

SURVEILLANCE REPORT

Annual Epidemiological Report for 2016

Tuberculosis

Key facts

- Thirty EU/EEA countries reported 58 994 TB cases, 11.4 cases per 100 000 population.
- The overall notification rate and most country-specific rates continued their longstanding declining trend, but annual rates of decline remained mostly too low to reach the United Nations' Sustainable Development Goal target of an 80% reduction in TB incidence by 2030 compared with 2015.
- Foreign-origin TB cases accounted for 33% of cases overall and for over 50% of cases in 15 EU/EEA countries, mainly in the north and west of Europe.
- Multidrug resistance (MDR) was reported for 4% of all tested cases and for 10–20% of the cases tested in the Baltic countries. Extensive drug resistance (XDR) was reported for 20% of MDR TB cases that underwent second-line drug susceptibility testing.
- Treatment success was achieved in 72% of all TB cases, 62% of HIV-coinfected TB cases, 38% of MDR TB cases notified in 2014, and 34% of XDR TB cases notified in 2013.
- The estimated TB mortality rate in the EU/EEA was 0.8 deaths per 100 000 population, with 4 270 estimated deaths overall.

Methods

This report is based on data for 2016 retrieved from The European Surveillance System (TESSy) on 7 March 2018. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases. For a detailed description of methods used to produce this report, please refer to the *Methods* chapter [1].

An overview of the national surveillance systems is available online [2].

A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [3].

ECDC and the WHO Regional Office for Europe jointly coordinate the collection and analysis of TB surveillance data in Europe. This report includes only data from EU/EEA countries. For 2016, all reporting countries had

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comprehensive surveillance systems, and all but France reported case-based data. Most countries used the EU case definition, two used their national case definition, and for one country the case definition was not specified.

Confirmed cases required a positive culture or detection of both acid-fast bacilli by microscopy and *M. tuberculosis* by nucleic acid amplification testing.

Multidrug resistance (MDR) was defined as resistance to at least isoniazid and rifampicin. Extensive drug resistance (XDR) was defined as resistance to (i) isoniazid and rifampicin (i.e. MDR), and (ii) resistance to a fluoroquinolone, and (iii) resistance to one or more of the following injectable drugs: amikacin, capreomycin or kanamycin.

The term 'native' as used in this report refers to cases born in, or having the citizenship (nationality) of, the reporting country. 'Foreign origin' refers to cases born in (or citizens of) a country different to the reporting country.

Periods of observation for treatment outcome monitoring were 12 months for non-MDR cases, 24 months for MDR TB and 36 months for XDR TB cases. Treatment success was defined as the proportion of cases reported as cured or having completed their treatment.

Epidemiology

Time and place

In 2016, 30 countries reported 58 994 TB cases, with Romania and Poland accounting for 34% (Table 1). The number of notifications per 100 000 population was 11.4, continuing the long-standing downward trend. Country-specific rates ranged from 1.8 in Iceland to 68.9 in Romania (Figure 1). The only countries with higher rates in 2016 than in 2012 were Belgium, Germany, Malta and Sweden. Age-standardised notification rates did not differ substantially from crude rates.

