

Annual Tuberculosis Epidemiological Report

February 2020

National Tuberculosis surveillance in Ireland, 2019

Key facts – TB notifications

- 267 TB cases were notified to HPSC
- HSE East reported the highest number of cases at 111 (42% of total)
- The male to female ratio was 1.5:1
- The highest proportion of cases occurred in those aged 65 years and older (24%)
- 40% were born in Ireland, 44% were foreign born and 16% did not have country of birth reported
- 2 cases of TB meningitis were notified
- 34% of cases with a pulmonary component were sputum smear positive at diagnosis
- 196 cases (73%) were culture positive
- *M. tuberculosis* was isolated from the majority of culture positive cases (90%)
- Resistance was reported in 27 cases, 14% of cases with drug sensitivity testing (DST) results and 10% of total cases reported
- 5 MDR and 7 rifampicin mono-resistant cases were reported
- HIV status was reported for 106 (40%) TB cases. Of these cases, 10 (9%) tested positive for HIV and 96

Table of Contents

Background	3
Methods summary	3
Further information available on HPSC website	3
Acknowledgements	3
Epidemiology of TB notifications	4
Regional distribution	4
Sex	5
Age groups	5
Country of origin	7
Diagnostic categories	9
Microbiological results	10
Sputum-smear status at initial diagnosis	10
Culture results at initial diagnosis	10
Molecular typing results	11
Antibiotic resistance	11
Chest X-ray	12
Case ascertainment	13
Previous history	13
HIV status	13
Outcome	13
Outbreaks	14
Appendix 1: Annual trends	15

Background

This report presents an epidemiological summary of the cases of tuberculosis (TB) notified to eight HSE areas in Ireland during the period 1st January to 31st December 2019.

Methods summary

Notifications of TB laboratory diagnoses are uploaded by microbiology laboratories directly onto the Computerised Infectious Disease Reporting (CIDR) system. TB clinical diagnoses are notified by clinicians to regional Departments of Public Health. TB enhanced surveillance forms are completed by public health doctors in the regional Departments of Public Health for each TB notification. These forms summarise all available additional clinical and epidemiological data and are entered onto the CIDR system by staff in the regional departments of public health. HPSC produces a quarterly TB report using notification data reported by departments of public health and laboratories to the CIDR system.

Data were extracted from CIDR on 11/02/2020.

Further information available on HPSC website

TB surveillance reports and information regarding surveillance methods are available at: www.hpsc.ie.

Acknowledgements

Sincere thanks are extended to all those who participated in the collection of data used in this report. This includes the notifying clinicians, laboratory staff, public health doctors, nurses, surveillance scientists, microbiologists and administrative staff.

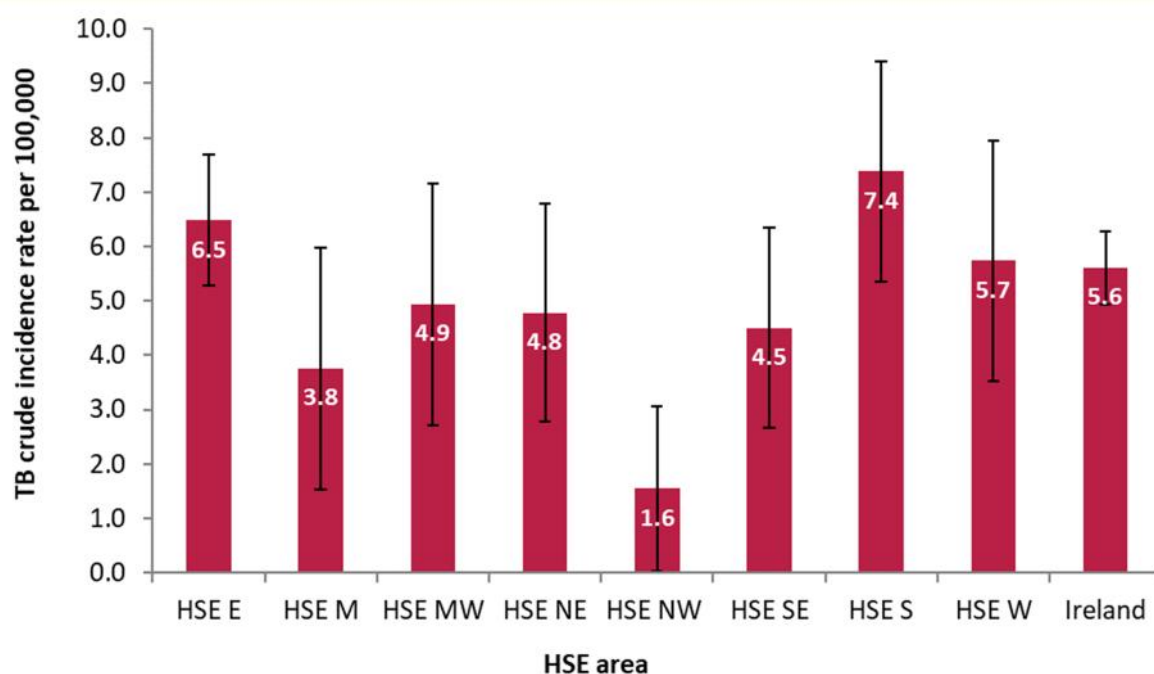
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Epidemiology of TB notifications

