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# Basic Overview of Tuberculosis Epidemiology in the Czech Republic in 2023



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# 1. Introduction

The publication “Basic Overview of Tuberculosis Epidemiology in the Czech Republic” has been regularly published by the Institute of Health Information and Statistics of the Czech Republic (IHIS) since 2016 (containing data for 2015) and picks up the threads of the publication “Tuberculosis and Respiratory Diseases”, which included data from 1960 to 2014. It is a selection of the most important review tables describing the occurrence of reported cases of tuberculosis (TB) and other mycobacterial infections in the Czech Republic. The presented data were obtained from the Register of Tuberculosis (RTB), which is part of an information system maintained by public health protection authorities, and which is run as a web application based on a central database. Furthermore, the Information System of Bacillary Tuberculosis (ISBT) has become an inseparable part of RTB. In the Czech Republic, all detected cases of tuberculosis or other mycobacterial infections must be reported into RTB. Apart from RTB data, data from the Czech Statistical Office are used to calculate rates per population.

RTB is administered by the Ministry of Health of the Czech Republic (MZ CR). Data on the national level are processed by IHIS, which is also responsible for providing and publishing statistical outputs and, together with the National Tuberculosis Surveillance Unit, maintains contacts with international organizations.

The binding regulations in this domain involve: Act No. 258/2000 Coll. on Protection of Public Health and Amendment to Some Related Acts; Decree No. 306/2012 Coll. of MZ CR on Conditions of Prevention and Spread of Infectious Diseases and Hygiene Requirements for the Operation of Medical Facilities and Social Care Institutions; Decree No. 473/2008 Coll. of MZ CR on System of Epidemiological Vigilance for Selected Infections, as subsequently amended; and Standard of Follow-Up Care for Patients with Tuberculosis and Other Mycobacterial Infections and for Persons at a Higher Risk of These Diseases (Bulletin No. 7/2016 of MZ CR).

In the context of evaluation of TB epidemiology in the Czech Republic, a new online and publicly available data-mining tool has been developed during the year 2020, providing a better insight into this issue; the tool will be designed in an interactive way, offering many different (and adjustable) points of view (available at: <https://tbc.uzis.cz/>).

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## 2. Methodology

The tabular outputs summarize TB epidemiology in the Czech Republic in 2023, based on data from RTB valid as of 17 June 2024. The reported cases of disease are assessed from many points of view, such as laboratory verification of the disease, age groups and sex, previous treatment, disease location, sensitivity to antitubercular agents, patient's death, or country of birth. Information on the evaluation of antituberculosis therapy at 12 months after its start is linked to cases reported into RTB in 2022. The last two tables, unlike all the preceding ones, provide information on reported cases of mycobacterial infections other than TB.

Data are available both as absolute numbers and as standardized indicators.

## 3. Summary of results

In 2023, a total of 459 TB cases (i.e. 4.22 cases per 100,000 population), involving all forms and locations, were reported into RTB (Table 1). Compared with the previous year, the number of reported cases has increased (in 2023, there are 76 more than in 2022). Among the reported patients, there were 20 persons who had been previously treated with antituberculoics (Table 3). Out of the total number of reported TB cases in 2023, definitive diagnosis of TB was confirmed in 377 cases (82.1%), of which 300 cases were verified from sputum or from the laryngeal swab (LS). Sputum smear microscopy was positive in 199 patients (43.4%) (Table 1).

According to RTB data, pulmonary TB was reported in 405 cases (88.2%); these cases also involved patients who had both pulmonary and extrapulmonary TB. By contrast, extrapulmonary TB only was reported in 54 cases (Table 4).

The occurrence of TB was much more common in men than in women: men accounted for more than 71% of cases. TB most frequently recorded patients were individuals aged 35-39 years. Relative to the population (based on 5-year age categories up to the 75+ category), the highest number of cases in men was observed in the 50-54 age group, and in women in the 35-39 age group. The number of patients under 20 years old in 2023 was 36 (almost double compared to 2022), and the number of patients aged 20-29 increased to 49 (comparing to 19 in 2022). (Table 2).

