

## SURVEILLANCE REPORT

# Tuberculosis

## Annual Epidemiological Report for 2022

### Key facts

- For 2022, the 30 countries in the European Union/European Economic Area (EU/EEA) reported a total of 36 179 tuberculosis (TB) cases (8.0 per 100 000 population).
- The notification rate slightly increased for 2022 compared with the previous two years. Despite observing an increase, the mean annual change rate when compared to the period before 2020 reveals an overall declining trend. However, at the current rate the EU/EEA is not on track to reach the World Health Organisation's global TB strategy of ending the TB epidemic by 2030.
- The decline in total case numbers and notification rates in 2020 and 2021 should be interpreted with caution, given the potential impact of measures put in place to mitigate the COVID-19 pandemic across the EU/EEA on TB diagnostic and clinical services and surveillance.
- Rifampicin resistance/multidrug resistance (RR/MDR) was reported for 4.9% of TB cases with drug susceptibility testing results reported. Of the MDR TB cases that underwent second-line drug susceptibility testing, pre-extensive drug resistance (pre-XDR) was reported for 26.9%, while extensive drug resistance (XDR) was reported for 10%.
- HIV status was reported by 21 countries for 73.6% of their total number of TB cases, and of TB cases with known HIV status, 4.1% were HIV-positive.
- Treatment success was achieved in 64.0% of all TB cases notified in 2021, 54.0% of HIV-co-infected TB cases notified in 2021, 52.5% of RR/MDR TB cases notified in 2020, and 22.2% of pre-XDR TB cases notified in 2020.

### Introduction

Tuberculosis (TB) is an infectious disease caused by a group of *Mycobacterium species* called the *Mycobacterium tuberculosis* complex. Tuberculosis typically affects the lungs (pulmonary tuberculosis), but it can also cause disease in any organ (extrapulmonary tuberculosis). Tuberculosis is transmitted from person-to-person when, for example, an individual with pulmonary TB expels bacteria into the air by coughing or sneezing. While most tuberculosis infections present as asymptomatic and are not infectious, about 10% of those infected will develop TB disease during their lifetime, with a higher risk among immunocompromised individuals (such as people infected with HIV).

## Methods

This report is based on data for 2022 retrieved from The European Surveillance System (TESSy) on 8 April 2024. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

An overview of the national surveillance systems for TB is available online [1].

A subset of the data used for this report is available through ECDC's online 'Surveillance atlas of infectious diseases' [2].

ECDC and the World Health Organization's Regional Office for Europe jointly coordinate the collection and analysis of TB surveillance data in Europe. This report only includes data from EU/EEA countries. For 2022, all reporting countries had comprehensive surveillance systems. All countries used the [EU case definition for tuberculosis](#) during the period included in this report.

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

Multidrug resistance (MDR) was defined as resistance to at least isoniazid and rifampicin. Pre-extensive drug resistance (pre-XDR) refers to resistance to: (i) at least rifampicin (that is, rifampicin resistance/multidrug resistance (RR/MDR)) and (ii) any fluoroquinolone. Extensive drug resistance (XDR) was defined as resistance to (i) at least rifampicin (that is rifampicin resistance/multidrug resistance (RR/MDR)), and (ii) a fluoroquinolone, and (iii) at least one additional Group A drug.

'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 all TB cases, 24 months for RR/MDR TB and pre-XDR 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.

