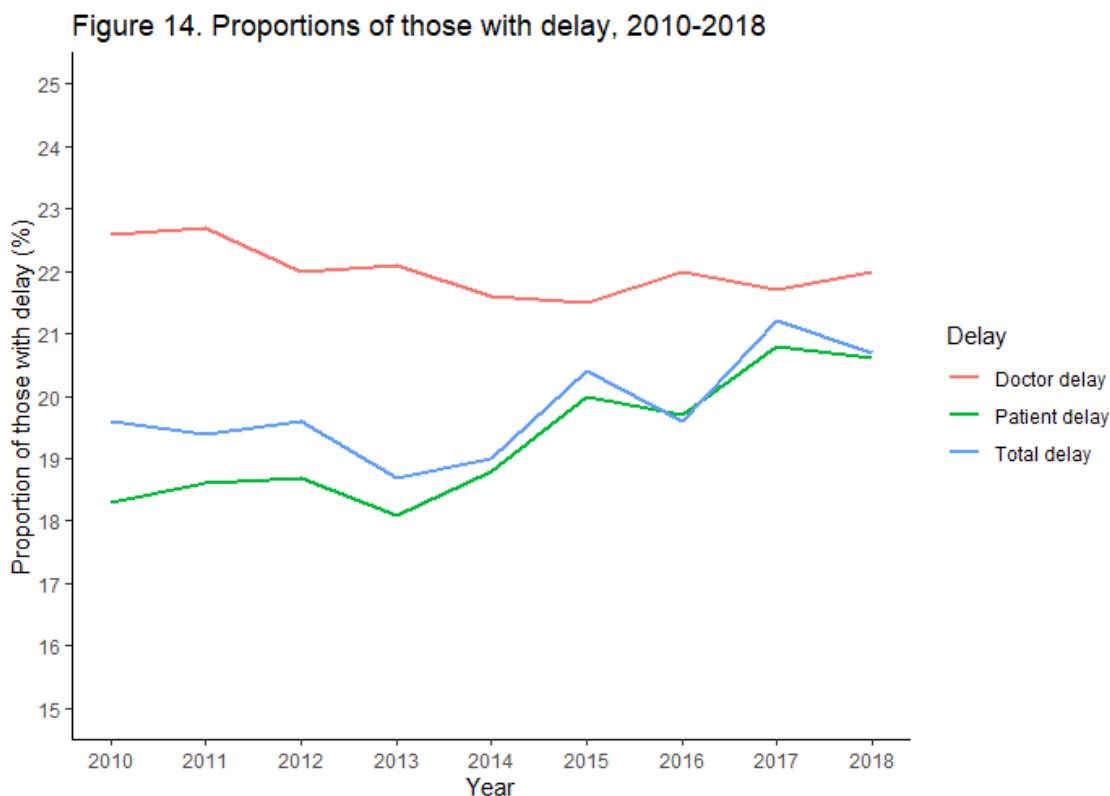
Of the 8,677 symptomatic pulmonary TB cases, information regarding patient delay was known for 72.1% (6,253 / 8,677), doctor delay for 92.0% (7,979 / 8,677), and total delay for 72.5% (6,293 / 8,677). Patient delay was observed in 20.6% (1,289 / (6,253)), doctor delay in 22.0% (1,752 / 7,979) and total delay in 20.7% (1,301 / 6,293). (Table 11).

Table 11. Number and proportion of those with delay, 2018

Type of delay	Total no. symptomatic PTB*	Cases with delay	
		n	%
Patient delay	6,253	1,289	20.6
Doctor delay	7,979	1,752	22.0
Total delay	6,293	1,301	20.7

\*Note: exclude those whose information on delay is unknown

The proportions of those with delay has gradually been increasing, with the proportion of those with doctor delay constantly being higher than patient delay (Figure 14, see also Table s19).



### Characteristics of those with delay:

Characteristics of symptomatic PTB patients by delay type are summarized in Table 12. Proportions of those with patient delay was higher among males compared with females, while vice versa for doctor delay. As for the age groups, proportions of those with patient delay tended to peak around those in their 40s and 50s. 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. Patient delay among the younger age groups is in fact higher among the Japan-born patients (data not shown). Proportion of total delay was the highest among those aged 45-54, followed by those aged 35-44 and unemployed persons.

Table 12. Proportions of those with delay among selected characteristics, 2018

	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 (%)
<b>TOTAL</b>	6,253	1289	20.6	7,979	1752	22.0	6,293	1301	20.7
<b>Sex</b>									
Male	3838	818	21.3	4892	1052	21.5	3861	788	20.4
Female	2415	471	19.5	3087	700	22.7	2432	513	21.1
<b>Age group</b>									
0-14	9	0	0.0	11	2	18.2	9	1	11.1
15-24	244	50	20.5	303	42	13.9	246	46	18.7
25-34	373	86	23.1	472	97	20.6	375	86	22.9
35-44	299	75	25.1	380	102	26.8	300	80	26.7
45-54	401	121	30.2	518	115	22.2	403	132	32.8
55-64	459	137	29.8	609	134	22.0	461	138	29.9
65+	4468	820	18.4	5,686	1,260	22.2	4499	818	18.2
<b>Country of birth</b>									
Foreign-born	541	120	22.2	692	134	19.4	545	123	22.6
Japan-born	5611	1146	20.4	7116	1589	22.3	5646	1158	20.5
COB unknown	101	23	22.8	171	29	17.0	102	20	19.6
<b>Social risk factor</b>									
Homeless	59	17	28.8	89	10	11.2	59	13	22.0
Unemployed*	326	87	26.7	409	82	20.0	327	80	24.5
On social welfare	478	97	20.3	621	128	20.6	479	94	19.6
No insurance	43	11	25.6	59	4	6.8	43	7	16.3

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 2017, a total of 16,734 non-MDR cases were reported. Treatment outcome at the end of 12 months was available for 99.4% (16,634 / 16,734) and is summarized in Table 13.