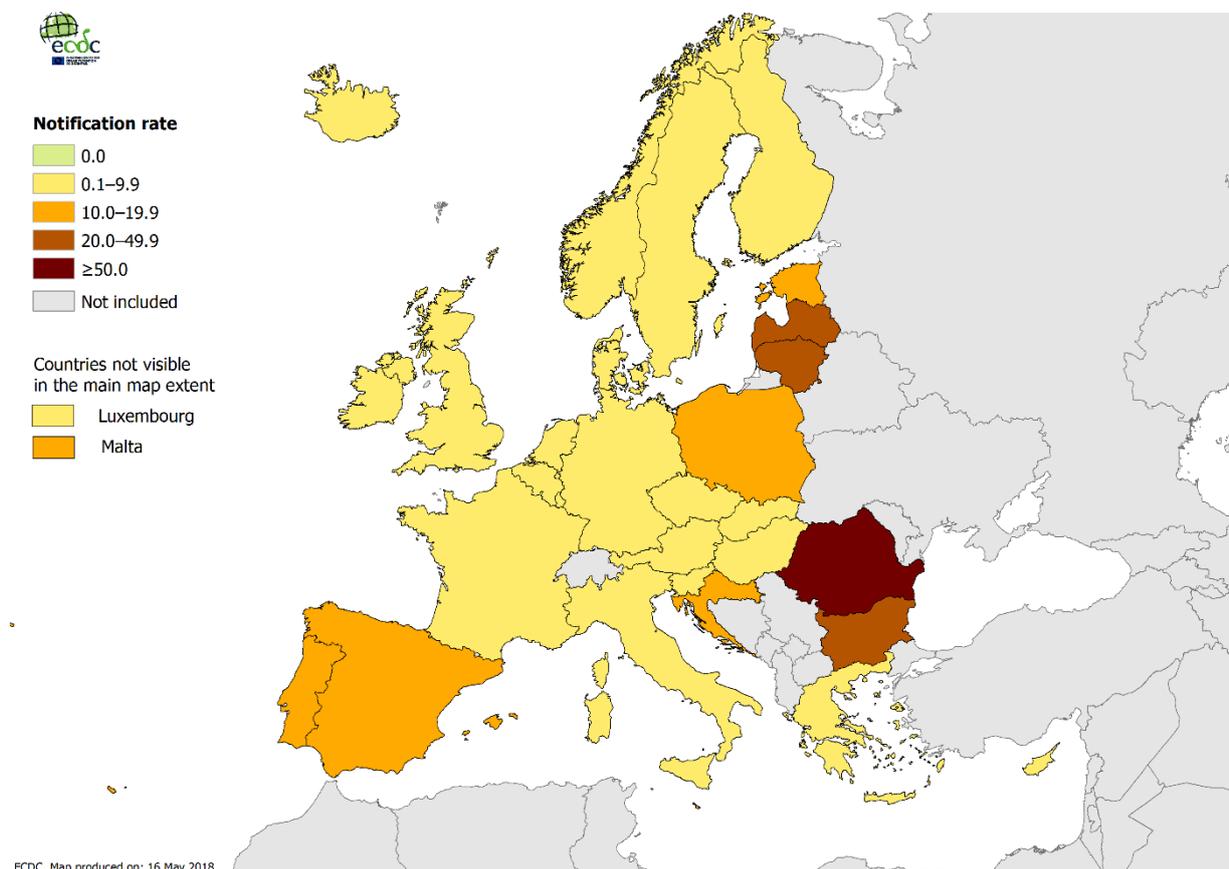
Table 1. Distribution of tuberculosis cases by country and year, EU/EEA, 2012–2016

Country	2012		2013		2014		2015		2016			
	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	ASR	Confirmed cases
Austria	646	7.7	653	7.7	586	6.9	583	6.8	634	7.3	7.5	489
Belgium	976	8.8	963	8.6	949	8.5	977	8.7	1047	9.3	9.6	801
Bulgaria	2280	31.1	1932	26.5	1872	25.8	1660	23.0	1603	22.4	21.6	764
Croatia	575	13.4	517	12.1	499	11.7	486	11.5	460	11.0	10.2	262
Cyprus	69	8.0	41	4.7	41	4.8	63	7.4	60	7.1	6.7	42
Czech Republic	597	5.7	497	4.7	511	4.9	517	4.9	516	4.9	4.8	392
Denmark	389	7.0	356	6.4	320	5.7	357	6.3	330	5.8	6.1	258
Estonia	289	21.8	290	22.0	248	18.8	217	16.5	192	14.6	14.1	156
Finland	274	5.1	273	5.0	263	4.8	272	5.0	236	4.3	4.3	186
France	5003	7.7	4947	7.5	4888	7.4	4741	7.1	4958	7.4	7.3	4197
Germany	4213	5.2	4340	5.4	4526	5.6	5852	7.2	5915	7.2	7.7	4164
Greece	558	5.0	540	4.9	519	4.7	482	4.4	443	4.1	3.9	246
Hungary	1223	12.3	1045	10.5	851	8.6	906	9.2	786	8.0	7.6	404
Iceland	11	3.4	11	3.4	9	2.8	7	2.1	6	1.8	2.0	5
Ireland	359	7.8	374	8.1	311	6.8	283	6.1	318	6.7	7.3	237
Italy	4252	7.2	3973	6.7	3916	6.4	3769	6.2	4032	6.6	6.3	3261
Latvia	993	48.6	904	44.7	761	38.0	721	36.3	660	33.5	32.5	559
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.	.
Lithuania	1781	59.3	1705	57.4	1607	54.6	1507	51.6	1442	49.9	48.6	1201
Luxembourg	45	8.6	38	7.1	24	4.4	30	5.3	29	5.0	5.2	26
Malta	42	10.1	50	11.9	46	10.8	32	7.5	50	11.5	12.1	42
Netherlands	956	5.7	845	5.0	814	4.8	862	5.1	889	5.2	5.5	583
Norway	374	7.5	392	7.8	324	6.3	313	6.1	299	5.7	6.0	231
Poland	7542	19.8	7250	19.0	6698	17.6	6430	16.9	6444	17.0	16.7	4619
Portugal	2606	24.7	2410	23.0	2278	21.8	2178	21.0	1836	17.8	17.0	1123
Romania	18190	90.5	16689	83.4	15879	79.6	15183	76.4	13617	68.9	67.5	9517
Slovakia	345	6.4	401	7.4	336	6.2	317	5.8	296	5.5	5.6	117
Slovenia	138	6.7	140	6.8	144	7.0	130	6.3	118	5.7	5.4	109
Spain	6070	13.0	5632	12.1	4914	10.6	4997	10.8	4877	10.5	10.3	3372