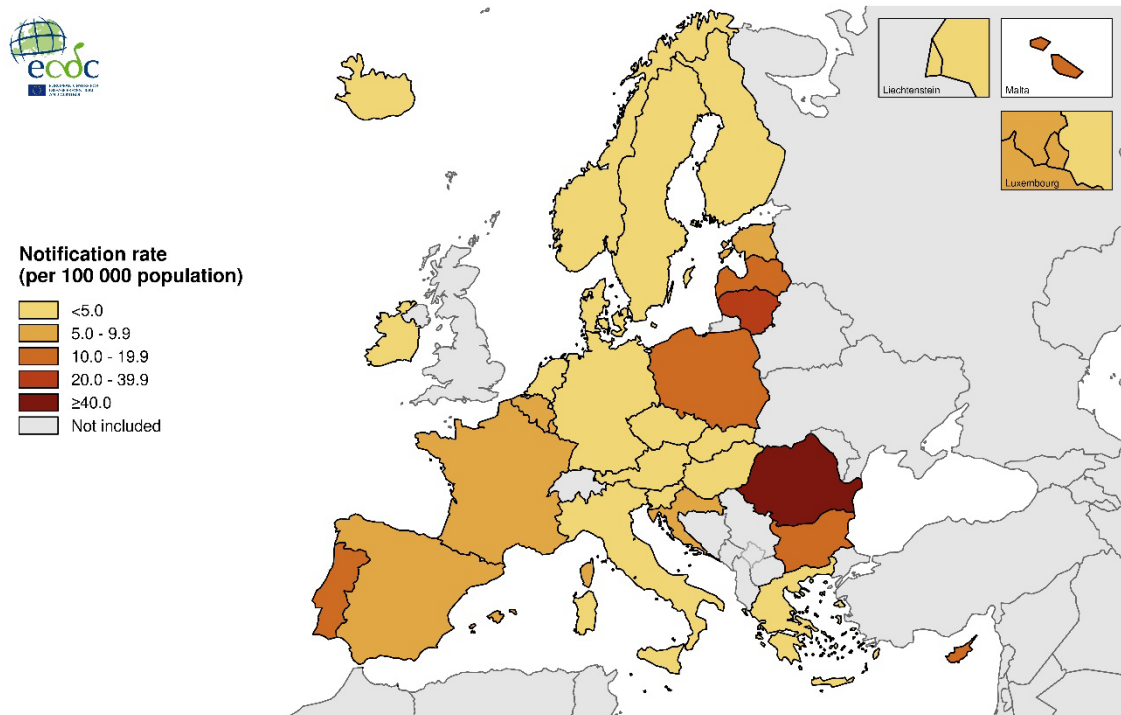
## Epidemiology

In 2022, a total of 36 179 TB cases were reported by all EU/EEA countries. Ten countries reported 87.7% of the total cases, with Romania alone accounting for 25.6% of all TB cases reported in 2022 (Table 1). The rate of notifications per 100 000 population was 8.0, continuing the downward trend observed since the launch of European enhanced TB surveillance in 1996. As reported for previous years, country-specific rates differed considerably in 2022, ranging from 2.5 in Liechtenstein to 48.7 in Romania (Table 1 and Figure 1). Notification rates have increased in the majority of countries compared to 2021, but compared to before the COVID-19 pandemic, the trends continued the decrease since 2018. Age-standardised notification rates did not differ substantially from crude rates.

**Table 1. Tuberculosis cases and rates per 100 000 population by country and year, EU/EEA, 2018–2022**

Country	2018		2019		2020		2021		2022		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	482	5.5	474	5.4	388	4.4	396	4.4	372	4.1	4.1
Belgium	977	8.6	963	8.4	825	7.2	868	7.5	852	7.3	7.7
Bulgaria	1 358	19.3	1 344	19.2	930	13.4	687	9.9	792	11.6	11.1
Croatia	372	9.1	305	7.5	198	4.9	173	4.3	212	5.5	5.0
Cyprus	52	6.0	69	7.9	36	4.1	48	5.4	96	10.6	10.6
Czechia	443	4.2	461	4.3	363	3.4	357	3.4	384	3.7	3.6
Denmark	291	5.0	284	4.9	221	3.8	218	3.7	225	3.8	4.0
Estonia	147	11.1	150	11.3	124	9.3	112	8.4	129	9.7	9.2
Finland	227	4.1	226	4.1	174	3.1	170	3.1	190	3.4	3.2
France	5 048	7.5	5 183	7.7	4 515	6.7	4 207	6.2	4 040	6.0	6.3
Germany	5 495	6.6	4 817	5.8	4 186	5.0	3 939	4.7	4 076	4.9	5.1
Greece	432	4.0	459	4.3	396	3.7	206	1.9	320	3.1	3.0
Hungary	640	6.5	552	5.6	406	4.2	335	3.4	440	4.5	4.3
Iceland	8	2.3	13	3.6	12	3.3	7	1.9	17	4.5	4.7
Ireland	310	6.4	257	5.2	236	4.8	217	4.3	216	4.3	4.5
Italy	3 912	6.5	3 346	5.6	2 287	3.8	2 480	4.2	2 439	4.1	4.3
Latvia	NDR	NRC	NDR	NRC	NDR	NRC	261	13.8	319	17.0	16.7
Liechtenstein	1	2.6	NDR	NRC	2	5.2	1	2.6	1	2.5	2.9
Lithuania	1 142	40.7	1 058	37.9	726	26.0	646	23.1	738	26.3	24.8
Luxembourg	42	7.0	50	8.1	34	5.4	35	5.5	48	7.4	7.3
Malta	55	11.6	98	19.9	140	27.2	54	10.5	61	11.7	11.4
Netherlands	795	4.6	754	4.4	622	3.6	681	3.9	635	3.6	3.7
Norway	208	3.9	166	3.1	157	2.9	155	2.9	174	3.2	3.3
Poland	5 487	14.4	5 321	14.0	3 388	8.9	3 704	9.8	4 314	11.5	11.0
Portugal	1 926	18.7	1 907	18.6	1 521	14.8	1 533	14.9	1 514	14.6	14.2
Romania	12 199	62.5	11 618	59.8	7 693	39.8	7 976	41.5	9 270	48.7	48.1
Slovakia	281	5.2	214	3.9	158	2.9	137	2.5	155	2.9	2.9
Slovenia	99	4.8	101	4.9	77	3.7	80	3.8	74	3.5	3.3
Spain	4 766	10.2	4 532	9.7	3 666	7.7	3 640	7.7	3 698	7.8	7.7
Sweden	488	4.8	479	4.7	324	3.1	353	3.4	378	3.6	3.7
<b>EU/EEA (30 countries)</b>	<b>47 683</b>	<b>10.6</b>	<b>45 201</b>	<b>10.0</b>	<b>33 805</b>	<b>7.5</b>	<b>33 676</b>	<b>7.4</b>	<b>36 179</b>	<b>8.0</b>	<b>8.0</b>
United Kingdom	5 036	7.6	5 132	7.7	NDR	NRC	NA	NA	NA	NA	NA
<b>EU/EEA (31 countries)</b>	<b>52 719</b>	<b>10.2</b>	<b>50 333</b>	<b>9.7</b>	<b>33 805</b>	<b>7.5</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