Regional distribution

There were 267 cases of TB notified during this period. The crude incidence rate* (CIR) by HSE area is shown in figure 1 while the number of cases notified in each HSE area and Local Health Area (LHO) is reported in table 1. The highest CIRs were reported by HSE-S (7.4) and -E (6.5) while the lowest CIRs were reported by HSE-NW (1.6) and -MW (3.8). The CIR in HSE-NW was significantly lower than the national CIR. Figure A1, [appendix 1](#) displays the annual number of TB notifications, 3 year moving average and crude incidence rate.

Figure 1: TB crude incidence rate† by HSE area, 2019



* All crude incidence rates in this report are calculated per 100,000 population using the 2016 Census denominator data

† Error bars represent 95% confidence intervals of the crude incidence rate

Table 1: Number and proportion of TB notifications by HSE area and LHO, 2019

HSE Area	Number of TB notifications	% of Total	LHO	Number of TB cases
East	111	41.6	Dublin North	15
			Dublin North Central	9
			Dublin North West	16
			Dublin South	8
			Dublin South City	12
			Dublin South East	13
			Dublin South West	5
			Dublin West	15
			Kildare	8
			Wicklow	10
Midland	11	4.1	Laois/Offaly	1
			Longford/Westmeath	10
Mid-West	19	7.1	Clare	2
			Limerick	15
			Tipperary N	2
North East	22	8.2	Cavan/Monaghan	7
			Louth	5
			Meath	10
North West	4	1.5	Donegal	2
			Sligo/Leitrim	2
South	51	19.1	Kerry	13
			North Cork	4
			North/South Lee	29
			West Cork	5
South East	23	8.6	Carlow/Kilkenny	5
			Tipperary S	4
			Waterford	10
			Wexford	4
West	26	9.7	Galway	21
			Mayo	3
			Roscommon	2
Ireland	267	100.0	Total	267

Sex

There were 107 females (40.1%) and 159 males (59.6%), corresponding to a male to female ratio of 1.5:1. Sex was not reported for the remaining case.

Age groups

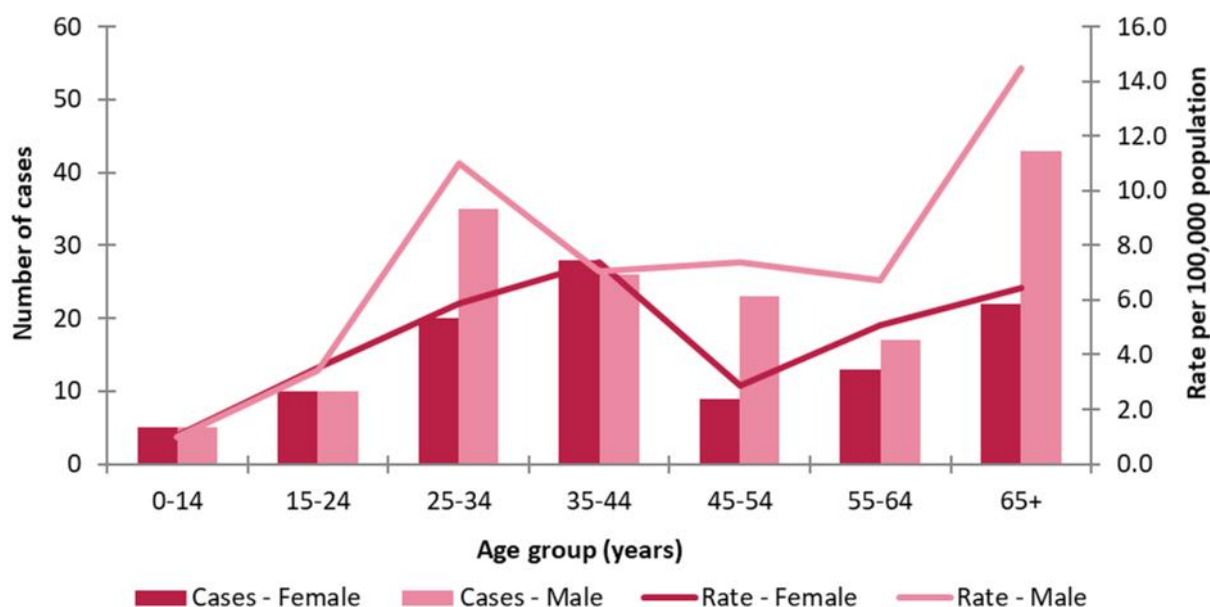
A breakdown of cases by age group and HSE area is shown in table 2 while figure 2 shows the age and sex specific incidence rates for 2019 and figure 3 displays the trend in the 0-14 year age group by year.