Table 13. Treatment outcomes at 12 months for drug sensitive cases notified in 2017

Tx outcomes	n	%
Cured	3707	22.3
Completed	7664	46.1
Died	3748	22.5
Failed	12	0.1
LTFU	273	1.6
Still on tx	648	3.9
Transferred-out	535	3.2
Not evaluated	47	0.3
Total	16,634	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 5,707 cases aged 64 and below, whose treatment outcomes at the end of 12 months were available, 83.8% (4,780 / 5,707) had either completed treatment or were cured (Table 14).



Table 14. Treatment outcomes 12 months for drug sensitive cases (aged 0-64) notified in 2017

Tx outcomes	n	%
Cured	1,437	25.2
Completed	3,343	58.6
Died	200	3.5
Failed	1	0.0
LTFU	106	1.9
Still on tx	237	4.2
Transferred-out	364	6.4
Not evaluated	19	0.3
Total	5,707	100.0

Tx = treatment, LTFU = lost to follow-up

### TB outcomes for the HIV positive cohort:

Of the 31 HIV positive cases whose treatment outcomes at the end of 12 months were available, 64.5% (20 / 31) had either completed treatment or were cured (Table 15).

Table 15. Treatment outcomes at 12 months for HIV positive drug sensitive cases notified in 2017

Tx outcomes	n	%
Cured	3	9.7
Completed	17	54.8
Died	2	6.5
Failed	0	0.0
LTFU	1	3.2
Still on tx	2	6.5
Transferred-out	5	16.1
Not evaluated	1	3.2
Total	31	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 16a. 64.8% (2,427 / 3,748) were males, 95.4% (3,574 / 3,748) were aged 65 and above, and 93.7% (3,511 / 3,748) were Japan-born. Proportions with the social risk factors among those aged between 25 and 64, and who have died (n=199) were also calculated: 11.0% (11 / 100) were homeless, 58.3% (116 / 199), were unemployed and 24.6% (49 / 199) were receiving social welfare.

Table 16a. Characteristics of those who have died among the entire drug sensitive cohort in 2017

	n	%
<b>Sex</b>		
Male	2,427	64.8
Female	1,321	35.2
<b>Age groups</b>		
0-14	0	0.0
15-64	174	4.6
65+	3,574	95.4
<b>Country of birth</b>		
Japan-born	3,511	93.7
Foreign-born	30	0.8
COB unknown	207	5.5
<b>Social risk factor (aged 25-64, n=199)</b>		
Homeless*	11	11.0
Unemployed	116	58.3
On social welfare	49	24.6
No insurance	6	3.0

\*Note: total of homeless excludes those whose information on the state of homelessness is unknown, i.e. total n=100

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

Proportions of those who have died by selected characteristics are summarized in Table 16b. It was slightly higher among males than females (24.1% vs 20.1%). By age groups, it was the highest among those aged 65 years old and above (32.1%), and by country of birth, highest among those whose country of birth was unknown (30.9%). The proportion of those who have died among homeless people and those without insurance was also high (14.3%, 14.0%).

Table 16b. Proportions of those who have died among the entire drug sensitive cohort in 2017

	No. patients	Of which died	% of those who have died
<b>Sex</b>			
Male	10,068	2,427	24.1
Female	6,566	1,321	20.1
<b>Age groups</b>			
0-14	58	0	0.0
15-64	5,450	174	3.2
65+	11,126	3,574	32.1
<b>Country of birth</b>			
Japan-born	14,465	3,511	24.3
Foreign-born	1,500	30	2.0
COB* unknown	669	207	30.9
<b>Social risk factor aged 25-64</b>			
Homeless	77	11	14.3
Unemployed	970	116	12.0
On social welfare	369	49	13.3
No insurance	43	6	14.0

\*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 17a. 58.2% (159 / 273) were males, 63.0% (172/ 273) were aged 65 and above, and 87.2% (238 / 273) were Japan-born. Proportions with the social risk factors among those aged between 25 and 64, and who were LTFU (n=97) were also calculated: 11.1% (6 / 54) were homeless, 27.8% were unemployed (27 / 97), and 13.4% (13 / 97) were receiving social welfare.

Table 17a. Characteristics of those lost to follow-up among the entire drug sensitive cohort in 2017

	n	%
<b>Sex</b>		
Male	159	58.2
Female	114	41.8
<b>Age groups</b>		
0-14	1	0.4
15-64	100	36.6
65+	172	63.0
<b>Country of birth</b>		
Japan-born	238	87.2
Foreign-born	24	8.8
COB unknown	11	4.0
<b>Social risk factor (aged 25-64, n=119)</b>		
Homeless*	6	11.1
Unemployed	27	27.8
On social welfare	13	13.4
No insurance	1	1.0

\*Note: total of homeless excludes those whose information on the state of homelessness is unknown, i.e. total n=54  
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 17b. It was slightly higher among females than males (1.6% vs 1.7%). 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 17b. Proportions of those lost to follow-up among the entire drug sensitive cohort in 2017

	No. patients	Of which LTFU	% of those LTFU
<b>Sex</b>			
Male	10,068	159	1.6
Female	6,566	114	1.7
<b>Age groups</b>			
0-14	58	1	1.7
15-64	5,450	100	1.8
65+	11,126	172	1.5
<b>Country of birth</b>			
Japan-born	14,465	238	1.6
Foreign-born	1,500	24	1.6
COB* unknown	669	11	1.6
<b>Social risk factor aged 25-64</b>			
Homeless*	77	6	7.8
Unemployed	970	27	2.8
On social welfare	369	13	3.5
No insurance	43	1	2.3

\*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 2018, 7,414 cases of LTBI were newly notified. The number of new cases has reached a peak in 2011 and decreased over 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 s20).