Source: country reports; ASR: age-standardised rate; NA: not applicable; NDR: no data reported; NRC: no rate calculated.

**Figure 1. Tuberculosis cases per 100 000 population by country, EU/EEA, 2022**

Administration boundaries: © EuroGeographics

The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union. ECDC. Map produced on 15 April 2024.

## Previous treatment, laboratory confirmation and tuberculosis site

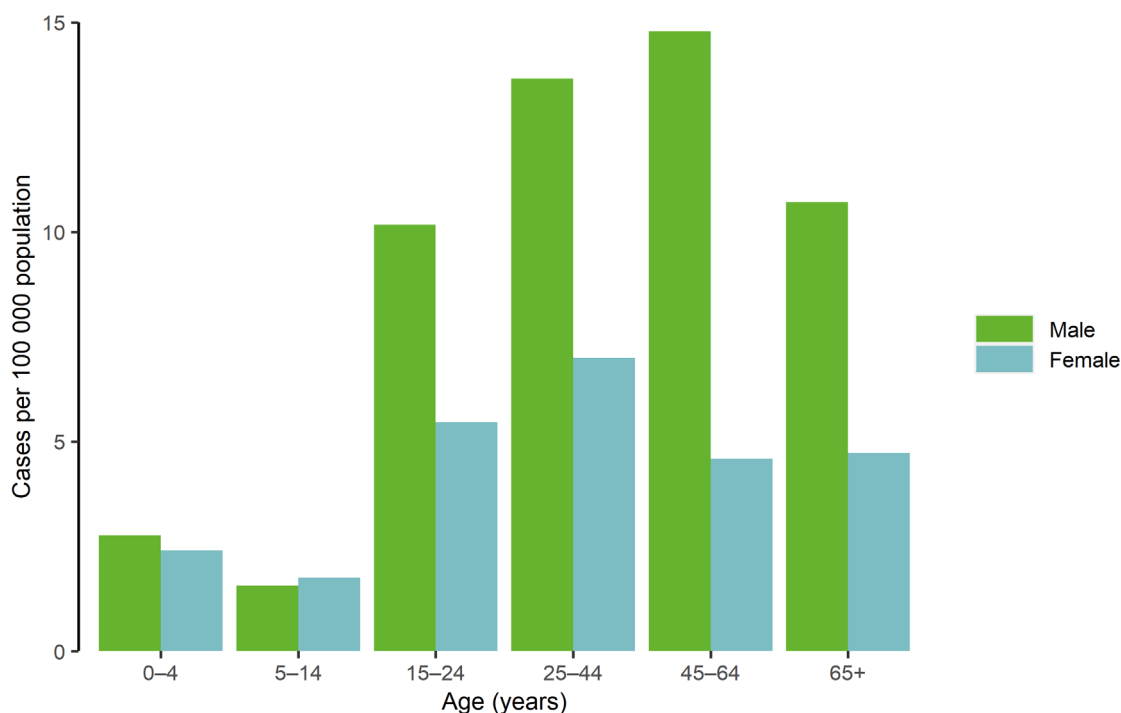
The distribution of cases by previous treatment history was similar in 2022 to that reported in previous years: 27 082 (74.9%) of 36 179 TB cases reported in 2022 were newly diagnosed, 4 777 (13.2%) had been previously treated for TB, and 4 320 (11.9%) had an unknown previous treatment status. The proportion of previously treated cases was 10% or above in nine countries: Bulgaria (11.2%), Estonia (19.4%), Iceland (11.9%), Lithuania (15.0%), Norway (12.6%), Poland (12.2%), Romania (19.7%), Slovakia (18.7%), and Spain (30.2%).