Just like in previous years, the Capital of Prague was the residence of the most TB patients (117; 7.49 per 100,000 population) reported in 2023. Higher numbers of TB cases than the national mean of 4.22 per 100,000 population were also reported in the Plzeň (6.06 per 100,000), Hradec Králové Region (4.41 per 100,000), Ústí nad Labem (4.55 per 100,000), Liberec (4.66/100,000) and Pardubice (4.90 per 100,000 population). By contrast, the lowest absolute and relative numbers of TB cases were reported in the Moravian-Silesian (1.85 per 100,000) (Table 1).

TB cases of 227 persons born outside the Czech Republic were reported into RTB in 2023, accounting for 49.5% of the total number of reported TB cases. Most of these people originated from Ukraine (144 persons), Slovakia (19 persons), Vietnam (12 persons), Romania (11 persons), India (8 persons), Mongolia (7 persons) and Bulgaria (5 persons) (Table 6).

In 2023, sensitivity to antituberculoics was tested in 368 patients. Resistance to isoniazid was found in 55 cases (14.7%), to streptomycin in 45 cases (12.2%), to rifampicin in 30 cases (8.2%), to pyrazinamide in 20 cases (5.4%), and to ethambutol in 12 cases (3.3%). Multidrug resistance was identified in 29 cases (7.9%). Further data on resistance to antituberculoic drugs are provided in Table 5.

Out of the total number of not yet treated TB cases in 2022 that were verified from sputum or from the laryngeal swab (240 cases), evaluation of antituberculosis therapy at 12 months after its start (Treatment outcome monitoring) has shown that 146 persons (60.8%) were successfully treated and 18 persons died, out of which 10 died from TB (4.2%). After one year, treatment continued in 12 persons (5.0%). 2 persons (0.8%) moved elsewhere; treatment was interrupted or data on treatment were missing in 60 persons (25.0%) and 2 of the treatments failed (0.8%) (Table 7).

In 2023, a total of 24 TB deaths were reported into RTB (this number may include additionally reported deaths from previous periods); the highest numbers of deaths were reported in the Capital of Prague (9 persons) (Table 8).

Apart from tuberculosis, cases of other mycobacterial infections are reported into RTB, too. In 2023, there were 117 reported cases of other mycobacterial infections (in 2022, there were 114 cases), i.e. 1.08 cases per 100,000 population. Within these cases, there were 93 cases with pulmonary location and 24 cases with extrapulmonary location. *M. avium* (43 cases), *M. xenopi* (16 cases), *M. intracellulare* (16 cases) a *M. kansasii* (14 cases) were the most frequently isolated strains (Table 9).

Mycobacterial infections are most frequently reported in Moravian-Silesian Region (25 cases), the South Moravian Region (15 cases) and Capital of Prague (9 cases). Relative to the population, the highest rates are observed in the Moravian-Silesian Region (2.1 cases per 100,000 inhabitants) and the Karlovy Vary Region (1.36 cases per 100,000 inhabitants) (Table 10).