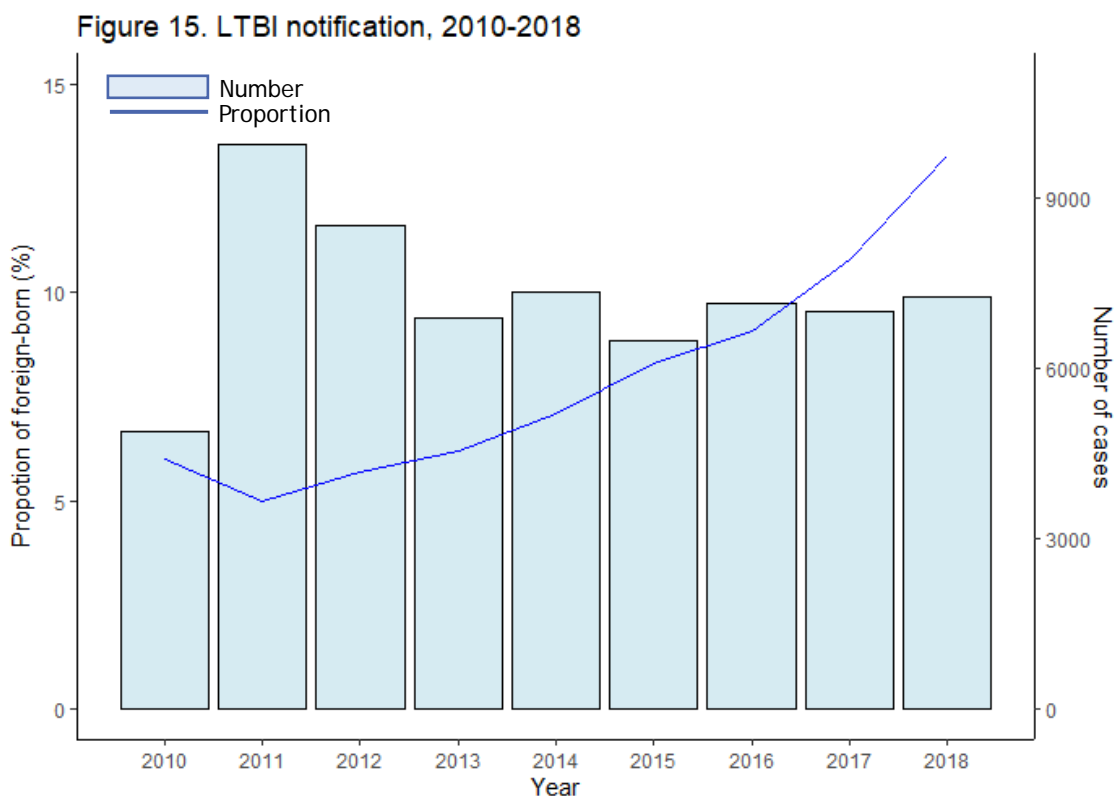


Table 18 summarizes the LTBI case notifications by sex and age groups. Breaking down the cases by age groups, the largest number of cases were diagnosed among those aged 65-74 (1,239 cases), followed by those aged 45-54 (1,019 cases). More LTBI is notified among female, especially among those aged 25-54.

Table 18. LTBI notification by age and sex, 2018

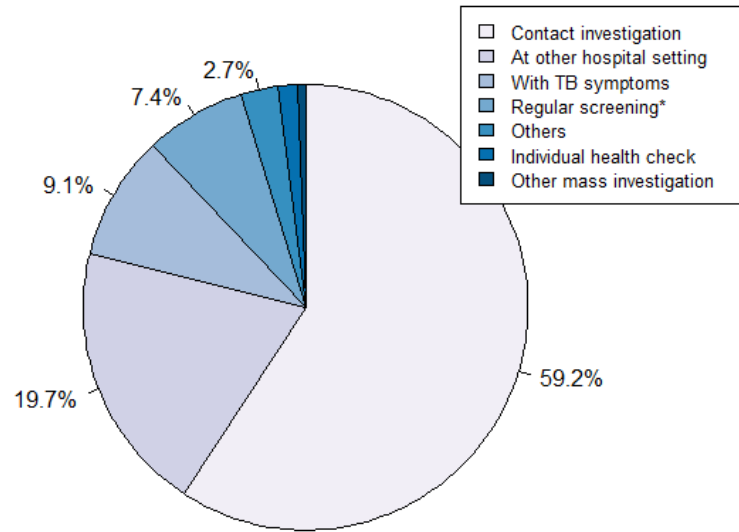
Age groups	Total		Male		Female	
	n	%	n	%	n	%
0-4	425	5.7	182	5.1	243	6.3
5-14	172	2.3	85	2.4	87	2.3
15-24	633	8.5	327	9.2	306	7.9
25-34	939	12.7	448	12.6	491	12.7
35-44	821	11.1	344	9.7	477	12.3
45-54	1,019	13.7	420	11.8	599	15.5
55-64	1,001	13.5	459	12.9	542	14.0
65-74	1,239	16.7	725	20.4	514	13.3
75-84	883	11.9	446	12.6	437	11.3
85+	282	3.8	115	3.2	167	4.3
TOTAL	7,414	100	3,551	100	3,863	100.0



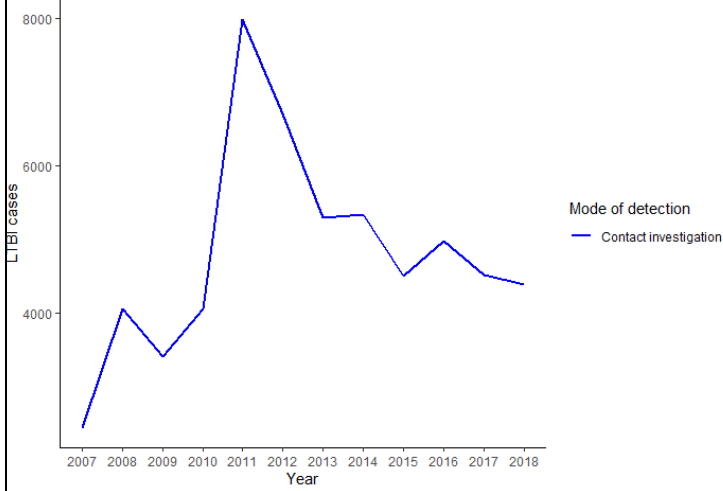
### Mode of detecting LTBI:

While 59.2% (4,388 / 7,414) of the notified LTBI cases were detected upon contact investigation (Figure 18, see also Table s21), its proportion out of the total cases has been declining. On the other hand, the proportion of those detected at hospital settings (i.e. during medical check-up for other diseases) has been increasing, but since last year, as shown a slight decline from 26.1% to 19.7% (Figure 17a & 17b, see also Table s22).