Among TB cases reported in 2022, 25 556 (70.6%) were laboratory-confirmed. Of these cases, 17 396 (68.1%) had laboratory confirmation based only on culture-positive results, 677 (2.6%) were both smear and nucleic acid test positive (but culture negative), and 7 483 (29.3%) cases were culture, smear, and nucleic acid test-positive.

Of all 36 179 TB cases reported in 2022, 26 717 (73.8%) were diagnosed with pulmonary TB, 6 885 (19.0%) with extrapulmonary TB, 2 293 (6.3%) with a combination of both and 284 (0.8%) had no TB site reported.

## Age and gender

In 2022, the highest notification rate was observed in the 25 to 44 years age group (9.5 per 100 000 population). Overall, the rate in males was twice the rate in females. This imbalance was observed in almost all age groups with the exception of those aged five to 14 years (Figure 2).

**Figure 2. Tuberculosis cases per 100 000 population, by age and gender, EU/EEA, 2022**

## Origin of cases

Of the 36 179 TB cases notified in 2022, 23 357 (64.6%) were born in, or were citizens of, the reporting country, 12 051 (33.3%) were of foreign origin, and 771 (2.1%) were of unknown origin. Of the eight countries with TB notification rates higher than 10 per 100 000 population, three reported fewer than 5% of TB cases as being of foreign origin: Bulgaria (1.1%), Lithuania (1.9%), and Romania (0.6%). The remaining five countries reported a higher proportion of TB cases of foreign origin: Cyprus (93.8%), Latvia (12.5%), Malta (90.2%), Poland (6.8%) and Portugal (29.9%).

## Drug resistance

Of 22 533 bacteriologically confirmed TB cases notified in 2022, 18 749 (83.2%) had drug susceptibility testing results for at least rifampicin. Of these, 863 (4.9%) had rifampicin resistance/multidrug resistance. In 2022, the proportion of TB cases with rifampicin resistance or with resistance to multiple anti-TB drugs has increased compared to the data from 2021 (rifampicin resistance 5.0% in 2022; 4.4% in 2021 and resistance to multiple anti-TB drugs 4.4% in 2022; 3.8% in 2021).

In 2022, 53.8% of the pulmonary confirmed RR/MDR-TB cases (502 of 933) had drug-susceptibility testing results for any fluoroquinolone. Among these, 135 (26.9%) met the definition for pre-XDR. The majority (88.9%, 120 of 135) of pre-XDR cases had drug-susceptibility testing results reported for at least one other Group A drug. Of these cases, 12 (10.0%) met the XDR case definition. The proportion of XDR cases decreased in 2022 (from 54.4%, n=43 in 2021), due to the adjustment of the XDR definitions, but the numbers reported remain low overall.

## HIV co-infection

HIV status was reported for 14 970 (73.6%) of 20 352 TB cases from the 21 countries that reported the HIV status of TB cases in 2022. Of cases with known HIV status, 620 (4.1%) were reported as HIV-positive. There were 18 countries with at least 50% reporting completeness for HIV status. Across these countries and among cases with known HIV status, the proportion of co-infected cases were highest in Cyprus (18.5%), Hungary (12.5%), and Portugal (10.1%).

## Treatment outcome

Of the 24 468 new and relapsed TB cases notified in 2021 with a treatment outcome reported in 2022, 15 649 (64.0%) were treated successfully, 1 998 (8.2%) died, 194 (0.8%) experienced treatment failure, 843 (3.4%) were lost to follow-up, 601 (2.5%) were still on treatment in 2022, and 5 183 (21.2%) had not been evaluated. In 2022 treatment success rate at 12 months decrease compared to 2021 (71.7% in 2021; 64.0% in 2022) while the numbers of those not evaluated increased by almost 8% (13.7% in 2021; 21.2% in 2022), the other outcomes remained relatively stable compared to 2021 trends.