Tab. 1. Reported numbers of TB cases in regions of the Czech Republic

Territory, region <sup>1)</sup>	Reported TB cases in total		Culture positive TB cases		Culture positive TB cases, verification from sputum or LS		Sputum smear microscopy positive TB cases	
	absolute numbers	per 100,000 popul.	absolute numbers	per 100,000 popul.	absolute numbers	per 100,000 popul.	absolute numbers	per 100,000 popul.
<b>Czech Republic</b>	459	4.22	377	3.47	300	2.76	199	1.83
<b>Capital of Prague</b>								
<b>Central</b>	117	8.51	103	7.49	88	6.40	62	4.51
<b>Bohemian</b>	59	4.07	47	3.24	36	2.48	30	2.07
<b>South Bohemian</b>	20	3.06	18	2.75	14	2.14	11	1.68
<b>Plzeň</b>	37	6.06	36	5.90	27	4.43	14	2.29
<b>Karlovy Vary</b>	13	4.41	9	3.05	5	1.70	4	1.36
<b>Ústí nad Labem</b>	37	4.55	25	3.08	17	2.09	7	0.86
<b>Liberec</b>	21	4.66	17	3.77	17	3.77	11	2.44
<b>Hradec Králové</b>	13	2.34	10	1.80	7	1.26	3	0.54
<b>Pardubice</b>	26	4.90	20	3.77	16	3.02	9	1.70
<b>Vysočina</b>	13	2.51	11	2.13	10	1.93	5	0.97
<b>South Moravian</b>	46	3.76	38	3.11	29	2.37	18	1.47
<b>Olomouc</b>	21	3.32	13	2.05	11	1.74	7	1.11
<b>Zlín</b>	14	2.41	11	1.89	8	1.38	6	1.03
<b>Moravian-Silesian</b>	22	1.85	19	1.60	15	1.26	12	1.01

<sup>1)</sup> Regions of patients' residence are reported

Tab. 2. Reported numbers of TB cases by age groups and gender

Age group (years)	Reported Tb cases					
	absolute numbers			per 100,000 population		
	total	men	women	total	men	women
<b>0–4 years</b>	17	8	9	3.08	2.83	3.34
<b>5–9 years</b>	9	6	3	1.53	1.99	1.04
<b>10–14 years</b>	3	2	1	0.50	0.65	0.34
<b>15–19 years</b>	7	2	5	1.22	0.67	1.79
<b>20–24 years</b>	19	14	5	3.72	5.43	1.97
<b>25–29 years</b>	30	22	8	5.36	7.71	2.92
<b>30–34 years</b>	44	35	9	6.21	9.65	2.60
<b>35–39 years</b>	58	39	19	7.81	10.29	5.22
<b>40–44 years</b>	43	33	10	5.29	7.96	2.51
<b>45–49 years</b>	25	19	6	2.65	3.96	1.29
<b>50–54 years</b>	53	42	11	6.92	10.84	2.90
<b>55–59 years</b>	34	28	6	4.95	8.15	1.75
<b>60–64 years</b>	28	20	8	4.64	6.74	2.60
<b>65–69 years</b>	30	19	11	4.64	6.28	3.20
<b>70–74 years</b>	32	20	12	5.22	7.38	3.51
<b>75–79 years</b>	15	12	3	3.09	6.02	1.05
<b>80–84 years</b>	5	-	5	1.80	-	2.87
<b>85–89 years</b>	5	3	2	3.69	6.92	2.17
<b>90–94 years</b>	2	2	-	3.63	13.31	-
<b>95+ years</b>	-	-	-	-	-	-
<b>Total</b>	459	326	133	4.22	6.12	2.40

Tab. 3. Reported numbers of TB cases by previous treatment in regions of the Czech Republic

Territory, region <sup>1)</sup>	Reported Tb cases			
	absolute numbers		per 100,000 population	
	previously treated		previously treated	
	yes	no	yes	no
<b>Czech Republic</b>	20	439	0.18	4.04
<b>Capital of Prague</b>	5	112	0.36	8.15
<b>Central Bohemian</b>	3	56	0.21	3.86
<b>South Bohemian</b>	-	20	-	3.06
<b>Plzeň</b>	2	35	0.33	5.74
<b>Karlovy Vary</b>	1	12	0.34	4.07
<b>Ústí nad Labem</b>	-	37	-	4.55
<b>Liberec</b>	2	19	0.44	4.22
<b>Hradec Králové</b>	2	11	0.36	1.98
<b>Pardubice</b>	2	24	0.38	4.53
<b>Vysočina</b>	1	12	0.19	2.32
<b>South Moravian</b>	-	46	-	3.76
<b>Olomouc</b>	1	20	0.16	3.16
<b>Zlín</b>	-	14	-	2.41
<b>Moravian-Silesian</b>	1	21	0.08	1.76