Age-specific incidence rates (ASIRs) were highest in those aged 65 years and older (10.2) and in the 25-34 year age group (8.3). ASIRs were higher among males than females for all age groups except for the 0-14, 15-24 and the 35-44 year age groups where they were equivalent. The highest ASIR among females was in the 35-44 year age group (7.4) while the highest ASIR among males was among those aged 65 years and older (14.5).

Table 2: Number and proportion of TB notifications by HSE and age group (years), 2019

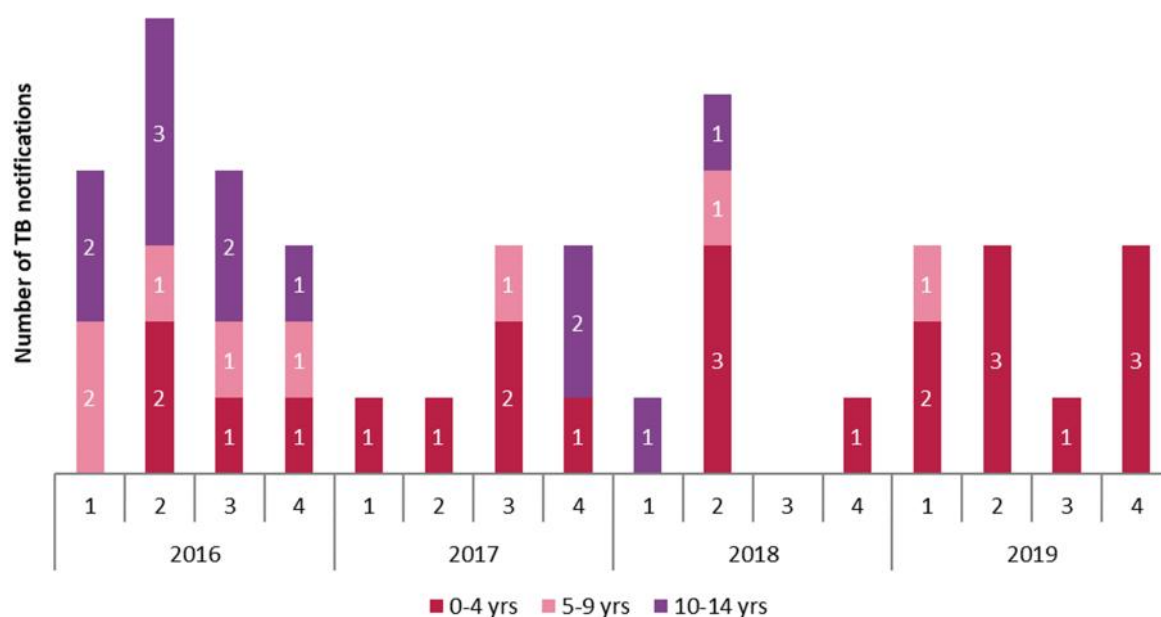
Age group (years)	HSE-E	HSE-M	HSE-MW	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total	%
0-4	3	0	1	1	0	1	3	0	9	3.4
5-9	0	0	0	0	0	0	1	0	1	0.4
10-14	0	0	0	0	0	0	0	0	0	0.0
15-19	1	0	1	1	0	2	1	2	8	3.0
20-24	6	1	1	1	0	1	1	1	12	4.5
25-34	29	3	7	4	1	3	3	6	56	21.0
35-44	20	2	2	7	0	5	13	5	54	20.2
45-54	16	1	0	5	1	2	6	1	32	12.0
55-64	11	0	1	1	0	4	10	3	30	11.2
65+	25	4	6	2	2	5	13	8	65	24.3
Unknown	0	0	0	0	0	0	0	0	0	0.0
Total	111	11	19	22	4	23	51	26	267	100.0

Figure 2: Number of TB notifications and age specific rate by sex, 2019



During 2019, 10 cases were reported in the 0-14 year age group, seven of whom were born in Ireland. Risk factors reported in this age group included being a contact of a TB case (n=8) and being born in or having a parent from, a country of high endemicity (n=3). Five cases reported BCG status, one of whom was vaccinated. Vaccination status for the remaining five cases was not reported.