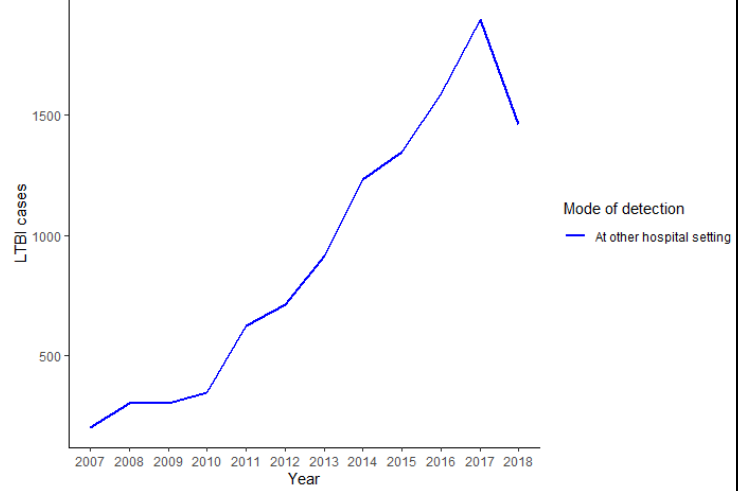
**Figure 16. Mode of detection of notified LTBI, 2018**



**Figure 17a. Mode of detection of notified LTBI, 2007-2018**



**Figure 17b. Mode of detection of notified LTBI, 2007-2018**



### Outcome of LTBI treatment (2017 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 2017, 7,255 LTBI cases were newly notified, of which treatment outcome was available for 99.8% (7,239 / 7,255). Of the 7,239 cases, 98.5% (7,130 / 7,239) had started treatment. Upon notification, 6,914 had initiated the treatment with isoniazid monotherapy. Treatment outcomes of the 7,239 cases are summarized in Table 19.

Table 19. Outcomes at 12 months of LTBI cases notified in 2017

Tx outcomes	n	%
Completed	6,106	84.3
Died	173	2.4
Tx failed	27	0.4
LTFU	576	8.0
Transferred-out	150	2.1
Still on tx	134	1.9
Unknown	73	1.0
Total	7,239	100.0

Tx = treatment

## Appendix I: Notes on TB surveillance system in Japan

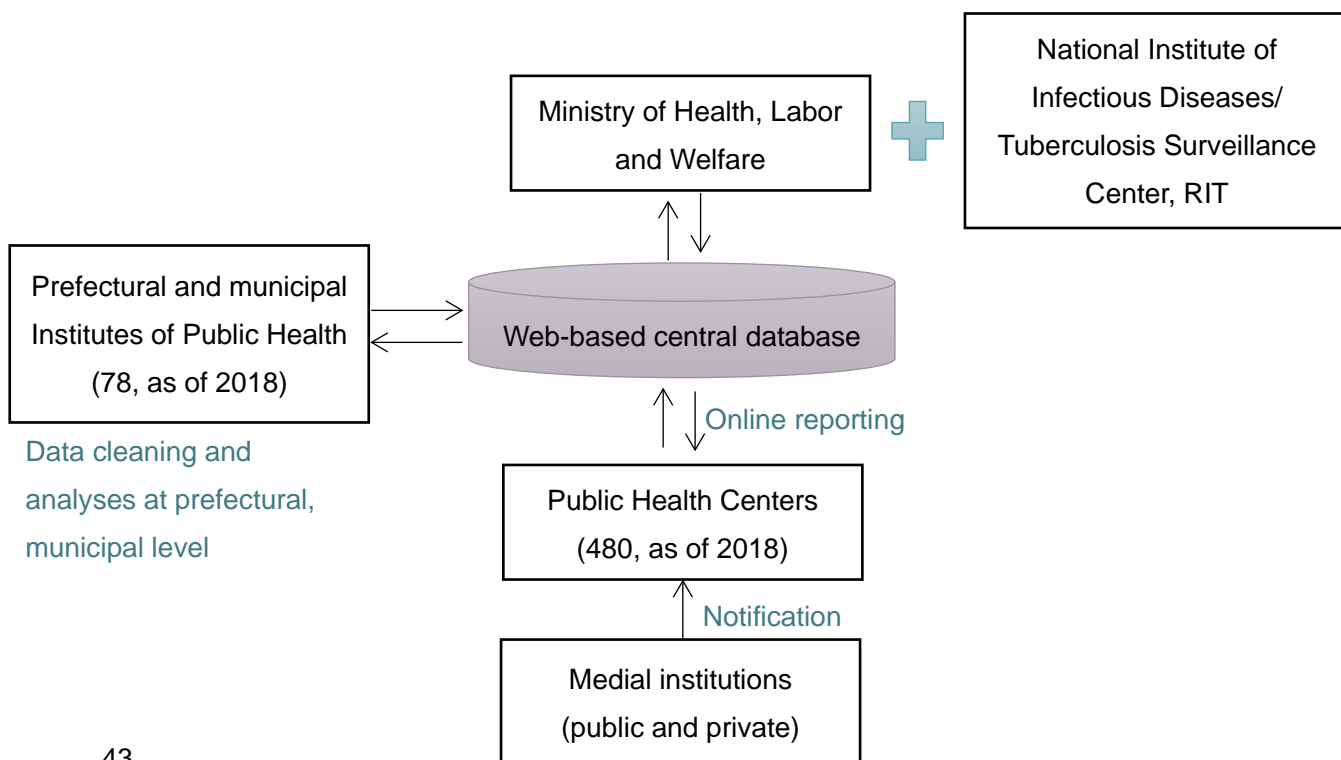
Both TB and LTBI (those diagnosed as being infected but not with active TB, and who were judged as requiring preventive therapy) are notifiable diseases under the Infectious Diseases Control Law. All physicians who diagnose TB or LTBI are requested to report to the local public health centers as soon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

Data cleaning and analyses at national level,  
Dissemination and publication of analysis results



## 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 1<sup>st</sup> 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 2010, 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 completing 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 2018 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 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:

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

$$\text{Occupation: } \frac{\text{All active TB} - \text{occupation unknown}}{\text{All active TB}} \times 100$$

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

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

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

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

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

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

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



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

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

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

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

The denominators are summarized in Table iii.b.