<sup>1)</sup> Regions of patients' residence are reported

Tab. 4. Reported numbers of TB cases by disease location in regions of the Czech Republic

Territory, region <sup>1)</sup>	Pulmonary TB (pulmonary TB only and both pulmonary and extrapulmonary TB)		Extrapulmonary TB (only)	
	absolute numbers	per 100,000 population	absolute numbers	per 100,000 population
<b>Czech Republic</b>	405	3.72	54	0.50
<b>Capital of Prague</b>	107	7.79	10	0.73
<b>Central Bohemian</b>	48	3.31	11	0.76
<b>South Bohemian</b>	18	2.75	2	0.31
<b>Plzeň</b>	30	4.92	7	1.15
<b>Karlovy Vary</b>	11	3.73	2	0.68
<b>Ústí nad Labem</b>	31	3.81	6	0.74
<b>Liberec</b>	21	4.66	-	-
<b>Hradec Králové</b>	12	2.16	1	0.18
<b>Pardubice</b>	23	4.34	3	0.57
<b>Vysočina</b>	13	2.51	-	-
<b>South Moravian</b>	40	3.27	6	0.49
<b>Olomouc</b>	19	3.00	2	0.32
<b>Zlín</b>	11	1.89	3	0.52
<b>Moravian-Silesian</b>	21	1.76	1	0.08

<sup>1)</sup> Regions of patients' residence are reported

Tab. 5. Resistance to antitubercular drugs

Resistance	Reported TB cases					
	previously treated yes		previously treated no			total
	abs. numbers	%	abs. numbers	%	abs. numbers	%
<b>Patients with TB resistant to certain drugs:</b>	16	100.0	352	100.0	368	100.0
<b>Any resistance to:</b>						
isoniazid (H)	3	18.8	51	14.5	54	14.7
rifampicin (R)	1	6.3	29	8.2	30	8.2
etambutol (E)	-	-	12	3.4	12	3.3
streptomycin (S)	2	12.5	43	12.2	45	12.2
pyrazinamid (Z)	-	-	20	5.7	20	5.4
<b>Resistance only to:</b>						
isoniazid (H)	1	-	11	3.1	12	3.3
rifampicin (R)	-	-	-	-	-	-
etambutol (E)	-	-	-	-	-	-
streptomycin (S)	-	-	6	1.7	6	1.6
pyrazinamid (Z)	-	-	2	0.6	2	0.5
<b>Mono-resistance in total</b>	1	6.3	19	5.4	20	5.4
H + R	-	-	2	0.6	2	0.5
H + R + E	-	-	-	-	-	-
H + R + S	1	-	8	2.3	9	2.4
H + R + Z	-	-	1	-	1	0.3
H + R + E + S	-	-	3	0.9	3	0.8
H + R + E + Z	-	-	-	-	-	-
H + R + S + Z	-	-	7	2.0	7	1.9
H + R + E + S + Z	-	-	7	2.0	7	1.9
<b>Multidrug resistance (MDR) in total</b>	1	6.3	28	8.0	29	7.9
H + E	-	-	-	-	0	-
H + S	1	6.3	8	2.3	9	2.4
H + Z	-	-	-	-	-	-
H + E + S	-	-	2	0.6	2	0.5
H + E + Z	-	-	-	-	-	-
H + S + Z	-	-	2	0.6	2	0.5
H + E + S + Z	-	-	-	-	-	-
R + E	-	-	-	-	-	-
R + S	-	-	-	-	-	-
R + Z	-	-	1	0.3	1	0.3
R + E + S	-	-	-	-	-	-
R + E + Z	-	-	-	-	-	-
R + S + Z	-	-	-	-	-	-
R + E + S + Z	-	-	-	-	-	-
E + S	-	-	-	-	-	-
E + Z	-	-	-	-	-	-
E + S + Z	-	-	-	-	-	-
S + Z	-	-	-	-	-	-
<b>Poly-resistance in total (other than MDR)</b>	1	6.3	13	3.7	14	3.8