Figure 3: Annual number of TB notifications in the 0-14 year age group by quarter



Country of origin

Of the 267 cases reported during this period, 107 (40.1%, CIR: 2.8) were born in Ireland and 118 (44.2%, CIR: 14.6) were born outside Ireland. Country of birth was not reported for 42 (15.7%) cases. Of the 118 cases born outside Ireland, 15 (12.7%) were reported as asylum seekers or refugees (three each from from HSE-E, -MW, -SE and -S, and one each from HSE-NE, -NW and -W). Table 3 summarises the regions of birth of cases and figure 4 shows the annual number of TB cases and crude incidence rate by geographic origin.

The highest age specific rates (ASIRs) among Irish-born TB cases (6.7) were in those aged 65 years and older, while the highest rates in foreign-born cases (19.7) were aged between 35-44 years old (figure 5).

Table 3: Number and proportion of TB notifications by region of origin, 2019

Region of origin	Number	%
Ireland	107	40.1
North Africa	1	0.4
Sub-Saharan Africa	27	10.1
Latin America	6	2.2
North America	1	0.4
Eastern Asia	4	1.5
South Asia	35	13.1
South East Asia	15	5.6
Western Asia	2	0.7
Eastern Europe	17	6.4
Northern Europe	7	2.6
Southern Europe	1	0.4
Western Europe	1	0.4
Oceania	1	0.4
Unk	42	15.7
Total	267	100.0

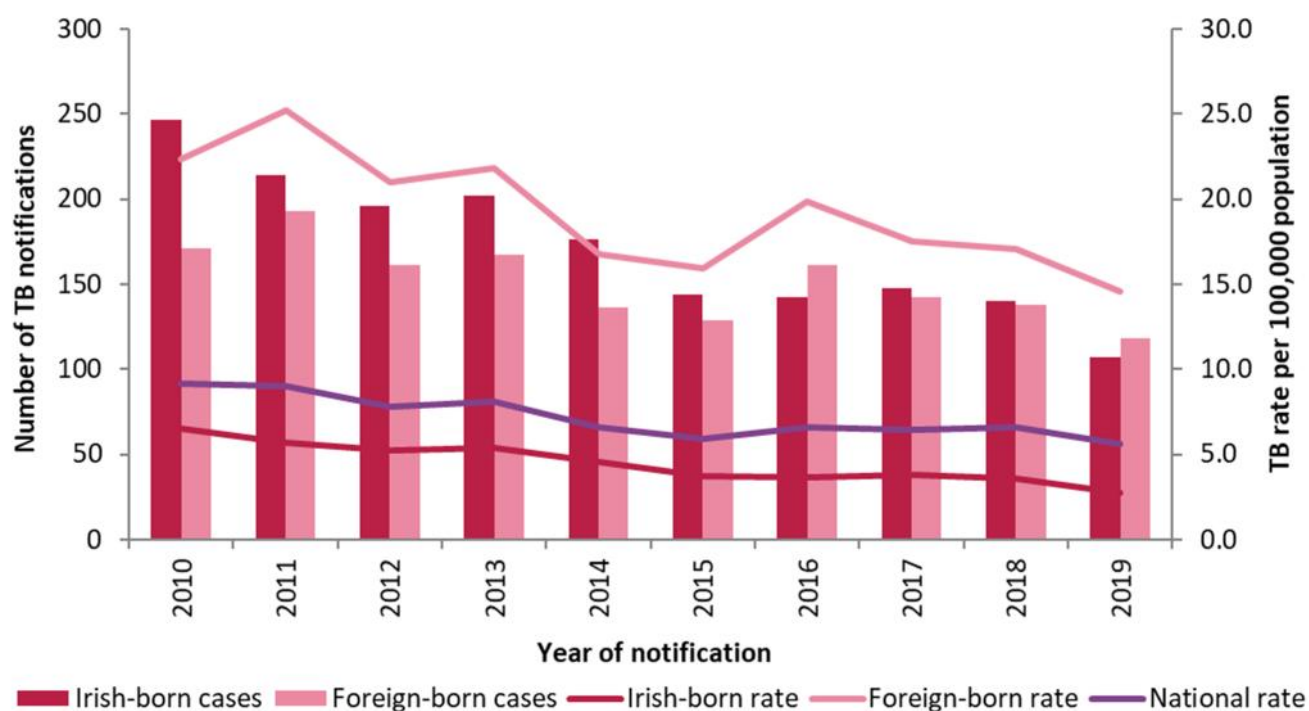
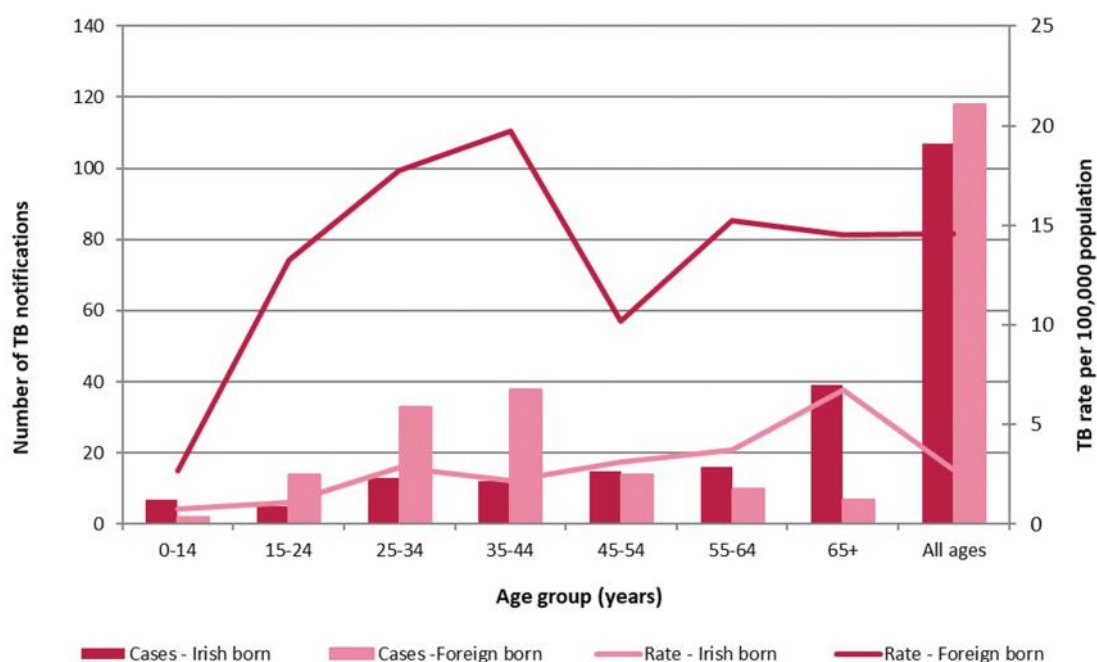
Figure 4: Annual number of TB notifications and crude incidence rate by geographic origin