Table iii.a  
Data capture rate, 2018

Prefecture	Country of birth	Occupation	Homelessness	Treatment history	Previous treatment regimen	Total delay
1	96.0	98.0	24.6	98.4	91.7	74.4
2	97.6	99.2	33.9	97.6	100.0	64.0
3	99.0	98.1	58.1	94.3	83.3	54.1
4	100.0	98.8	56.6	98.2	66.7	77.0
5	100.0	100.0	43.2	94.6	85.7	52.8
6	100.0	100.0	73.8	98.5	20.0	31.6
7	100.0	99.5	83.1	100.0	87.5	67.3
8	100.0	99.3	50.3	99.3	70.0	36.5
9	100.0	99.4	27.3	98.8	87.5	97.9
10	100.0	100.0	65.5	100.0	75.0	97.3
11	96.0	93.8	50.2	98.0	55.9	37.7
12	98.8	97.9	65.3	99.6	80.0	75.1
13	99.5	97.9	69.3	98.3	70.5	72.1
14	91.1	97.6	31.8	98.0	67.3	48.9
15	99.4	100.0	48.3	100.0	81.8	90.2
16	97.2	100.0	40.2	99.1	80.0	43.1
17	100.0	100.0	76.4	98.2	100.0	91.2
18	98.7	100.0	50.0	92.1	100.0	90.2
19	98.7	97.4	68.8	96.1	60.0	73.7
20	99.5	100.0	36.0	98.9	100.0	72.8
21	100.0	100.0	64.5	99.3	78.9	86.9
22	99.5	98.7	44.8	99.2	93.3	78.6
23	100.0	99.5	85.5	99.5	74.5	92.1
24	100.0	98.5	16.2	99.5	83.3	52.6
25	100.0	98.0	8.0	100.0	100.0	19.7
26	99.4	98.1	69.7	98.9	78.6	70.5
27	99.2	97.2	47.7	98.7	74.7	95.0
28	93.5	98.9	41.2	99.8	83.9	69.8
29	100.0	98.1	84.0	98.7	75.0	94.6
30	100.0	100.0	64.4	99.2	100.0	96.2
31	96.1	100.0	35.3	98.0	50.0	7.4
32	89.7	97.4	50.0	100.0	75.0	38.5
33	99.5	98.9	31.6	100.0	100.0	75.5
34	94.8	96.2	31.4	98.3	54.5	49.7
35	97.5	99.4	34.4	100.0	66.7	60.9
36	97.2	96.2	20.8	98.1	50.0	17.5
37	100.0	100.0	60.2	100.0	50.0	90.9
38	98.5	100.0	85.9	100.0	63.6	94.6
39	73.0	97.3	29.7	97.3	83.3	48.9
40	95.6	97.6	36.7	98.5	56.8	80.6
41	100.0	98.8	20.0	96.3	100.0	67.3
42	92.3	100.0	50.5	98.2	90.0	68.5
43	95.5	98.5	32.8	99.0	81.3	73.7
44	98.8	97.6	45.6	99.4	100.0	97.2
45	100.0	99.0	27.8	97.9	57.1	73.3
46	100.0	100.0	46.6	98.3	66.7	70.2
47	100.0	99.5	85.9	99.5	71.4	74.7
Total	97.7	98.1	52.4	98.7	74.2	72.5

(cont.)

Prefecture	DM	HIV status	HIV testing status	Culture known TB	Culture known PTB	DST known TB	DST known PTB
1	81.2	16.6	52.1	77.6	85.3	59.8	60.2
2	66.9	0.0	55.9	63.8	64.2	62.7	66.0
3	68.6	0.0	45.7	81.9	84.5	31.9	30.6
4	91.6	2.4	28.3	93.4	97.1	85.2	84.2
5	82.4	1.4	25.7	74.3	80.0	61.0	59.4
6	95.4	3.1	23.1	96.9	96.2	86.5	86.7
7	87.4	0.5	45.4	79.2	80.3	79.8	79.2
8	86.2	3.6	60.9	84.9	89.5	55.4	55.6
9	82.6	15.7	37.8	98.3	100.0	92.1	92.0
10	94.2	1.8	52.6	96.5	100.0	84.7	83.2
11	81.1	4.0	22.2	78.2	81.9	72.3	72.6
12	93.2	3.0	33.2	92.1	95.5	86.4	87.0
13	91.7	46.7	67.2	92.7	94.8	95.5	96.6
14	76.3	1.9	20.7	81.9	84.0	72.4	72.0
15	82.6	1.7	66.9	90.4	94.9	86.5	86.5
16	90.7	3.7	37.4	100.0	100.0	75.0	80.7
17	93.6	1.8	48.2	99.1	100.0	92.9	92.9
18	98.7	1.3	3.9	93.4	96.6	82.5	87.8
19	70.1	0.0	29.9	83.1	93.3	34.8	38.9
20	94.6	4.8	37.1	85.5	92.6	75.8	77.9
21	92.8	0.0	32.3	92.5	95.9	89.7	88.2
22	88.3	1.3	10.2	85.0	89.0	74.3	74.2
23	90.6	3.2	35.5	97.4	99.0	95.5	97.1
24	85.9	0.0	15.2	80.3	85.0	55.6	57.3
25	96.0	0.0	28.0	81.3	86.3	68.4	68.7
26	92.8	0.8	25.6	92.3	95.4	81.4	81.2
27	92.6	2.1	48.9	95.8	97.5	94.6	95.3
28	92.1	1.9	30.8	88.1	92.6	87.4	87.8
29	97.4	5.1	48.7	97.4	98.4	93.4	94.6
30	97.7	1.5	80.3	95.5	100.0	94.1	94.3
31	92.2	0.0	27.5	66.7	82.4	56.0	58.3
32	93.6	0.0	2.6	91.0	98.1	81.8	79.5
33	90.9	0.5	42.2	87.7	87.8	77.1	75.5
34	78.3	3.4	29.7	76.6	83.1	55.2	57.7
35	93.1	0.0	28.1	80.0	86.2	68.6	71.4
36	84.9	0.9	10.4	92.5	90.1	81.0	80.6
37	86.5	0.0	17.3	87.2	95.7	67.1	66.2
38	91.9	1.5	60.0	88.1	92.9	71.7	77.2
39	95.9	0.0	4.1	77.0	73.8	59.5	57.1
40	87.9	0.8	15.2	87.4	91.2	88.7	90.2
41	65.0	2.5	5.0	71.3	75.4	80.9	90.5
42	95.9	1.4	39.2	81.1	87.8	68.3	68.0
43	92.5	2.5	49.8	73.1	83.3	72.0	73.2
44	95.3	5.3	58.0	97.6	98.6	88.0	88.2
45	76.3	6.2	38.1	96.9	100.0	94.4	95.1
46	95.3	0.8	25.8	82.6	89.1	71.2	73.8
47	99.0	1.0	39.3	90.1	97.6	94.5	96.2
Total	88.8	8.3	38.8	88.6	92.0	83.2	84.0