Country	2012		2013		2014		2015		2016			
	Reported cases	Rate	ASR	Confirmed cases								
Sweden	623	6.6	639	6.7	659	6.8	815	8.4	726	7.4	7.8	597
United Kingdom	8711	13.7	7868	12.3	7049	11.0	6234	9.6	6175	9.4	9.9	3907
EU-EEA	70130	13.8	65715	12.9	61842	12.1	60921	11.9	58994	11.4	11.4	41867

ASR: age-standardised rate

Figure 1. Distribution of tuberculosis cases per 100 000 population by country, EU/EEA, 2016



Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

Previous treatment, laboratory confirmation and TB site

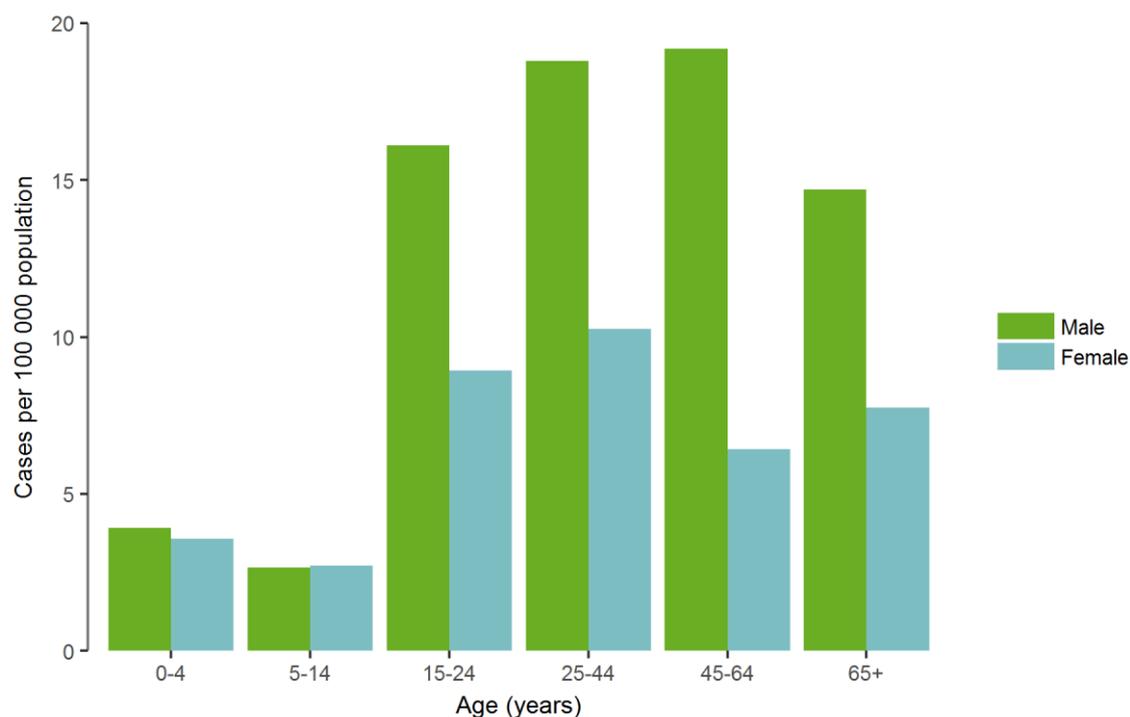
Of 58 994 TB cases reported in 2016, 41 531 (70.4%) were newly diagnosed, 6 207 (10.5%) had been previously treated for TB, and 11 256 (19.1%) had an unknown previous treatment status. Proportions of previously treated cases exceeded 20% in Lithuania and Romania.

The TB diagnosis was laboratory-confirmed in 41 868 (71.0%) of 58 994 cases, the highest proportion recorded at EU/EEA level so far. Country-specific proportions of laboratory-confirmed cases ranged from 39.5% in Slovakia to 92.4% in Slovenia.