Figure 5: Number of TB notifications and crude incidence rate by geographic origin and age group (years)



Diagnostic categories

Cases are classified into one of three diagnostic categories based on the site of disease. Table 5 summarises the available data for each HSE area. Extra-pulmonary disease components were reported in 102 (38.2%) cases (table 6).

Two cases of TB meningitis were reported during this period, both were adult cases born in high TB incidence countries. BCG status was not reported for either case.

Table 4: Number and proportion of TB notifications by HSE area and diagnostic type, 2019

HSE area	Pulmonary	Pulmonary & Extrapulmonary (P+E)	Extrapulmonary	Not reported	Total
HSE-E	65	11	29	6	111
HSE-M	6	0	0	5	11
HSE-MW	8	4	6	1	19
HSE-NE	12	0	10	0	22
HSE-NW	3	0	1	0	4
HSE-SE	11	3	8	1	23
HSE-S	31	6	13	1	51
HSE-W	15	4	7	0	26
Total	151	28	74	14	267
%	56.6	10.5	27.7	5.2	100.0

Table 5: Number and proportion of extrapulmonary TB notifications by site of disease, 2019

Extrapulmonary sites	Number of TB cases	%
Disseminated	3	2.9
Genito-urinary	4	3.9
Lymphatic extrathoracic	34	33.3
Lymphatic intrathoracic	11	10.8
Meningitis	2	2.0
Peritoneal/digestive	1	1.0
Pleural	19	18.6
Spine	6	5.9
Other	14	13.7
Not reported	8	7.8
Total	102	100.0

Microbiological results

Sputum-smear status at initial diagnosis

Of the 179 cases with a pulmonary component reported, 60 (33.5%) were sputum-smear positive at diagnosis. Of the smear positive cases, 28 (46.7%) reported a second sputum-smear positive result.