Table iii.b  
Denominators used to  
calculate the capture  
rate, 2018

Prefecture	Active TB	Total PTB	Active TB, retreatment cases	Symptomatic PTB	Culture positive PTB	Culture positive TB
1	451	347	12	258	231	256
2	127	95	6	75	50	59
3	105	84	6	61	62	69
4	166	136	6	87	114	128
5	74	50	7	36	32	41
6	65	53	5	38	45	52
7	183	147	8	101	101	114
8	304	237	10	170	171	193
9	172	140	8	95	112	126
10	171	136	8	111	119	137
11	856	686	34	512	463	513
12	755	577	40	402	438	494
13	1,970	1,567	95	1,020	1,172	1,353
14	1,024	812	52	544	572	662
15	178	138	11	122	111	126
16	107	79	5	51	57	72
17	110	82	6	57	70	84
18	76	58	3	41	49	57
19	77	45	5	38	36	46
20	186	135	5	103	104	124
21	279	217	19	168	153	174
22	393	281	15	196	217	253
23	1,126	879	55	623	697	808
24	198	147	12	114	110	124
25	150	95	1	66	67	76
26	363	262	14	200	207	247
27	1,805	1,498	79	1,077	1,154	1,267
28	827	645	31	503	510	581
29	156	127	8	93	111	121
30	132	100	7	79	88	101
31	51	34	2	27	24	25
32	78	52	4	39	44	55
33	187	147	7	106	102	118
34	290	201	11	149	123	143
35	160	123	9	87	91	105
36	106	81	2	63	62	79
37	133	94	8	77	71	82
38	135	99	11	74	79	92
39	74	61	6	45	35	42
40	594	444	37	314	326	372
41	80	61	5	49	42	47
42	222	148	10	124	100	120
43	201	132	16	95	97	118
44	169	139	4	109	110	125
45	97	70	7	60	61	71
46	236	165	6	131	122	139
47	191	127	14	87	104	128
Total	15,590	12,033	732	8,677	9,016	10,319

## Appendix IV: Supplementary tables

Table s1. Number and rate of all active TB notifications, 2010-2018

Notification year	No.cases	Percentage change in cases	Notification rate per 100,000	Percentage change in rate
2010	23,261	NA	18.2	NA
2011	22,681	2.5	17.7	2.8
2012	21,283	6.2	16.7	5.7
2013	20,495	3.7	16.1	3.6
2014	19,615	4.3	15.4	4.4
2015	18,280	6.8	14.4	6.5
2016	17,625	3.6	13.9	3.5
2017	16,789	4.7	13.3	4.3
2018	15,590	7.1	12.3	7.5

Table s2. Number of TB notifications by age group and sex, 2018

Age group	Total		Male		Female	
	n	rate per 100,000	n	rate per 100,000	n	rate per 100,000
0-4	24	0.5	17	0.7	7	0.3
5-9	6	0.1	3	0.1	3	0.1
10-14	21	0.4	12	0.4	9	0.3
15-19	158	2.7	88	2.9	70	2.4
20-24	654	10.3	372	11.4	282	9.2
25-29	619	9.9	351	11.0	268	8.8
30-34	460	6.6	237	6.7	223	6.6
35-39	425	5.5	230	5.9	195	5.1
40-44	433	4.8	271	5.9	162	3.6
45-49	601	6.2	368	7.5	233	4.9
50-54	557	6.7	375	8.9	182	4.4
55-59	593	7.8	402	10.5	191	5.0
60-64	642	8.5	450	12.0	192	5.0
65-69	1,062	11.3	759	16.7	303	6.3
70-74	1,253	15.2	828	21.4	425	9.7
75-79	1,742	25.1	1,102	35.5	640	16.7
80-84	2,170	40.6	1,289	58.8	881	27.9
85-89	2,364	67.3	1,279	104.4	1,085	47.4
90+	1,806	82.8	830	154.5	976	59.3
Total	15,590	12.3	9,263	15.1	6,327	9.7

Table s3. Number of TB notification among those aged 65 and above, 2010-2018

Notification year	Age group		
	65-74	75-84	85+
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
2018	2,315	3,912	4,170

Table s4. Notification rate per 100,000 by prefectures, 2018

Prefecture	Rate per 100,000		
		Tottori	9.1
Hokkaido	8.5	Shimane	11.5
Aomori	10.1	Okayama	9.9
Iwate	8.5	Hiroshima	10.3
Miyagi	7.2	Yamaguchi	11.7
Akita	7.5	Tokushima	14.4
Yamagata	6	Kagawa	13.8
Fukushima	9.8	Ehime	10
Ibaraki	10.6	Kochi	10.5
Tochigi	8.8	Fukuoka	11.6
Gunma	8.8	Saga	9.8
Saitama	11.7	Nagasaki	16.6
Chiba	12.1	Kumamoto	11.4
Tokyo	14.3	Oita	14.8
Kanagawa	11.2	Miyazaki	9
Niigata	7.9	Kagoshima	14.6
Toyama	10.2	Okinawa	13.2
Ishikawa	9.6		
Fukui	9.8		
Yamanashi	9.4		
Nagano	9		
Gifu	14		
Shizuoka	10.7		
Aichi	14.9		
Mie	11.1		
Shiga	10.6		
Kyoto	14		
Osaka	20.5		
Hyogo	15.1		
Nara	11.7		
Wakayama	14.1		