Of all TB cases reported in 2016, 38 102 (64.6%) were diagnosed with pulmonary TB, 13 450 (22.8%) were diagnosed with extrapulmonary TB, 6 922 (11.7%) were a combination of both, and for 520 cases (0.9%) no TB site was reported.

Age and gender

Adults between the ages of 25 and 64 years accounted for the majority (65.3%) of TB cases reported with known age in 2016; notification rates per 100 000 population among 15–24-year-olds and persons 65 years of age and older were in the same range (Figure 2). The rate in males was twice the overall rate in females. This imbalance was mainly observed in age groups above 14 years.

Figure 2. Distribution of tuberculosis cases per 100 000 population, by age and gender, EU/EEA, 2016

Origin of cases

Of the 58 994 TB cases notified in 2016, 37 909 (64.3%) were born in, or citizens of, the reporting country (referred to as 'native'), 19 312 (32.7%) were of foreign origin, and 1 773 (3.0%) were of unknown origin. Of the cases of foreign origin, nearly half (44.0%) were reported by Germany and the United Kingdom. Foreign-origin TB cases accounted for more than 50% of all cases in 15 EU/EEA countries, mainly in the north and west of Europe, but also in Cyprus, Italy and Malta.

Drug resistance

Of 41 273 laboratory-confirmed TB cases notified in 2016, 36 071 (87.4%) underwent isoniazid and rifampicin susceptibility testing. Resistance to at least one anti-TB drug was reported for 3 216 (9.9%) of the tested cases. MDR TB was reported for 1 322 (3.7%) of 36 071 tested cases; 10–20% of the cases tested in Estonia, Latvia and Lithuania had MDR TB. The proportion of MDR TB has been decreasing since 2012 when it was at 4.7%. XDR TB was reported for 198 (20.1%) of 984 MDR TB cases that underwent second-line drug susceptibility testing. This proportion increased from its previous value of 13.9% (2012).

HIV co-infection

HIV status was reported for 19 988 (69.0%) of 28 971 TB cases from 20 countries. Of these cases with known HIV status, 895 (4.5%) were reported as HIV positive. Among countries with at least 50% reporting completeness for HIV status, the proportion of coinfecting cases was highest in Malta (17.4%), Portugal (13.9%), and Estonia (12.0%). The proportion of HIV-coinfecting TB cases decreased from 5.3% in 2012.

Treatment outcome

Of the 46 870 TB cases notified in 2015 with a treatment outcome reported in 2016, 33 519 (71.5%) were treated successfully, 3 709 (7.9%) died, 583 (1.2%) experienced treatment failure, 2 442 (5.2%) were lost to follow-up, 2 011 (4.3%) were still on treatment in 2016 and 4 606 (9.8%) had not been evaluated. Treatment success was achieved in 62.2% of all HIV-coinfecting cases. Treatment success was lower for MDR TB cases notified in 2014 (37.5%) and XDR TB cases notified in 2013 (33.8%).

The estimated TB mortality rate in the EU/EEA was 0.8 deaths per 100 000 population in 2016, with an estimated 4 220 to 4 300 deaths overall.

Threats

In 2016, three cases of XDR TB were found to be linked to a cluster originally detected in foreign medical students at a Romanian university in 2015 [4].

A cluster of 29 cases of MDR TB among refugees from the Horn of Africa and Sudan was detected in six EU Member States and Switzerland [5].

Discussion

Although TB notification rates continued to decline in most EU/EEA countries, the overall rate of decline is still too low to reach the United Nations' Sustainable Development Goal target of an 80% reduction in TB incidence by 2030 compared with 2015 [6].

In 2016, WHO's Regional Office for Europe published the 'Roadmap to implement the tuberculosis action plan for the WHO European Region 2016–2020' [7]. It includes 26 indicators for assessing a country's performance in tackling TB; based on data availability, 14 of these indicators could readily be measured in the EU/EEA.

Most EU/EEA Member States did well in terms of detecting and notifying TB cases, enrolling them in treatment, and testing mycobacterial isolates for susceptibility to first-line drugs [8]. They did not do so well, however, regarding the use of WHO-recommended rapid tests for diagnosis, the percentage of MDR TB among new TB patients, and the percentage of HIV co-infection. EU/EEA countries performed poorly regarding estimated MDR TB case detection, TB and MDR TB treatment success, HIV testing coverage, and the estimated detection of TB/HIV co-infection.