Culture results at initial diagnosis

Culture results by HSE area are detailed in table 7. Of the 196 culture positive cases, *M. tuberculosis* was isolated in 177 (90.3%), *M. bovis* in seven (3.6%), *M. africanum* in one (0.5%), *M. tuberculosis* complex in nine (4.6%) and species was not reported for the remaining two cases (1.0%).

Table 6: Number and proportion of TB notifications by HSE area and culture result, 2019

Culture result	HSE- E	HSE- M	HSE- MW	HSE- NE	HSE- NW	HSE- SE	HSE- S	HSE- W	Total	%
Culture positive	87	5	16	15	4	15	36	18	196	73.4
Culture negative	3	1	0	2	0	1	4	4	15	5.6
Not done	1	0	0	0	0	2	1	0	4	1.5
Not reported	20	5	3	5	0	5	10	4	52	19.5
Total	111	11	19	22	4	23	51	26	267	100.0
% Culture	78.4	45.5	84.2	68.2	100.0	65.2	70.6	69.2		

Molecular typing results

Of the 196 culture positive cases, MIRU-VNTR typing results were reported for 160 cases (81.6%). Of the 160 typed isolates reported during this period, 29 cases had a 24 character MIRU-VNTR match with another case in the same period. These 29 cases were spread over 10 clusters. During this time period, one cluster had seven associated cases, four clusters had three associated cases and five clusters had two associated cases.

Nine of these clusters represent expansion of previously known clusters or outbreaks already investigated by public health. The VNTR type associated with the remaining cluster with two matching isolates was not previously detected prior to 2019.

Table 7: TB notifications with 24 character MIRU-VNTR result match by HSE area, 2019

Sub-lineage	MIRU-VNTR Type	HSE-E	HSE-M	HSE-MW	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Haarlem	2232253423344251433	5		1				1		7
Haarlem	2232353323344251533	1	1					1		3
X	2232543424342251533						3			3
Bovis	2253222324534542533	3								3
URAL	2351362322444251131								3	3
LAM	1422443322241261433	2								2
Haarlem	2231353324324231533	1			1					2
Euro-	2242431223332251533					1		1		2
Beijing	2442333525444251533					1		1		2
Euro-	2452431223342251433				2					2

Antibiotic resistance

Drug sensitivity testing (DST) results by either phenotypic or molecular methods were reported for 192 cases (71.9% of total cases). Resistance was reported in 27 cases (14.1% of cases with DST results and 10.1% of total cases reported). Of the resistant cases, five were MDR-TB and seven were rifampicin mono-resistant. Of the 27 resistant cases, 17 (63.0%) were born outside Ireland. Three resistant cases (11.1%) had a previous history of TB reported. Details of the resistant cases are presented in table 9.

Table 8: Drug susceptibility testing[‡] (DST) results[§] of drug resistant TB notifications, 2019

Isolate **	Phenotypic DST results					Genetic markers of resistance		History of TB disease	Born outside Ireland	Age group (years)	Resistance pattern
	INH	RIF	ETH	PZA	STR	INH	RIF				
<i>M.tb</i>	R		R	S	R	Yes	Yes		Yes	45-54	MDR-TB
<i>M.tb</i>	R	ND	S	R	S	Yes	Yes	No	No	45-54	MDR-TB
<i>M.tb</i>	R	R	S	R	R	Yes	Yes	Yes	Yes	45-54	MDR-TB
<i>M.tb</i>	R	R	S	S	R			No	Yes	35-44	MDR-TB
<i>M.tb</i>	R	R	S	S	R	Yes	Yes	Yes	Yes	25-34	MDR-TB
<i>M.tb</i>	R	S	R	S	R	No	No	No	Yes	35-44	Resistant
<i>M.tb</i>	R	S	S	S	R		No	No	Yes	15-24	Resistant
<i>M.tb</i>	R	S	S	S	S	Yes	No		Yes	25-34	Resistant
<i>M.tb</i>	R	S	S	S			No		Unk	25-34	Resistant
<i>M.tb</i>	S	S	S	R	S	No	No	No	No	45-54	Resistant
<i>M.tb</i>	R	S	S	S	S	Yes	No	No	No	45-54	Resistant
<i>M.tb</i>	S	S	S	S	R		No		Yes	65+	Resistant
<i>M.bo</i>	R	S	S	n/a	S			Yes	No	65+	Resistant
<i>M.tb</i>	R	S	S	S	S	Yes	No		Unk	35-44	Resistant
<i>M.tb</i>	S	S	S	R	S			No	Yes	35-44	Resistant
<i>M.tb</i>	S	S	S	R	S		No	No	Yes	25-34	Resistant
<i>M.tb</i>	S	S	S	R	S		No	No	Yes	25-34	Resistant
<i>M.tb</i>	R	S	S	S				No	Yes	45-54	Resistant
<i>M.tb</i>	S	S	S	R	S			No	Yes	35-44	Resistant
<i>M.tb</i>	R	S	S	S	S		No	No	No	45-54	Resistant
<i>M.tb</i>	S		S	S	S		Yes		No	25-34	RR-TB
<i>M.tb</i>	S		S	S	S		Yes	No	Yes	15-24	RR-TB
<i>M.tb</i>	S	R	S	S	S	No	Yes	No	Yes	25-34	RR-TB
<i>M.tb</i>	S	R	S	S	S	No	Yes		No	65+	RR-TB
<i>M.tb</i>	S	R	S	S	S	No	Yes		Yes	35-44	RR-TB
<i>M.tb</i>	S	S	S	S	S		Yes	No	Yes	35-44	RR-TB
<i>M.tb</i>	S	S	S	S	S	No	Yes	No	No	35-44	RR-TB