Table s5. Number and proportion of TB notifications by sex and occupation (aged 25-64), 2018

Occupation	Total		Male		Female	
	n	%	n	%	n	%
Doctors	24	100.0	16	66.7	8	33.3
Nurses	147	100.0	9	6.1	138	93.9
Other HCWs	187	100.0	49	26.2	138	73.8
Full- and part-time employed	1,874	100.0	1,411	75.3	463	24.7
Service industry	266	100.0	141	53.0	125	47.0
Teachers	53	100.0	26	49.1	27	50.9
Temporary employed	346	100.0	207	59.8	139	40.2
Self-employed	215	100.0	172	80.0	43	20.0
Houseworkers	94	100.0	2	2.1	92	97.9
Students	163	100.0	91	55.8	72	44.2
Unemployed	845	100.0	497	58.8	348	41.2
Unknown	116	100.0	63	54.3	53	45.7
TOTAL	4330	100.0	2684	100.0	1646	100.0

Table s6.a. Number and proportion of those homeless among TB notifications (aged 25-64), 2018

	Homeless (a)	Not homeless (b)	Unknown (c)	Total (d)*	Total excluding unknown (d-c)	Proportion of homeless (a/(d- c))*100 (%)
<b>Total</b>	61	2,319	497	2,877	2,380	2.6
<b>Sex</b>						
Male	55	1,377	338	1,770	1,432	3.8
Female	6	942	159	1,107	948	0.6
<b>Age group</b>						
25-34	4	627	152	783	631	0.6
35-44	7	482	93	582	489	1.4
45-54	22	599	126	747	621	3.5
55-64	28	611	126	765	639	4.4
<b>Country of birth</b>						
Japan-born	57	1,755	266	2,078	1,812	3.1
Foreign-born	3	553	189	745	556	0.5
COB unknown	1	11	42	54	12	8.3

COB = country of birth

\* Homeless status known for 2,877 of 4,330 TB cases aged 25-64

Table s6.b. Number and proportion of those unemployed among TB notifications (aged 25-64), 2018

	Unemployed (a)	Employed (b)	Unknown (c)	Total (d)	Total excluding unknown (d-c)	Proportion of unemployed (a/(d- c))*100 (%)
<b>Total</b>	845	3,369	116	4,330	4,214	20.1
<b>Sex</b>						
Male	497	2,124	63	2,684	2,621	19.0
Female	348	1,245	53	1,646	1,593	21.8
<b>Age group</b>						
25-34	112	936	31	1,079	1,048	10.7
35-44	110	732	16	858	842	13.1
45-54	233	895	30	1,158	1,128	20.7
55-64	390	806	39	1,235	1,196	32.6
<b>Country of birth</b>						
Japan-born	664	2,498	70	3,232	3,162	21.0
Foreign-born	165	817	38	1,020	982	16.8
COB unknown	16	54	8	78	70	22.9

COB = country of birth

Table s6.c. Number and proportion of those on social welfare among TB notifications (aged 25-64), 2018

	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) (%)
<b>Total</b>	238	4,008	84	4,330	4,246	5.6
<b>Sex</b>						
Male	202	2,418	64	2,684	2,620	7.7
Female	36	1,582	28	1,646	1,618	2.2
<b>Age group</b>						
25-34	6	1,043	30	1,079	1,049	0.6
35-44	13	831	14	858	844	1.5
45-54	84	1,056	18	1,158	1,140	7.4
55-64	135	1,078	22	1,235	1,213	11.1
<b>Country of birth</b>						
Japan-born	15	3,172	45	3,232	3,187	0.5
Foreign-born	219	768	33	1,020	987	22.2
COB unknown	4	71	3	78	75	5.3

COB = country of birth

Table s6.d. Number and proportion of those without health insurance among TB notifications (aged 25-64), 2018

	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) (%)
<b>Total</b>	47	4,199	84	4,330	4,246	1.1
<b>Sex</b>						
Male	40	2,587	57	2,684	2,627	1.5
Female	7	1,612	27	1,646	1,619	0.4
<b>Age group</b>						
25-34	1	1,048	30	1,079	1,049	0.1
35-44	5	839	14	858	844	0.6
45-54	17	1,123	18	1,158	1,140	1.5
55-64	24	1,189	22	1,235	1,213	2.0
<b>Country of birth</b>						
Japan-born	42	3,145	45	3,232	3,187	1.3
Foreign-born	5	982	33	1,020	987	0.5
COB unknown	0	72	6	78	72	0.0

COB = country of birth

Table s7. Clinical characteristics of TB notifications by age groups, 2018

Age group	EPTB bac	EPTB clin	PTB bac	PTB clin	TOTAL
0-4	1	5	3	15	24
5-14	0	3	8	16	27
15-24	67	53	456	236	812
25-34	89	91	649	250	1,079
35-44	70	90	541	157	858
45-54	123	135	736	164	1,158
55-64	99	147	828	161	1,235
65-74	242	298	1,522	253	2,315
75-84	469	567	2,626	250	3,912
85+	496	512	3,017	145	4,170
TOTAL	1,656	1,901	10,386	1,647	15,590

Table s8. Number and rate per 100,000 of foreign-born TB, 2010-2018

Notification year	No. cases	Rate per 100,000
2010	952	45.6
2011	921	45.0
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
2018	1,667	61.0

Table s9 Number and proportion\* of foreign-born TB by age group, 2010-2018

\* 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	%
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
2018	1,667	10.9	12	23.5	571	70.8	625	58.4	200	23.9	139	12.2	120	1.1