The epidemiology of TB differs markedly between high- and low-incidence EU/EEA countries. High-incidence countries have made substantial progress on their way towards reducing TB disease but still have notification rates that are up to 38 times higher than in low-incidence countries. Cases in high-incidence EU/EEA countries are mostly native cases and include more paediatric cases, more previously treated cases, and more cases with multidrug resistance than in countries with low incidence [8]. In low-incidence countries, TB remains largely confined to hard-to-reach vulnerable groups, especially people of foreign origin who account for over 50% of cases in most of these countries.

Studies on the effectiveness and cost-effectiveness of screening programmes for active and latent TB aimed at migrants are scarce, heterogeneous, and of low quality. Despite this, the screening of migrants from high-TB-incidence countries still appears to be the most promising strategy [9,10]. A mathematical modelling study based on data from four EU countries found that screening migrants for latent TB is cost-effective, especially if the country of origin has a higher TB incidence. This was particularly true for migrant prisoners at the moment of entering prison [11].

Public health implications

TB is a poverty-related disease, so some of the reasons for the differences between high- and low-incidence countries are socio-economical and will eventually need to be addressed on that level rather than by public health measures alone. In the meantime, all countries are encouraged to offer rapid tests for TB and drug-resistant TB and provide adequate treatment as this is the most effective intervention to stop TB transmission. High-incidence countries should consider assessing whether and where their TB programmes need further strengthening. Low-incidence countries need to consider whether they should focus their screening, diagnostic and treatment efforts on vulnerable subpopulations, especially on migrants from high-incidence countries.

References

1. European Centre for Disease Prevention and Control. Introduction to the Annual epidemiological report for 2016. In: ECDC. Annual epidemiological report for 2016. Stockholm: ECDC; 2017. Available from: <https://ecdc.europa.eu/en/annual-epidemiological-reports-2016/methods>.
2. European Centre for Disease Prevention and Control. Surveillance systems overview [internet, downloadable spreadsheet]. Stockholm: ECDC; 2018. Available from: <https://ecdc.europa.eu/en/publications-data/surveillance-systems-overview-2016>.
3. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases [internet]. Stockholm: ECDC; 2017 [cited 30 Jan 2018]. Available from: <http://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=54>
4. European Centre for Disease Prevention and Control. Communicable Disease Threats Report. Week 43, 23–29 October 2016. Stockholm: ECDC; 2016. Available from: <https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/communicable-disease-threats-report-29-oct-2016.pdf>
5. Walker TM, Merker M, Knoblauch AM, Helbling P, Schoch OD, van der Werf MJ, et al; MDR TB Cluster Consortium. A cluster of multidrug-resistant *Mycobacterium tuberculosis* among patients arriving in Europe from the Horn of Africa: a molecular epidemiological study. *Lancet Infect Dis* 2018 Apr;18(4):431-440.
6. World Health Organization. Towards TB elimination: an action framework for low-incidence countries. Geneva: WHO; 2014. Available from: http://www.who.int/tb/publications/elimination_framework/en
7. World Health Organization Regional Office for Europe. Roadmap to implement the tuberculosis action plan for the WHO European Region 2016–2020. Copenhagen: WHO Europe; 2016. Available from: http://www.euro.who.int/data/assets/pdf_file/0020/318233/50148-WHO-TB-Plan_May17_web.pdf
8. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. Tuberculosis surveillance and monitoring in Europe, 2018–2016 data. Stockholm: European Centre for Disease Prevention and Control; 2018. Available from: <https://ecdc.europa.eu/sites/portal/files/documents/ecdc-tuberculosis-surveillance-monitoring-Europe-2018-19mar2018.pdf>
9. Greenaway C, Pareek M, Abou Chakra CN, Walji M, Makarenko I, Alabdulkarim B, et al. The effectiveness and cost-effectiveness of screening for active tuberculosis among migrants in the EU/EEA: a systematic review. *Euro Surveill*. 2018;23(14):pii=17-00542. Available from: <https://doi.org/10.2807/1560-7917.ES.2018.23.14.17-00542>
10. Greenaway C, Pareek M, Abou Chakra CN, Walji M, Makarenko I, Alabdulkarim B, et al. The effectiveness and cost-effectiveness of screening for latent tuberculosis among migrants in the EU/EEA: a systematic review. *Euro Surveill*. 2018;23(14):pii=17-00543. Available from: <https://doi.org/10.2807/1560-7917.ES.2018.23.14.17-00543>
11. European Centre for Disease Prevention and Control. Cost-effectiveness analysis of programmatic screening strategies for latent tuberculosis infection in the EU/EEA. Stockholm: ECDC; 2018. Available from: <https://ecdc.europa.eu/sites/portal/files/documents/LTBI%20cost-effectiveness%20report.pdf>