Chest X-ray

Of the cases with a pulmonary component, 112 (62.6% of pulmonary cases) had X-ray findings consistent with active pulmonary TB (table 10).

[‡] Where INH = isoniazid, RIF= rifampicin, ETH= ethambutol and PZA = pyrazinamide, STR = streptomycin

[§] S = sensitive, R = resistant, ND = not done, unk = unknown, n/a – not applicable for pyrazinamide resistance detected in *M. bovis* cases

** *M. tb* = *M. tuberculosis*, *M. af* = *M. africanum*. *M. bo* = *M. bovis* and *M. ca* = *M. cannetti*

Table 9: Number and proportion of pulmonary TB notifications by chest X-ray result, 2019

Chest X-Ray result	Total	%
Active cavitary TB	34	19.0
Active non-cavitary TB	78	43.6
Other	11	6.1
Pleural	2	1.1
Inactive/old TB	1	0.6
Normal	9	5.0
Not done	2	1.1
Not reported	42	23.5
Total	179	100.0

Case ascertainment

Table 11 summarises the method by which reported cases were detected. The majority of cases (68.9%) presented as cases.

Table 10: Number and proportion of TB notifications by method of case finding, 2019

Case found by	Number	%
Presenting as case	184	68.9
Contact tracing	15	5.6
Immigrant screening	2	0.7
Pre-employment screening	0	0.0
Post-mortem diagnosis	0	0.0
Other	13	4.9
Not reported	53	19.9
Total	267	100.0

Previous history

Nineteen cases (7.1% of total reported) had a previous history of TB, 11 of whom were born outside Ireland. Year of previous diagnosis ranged from 1960 to 2018 for these cases.

HIV status

HIV status was reported for 106 (39.7%) TB cases. Of these cases, 10 (9.4%) tested positive for HIV and 96 (90.6%) tested negative for HIV.

Outcome

Among the TB cases notified during this period, five deaths were reported. Cause of death was not yet known for any deaths.