Treatment success was achieved in 225 (54.0%) of 417 new and relapsed HIV co-infected cases who were reported in 2021 and started on first-line TB treatment. Among all 566 RR/MDR TB cases notified in 2020, 297 (52.5%) were reported to have treatment success. A total of 20 (22.0%) of the pre-XDR TB cases notified in 2020 had a successful treatment reported, while none of the two XDR TB cases notified in 2019 had a successful treatment reported in 2022 (one case had reported treatment failure and the other was lost to follow-up).

## Discussion

In 2022, all EU/EEA countries reported TB notification data, with a total of 36 179 TB cases. As in previous years, a few countries reported a large proportion of the total number of cases, including Romania, which reported more than a quarter of all TB cases in 2022.

There was a slight increase in the overall TB notification rate for 2022 compared with the previous two years. The lower rates and data for 2020 and 2021 must be interpreted with caution due to the impact of measures implemented to mitigate the COVID-19 response. Despite observing recent increases, the mean annual change rate between 2018 to 2022 is reported to be of -6.7%, and a comparison of the 2022 rate to the period before 2020 reveals an overall declining trend. The United Nations Sustainable Development Goal 3 at the EU/EEA level is to reach a notification rate of 2.4 per 100 000 in 2030 (80% reduction of 2015 TB notification rate of 11.9 per 100 000). Although progress is being made towards this goal, at the current rate of decline, the majority of EU/EEA countries are not on track to reach the 80% reduction target by 2030, or the elimination target by 2050 [3]. Countries need to accelerate their progress towards these goals to meet them.

The reported number of drug-resistant TB cases in the EU/EEA increased in 2022, after a steady decline over the previous four years. This observed increase can be attributed to a range of factors, including the resumption of normal testing services after the COVID-19 pandemic, the recent population displacements following the Russian invasion of Ukraine, together with the expansion of more targeted TB testing services in certain settings and among populations at risk [4].

Despite the slight increase observed for the number of MDR TB cases in the EU/EEA in 2022, the number of drug-resistant TB cases in the EU/EEA area remains relatively stable, in contrast with the high number of drug-resistant TB cases in the European Region High Priority Countries (HPCs) bordering the EU/EEA. Drug-susceptibility testing results for first-line drugs were only reported for over 75% of laboratory-confirmed TB cases in 2022, indicating that there is still considerable room for improvement here. Countries need drug-susceptibility testing results to be able to diagnose and treat drug-resistant TB, as well as to monitor this threat.

The World Health Organization (WHO) has set a target of 85% for TB treatment success [4-5]. Data reported in 2022 (64.0% treatment success rate) indicate that improvement is needed to reach the treatment success target. The target for successful treatment among RR/MDR TB cases after 24 months is 75%, and overall the EU/EEA is far below where it should be (at 52.5% of RR/MDR TB cases with treatment success). In 2020, WHO released updated treatment guidelines for drug-resistant TB [6]. The move away from injectable agents to all-oral regimens and new agents such as pretomanid will facilitate treatment, and with that the rate of treatment success for RR/MDR TB may improve in the future.

The increase in total case numbers and notification rates in 2022 shows the effect of the COVID-19 pandemic's disruptions on healthcare systems. As a result, some countries have experienced an increase in the number of cases as they recovered from the pandemic period.

The previously identified diversion of TB resources to COVID-19 – clinical, laboratory or public health – (through the survey conducted alongside the 2020 data collection) alongside the difficulties in accessing patients' clinical services due to movement restrictions/stay-at-home measures and overburdened health services might have had an impact on delayed presentation and/or diagnosis of some TB cases during 2020 and 2021, resulting in an impact on the number of cases notified in the Member States. Delayed diagnosis might also have resulted in more severe illness at the time of diagnosis for some cases.

This report indicates that despite ongoing progress toward reaching the goals set by the United Nations and WHO, countries continue to face several challenges in achieving elimination targets. Additional resources will be required

to accelerate progress towards achieving these targets and to counteract any increase in TB cases resulting from the impact of the COVID-19 pandemic on TB services.

## Public health implications

TB is a poverty-related disease, so some of the reasons for the differences between higher- and low-incidence countries are socio-economic and will eventually need to be addressed on that level rather than by public health measures alone. Meanwhile, all countries are encouraged to continue to ensure rapid diagnosis of TB and drug-resistant TB and provide adequate treatment as the most effective intervention to stop TB transmission. Higher-incidence countries should consider assessing whether and where their TB programmes need further strengthening. Low-incidence countries need to consider focusing their screening, diagnostic and treatment efforts even more on sub-populations vulnerable to TB.



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