Table s10. Foreign-born TB by country name, 2018

Country name	No.cases	Proportion (%)			
			North Korea	2	0.1
The Philippines	340	20.4	Sudan	2	0.1
Vietnam	289	17.3	Uzbekistan	2	0.1
China	274	16.4	Morocco	1	0.1
Indonesia	171	10.3	UAE	1	0.1
Nepal	170	10.2	Australia	1	0.1
Myanmar	101	6.1	Bolivia	1	0.1
Unknown	46	2.8	Canada	1	0.1
South Korea	43	2.6	Cameroon	1	0.1
India	27	1.6	Egypt	1	0.1
Thailand	26	1.6	Ethiopia	1	0.1
Peru	23	1.4	UK	1	0.1
Mongolia	21	1.3	Guinea	1	0.1
Brazil	15	0.9	Ireland	1	0.1
Cambodia	15	0.9	Kenya	1	0.1
Bhutan	13	0.8	<b>Kiribati</b>	1	0.1
Pakista	12	0.7	Mali	1	0.1
Taiwan	12	0.7	Nigeria	1	0.1
Bangladesh	10	0.6	Paraguay	1	0.1
Sri Lanka	9	0.5	Russia	1	0.1
Laos	5	0.3	Saudi Arabia	1	0.1
Malaysia	4	0.2	Senega	1	0.1
Ghana	3	0.2	Singapore	1	0.1
Afghanista	2	0.1	Sweden	1	0.1
Argeria	2	0.1	Tonga	1	0.1
Congo	2	0.1	Uganda	1	0.1
Hong Kong	2	0.1	USA	1	0.1
			<b>TOTAL</b>	<b>1667</b>	<b>100.0</b>

Table s11. Foreign-born TB by selected countries of birth, 2010-2018

Notification year	China	the Philippines	Nepal	Vietnam	Indonesia
2010	273	216	39	24	64
2011	273	218	38	52	49
2012	294	290	42	63	57
2013	292	256	65	68	57
2014	259	292	88	109	53
2015	249	284	108	135	78
2016	272	318	135	212	90
2017	258	321	164	257	121
2018	274	340	170	289	171

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 s12. Foreign-born TB by year of entry to Japan, 2012-2018

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
2018	601	281	99	193

Table s13. TB notification among children aged 0-14 by country of birth, 2010-2018

Notification year	Total no. cases	Of which Japan-born	Of which foreign-born	Of which COB unknown
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
2018	51	39	12	0

COB = country of birth

Table s14.a. Source of infection of childhood TB by country of birth, 2018

Country of birth	Father	Mother	Grandparents	Others	Unknown	TOTAL
Japan-born	4	6	7	4	18	39
Foreign-born	0	3	0	2	7	12

COB = country of birth

Table s14.b. Mode of detection of childhood TB by country of birth, 2018

Country of birth	Screening at school	Contact investigation (family)	Contact investigation (casual)	Other mass screening	Visit hospital with symptoms	Others	TOTAL
Japan-born	0	22	5	1	9	2	39
Foreign-born	4	4	0	0	3	1	12

COB = country of birth



**Table s15. Number of PTB and culture confirmed PTB, 2010-2018**

Notification year	PTB	Of which culture confirmed	Proportion of culture confirmed
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
2018	12,033	9,016	74.9

PTB = pulmonary tuberculosis

**Table s16. Number and proportion of cases with DST results to INH and RFP known, 2012-2018**

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
2018	10,319	8,584	83.2

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

Table s17. Number and proportion of cases with MDR by country of birth, 2012-2018

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
2018	8,584	60	0.7	7,625	30	0.4	804	30	3.7

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 s18 Number and proportion of cases with INH resistance by country of birth, 2012-2018

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
2018	8,584	353	4.1	7,625	281	3.7	804	68	8.5

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 s19. Number and proportion of those with delay among symptomatic pulmonary TB, 2010-2018

Notification year	Patient delay			Doctor delay			Total delay		
	Total	n	%	Total	n	%	Total	n	%
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
2018	6,253	1,289	20.6	7,979	1,752	22.2	6,293	1,301	20.7

\*Note: total excluding those cases without data on delay

Table s20. Number of LTBI notifications by country of birth, 2010-2018

Notification year	Total no. cases	Of which Japan-born	Of which foreign-born	Of which COB unknown
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
2018	7,414	6,293	963	158

COB = country of birth

Table s21. Mode of detection of LTBI cases, 2018

Mode of detection	n	%
Individual health check	102	1.4
Regular screening	546	7.4
Contact investigation	4,388	59.2
Other mass investigation	45	0.6
At hospital setting	2,132	28.8
Others	174	2.3
Unknown	23	0.3
During follow-up for TB	4	0.1
TOTAL	7,414	100.0

Table s22. Trend in the mode of detection of LTBI cases, 2007-2018

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	6.3	4,524	62.4	74	1.0	1,893	26.1	186	2.6	7,255
2018	102	1.4	546	7.4	4,388	59.2	45	0.6	2,132	28.8	201	2.7	7,414

## Appendix V: Supplementary data

Table sd1. Population used to calculate the notification rates, 2018

Age group	Total	Male	Female
0-4	4,838,489	2,478,436	2,360,053
5-9	5,184,375	2,654,638	2,529,737
10-14	5,391,698	2,759,927	2,631,771
15-19	5,906,609	3,031,927	2,874,682
20-24	6,329,748	3,263,769	3,065,979
25-29	6,223,060	3,194,301	3,028,759
30-34	6,936,349	3,532,721	3,403,628
35-39	7,693,660	3,900,049	3,793,611
40-44	9,093,042	4,608,882	4,484,160
45-49	9,666,294	4,883,663	4,782,631
50-54	8,359,855	4,202,736	4,157,119
55-59	7,650,988	3,819,180	3,831,808
60-64	7,591,175	3,744,557	3,846,618
65-69	9,368,050	4,531,496	4,836,554
70-74	8,234,456	3,869,159	4,365,297
75-79	6,931,919	3,100,959	3,830,960
80-84	5,347,317	2,193,852	3,153,465
85-89	3,513,652	1,225,093	2,288,559
90+	2,182,444	537,150	1,645,294
Total	126,443,180	61,532,495	64,910,685

Source: Population as of October 1, 2018. 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, 2010-2018

Notification year	Population of foreign-born
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
2018	2,731,093

Source: Population of foreign-born residents. Foreign residents' statistics, Ministry of Justice  
[http://www.moj.go.jp/housei/toukei/toukei\\_ichiran\\_touroku.html](http://www.moj.go.jp/housei/toukei/toukei_ichiran_touroku.html)