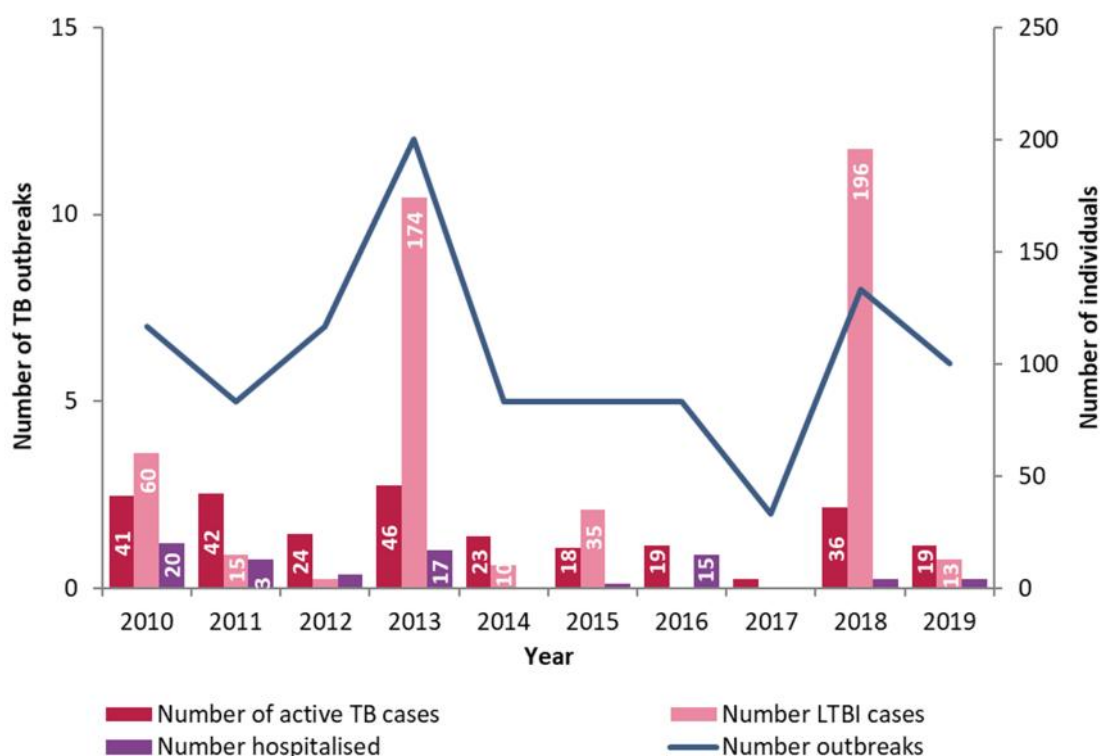
Outbreaks

Six TB outbreaks were reported during this period, with 19 associated cases of active TB disease, 13 cases of latent TB infection (LTBI) and four hospitalisations. Table 12 summarises outbreaks reported during this period while Of the six outbreaks, two reported data on LTBI cases. Figure 6 illustrates the trend in TB outbreaks by year including the number of active and latent TB cases and the number of cases hospitalised.

Table 11: TB outbreak summary, 2019

Outbreak type	Outbreak location	Number outbreaks	Number active TB	Number LTBI	Number hospitalised	Number deaths
Family outbreak	Extended family	1	4	10	1	-
	Private house	2	4	3	2	0
General outbreak	Community outbreak	2	9	-	-	-
	Residential institution	1	2	-	1	-
Total		6	19	13	4	0

Figure 6: TB outbreak summary by year



Appendix 1: Annual trends

Figure A1: Annual number of TB notifications, 3 year moving average and crude incidence rate

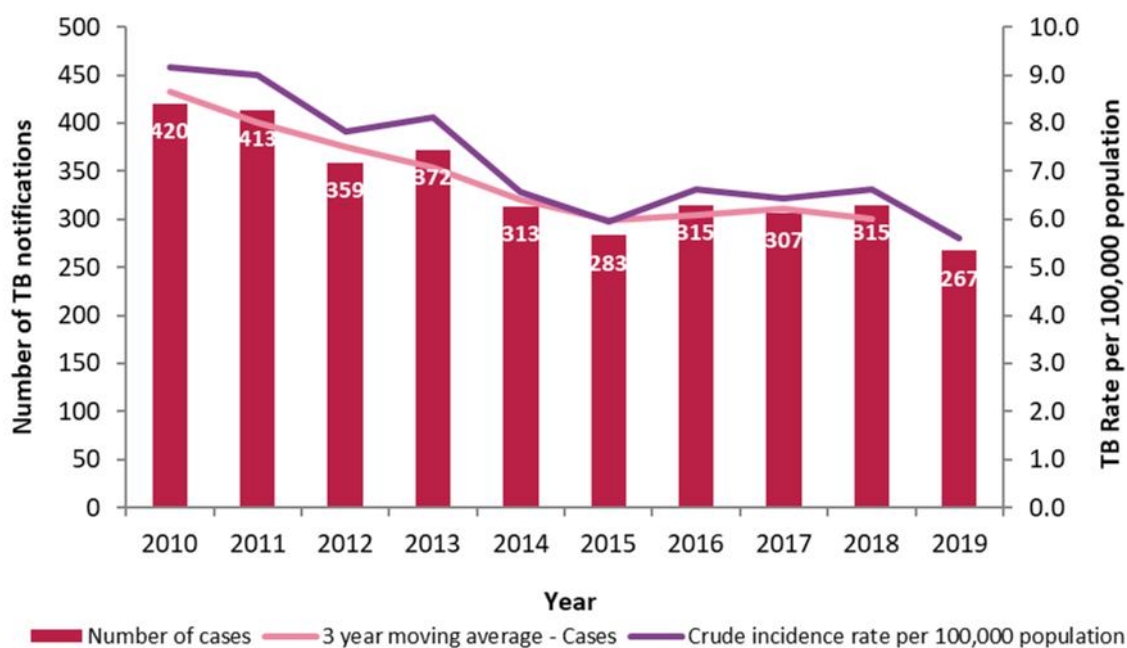


Figure A2: TB crude incidence rate per 100,000 population by HSE area and year