Tab. 6. Reported numbers of TB cases in foreign nationals by country of birth

Year	Reported TB cases									% of the total number of reported TB cases
	Total	Ukraine	Slovakia	Vietnam	Romania	India	Mongolia	Bulgaria	Others	
2023	227	144	19	12	11	8	7	5	21	49.5

Tab. 7. Evaluation of antituberculosis therapy at 12 months after its start in TB cases reported into RTB in 2023

Treatment outcome	Reported TB cases in total		Previously untreated TB cases, verification from sputum or LS	
	abs. numbers	%	abs. numbers	%
<b>Total numbers of reported TB cases in 2023</b>	383	x	240	x
<b>TB was excluded</b>	2	x	-	x
<b>Verified TB cases reported in 2023</b>	381	100.0	240	100.0
<b>Cured / treatment completed</b>	232	60.9	146	60.8
<b>Death</b> <b>from TB</b>	22	5.8	10	4.2
<b>from another cause</b>	22	5.8	8	3.3
<b>Treatment interrupted / missing data / missing follow-up report</b>	85	22.3	60	25.0
<b>Still on treatment</b>	14	3.7	12	5.0
<b>Patient transferred</b>	3	0.8	2	0.8
<b>Treatment failed</b>	3	0.8	2	0.8

Tab. 8. Reported numbers of TB deaths in regions of the Czech Republic <sup>2)</sup>

Territory, region <sup>1)</sup>	Number of deaths	
	absolute numbers	per 100,000 population
<b>Czech Republic</b>	24	0.22
<b>Capital of Prague</b>	9	0.65
<b>Central Bohemian</b>	1	0.07
<b>South Bohemian</b>	-	-
<b>Plzeň</b>	-	-
<b>Karlovy Vary</b>	1	0.34
<b>Ústí nad Labem</b>	2	0.25
<b>Liberec</b>	1	0.22
<b>Hradec Králové</b>	2	0.36
<b>Pardubice</b>	1	0.19
<b>Vysočina</b>	1	0.19
<b>South Moravian</b>	3	0.25
<b>Olomouc</b>	-	-
<b>Zlín</b>	1	0.17
<b>Moravian-Silesian</b>	2	0.17

<sup>1)</sup> Regions of patients' residence are reported

<sup>2)</sup> Including additionally reported deaths from previous periods

Tab. 9. Reported numbers of cases of mycobacterial infections other than TB

Disease group	Patients with mycobacterial infections Diagnosis A31	
	absolute numbers	per 100,000 population
Pulmonary mycobacterial infection	93	0.85
Extrapulmonary mycobacterial infection	24	0.22
Reported infections in total	117	1.08
out of which, the following strains were isolated:		
<b>M.AVIUM</b>	43	0.40
<b>M.KANSASII</b>	16	0.15
<b>M.XENOPI</b>	16	0.15
<b>M.INTRACELLULARE</b>	14	0.13
<b>M.FORTUITUM</b>	4	0.04
<b>M.GORDONAE</b>	2	0.02
<b>M.MARINUM</b>	2	0.02
<b>M. others/undetermined</b>	20	0.18
<b>M.AVIUM</b>	43	0.40

Tab. 10. Reported numbers of cases of mycobacterial infections other than TB in regions of the Czech Republic

Territory, region <sup>1)</sup>	Reported cases of pulmonary mycobacterial infections		Reported cases of extrapulmonary mycobacterial infections	
	absolute numbers	per 100,000 population	absolute numbers	per 100,000 population
<b>Czech Republic</b>	93	0.85	24	0.22
<b>Capital of Prague</b>	9	0.65	3	0.22
<b>Central Bohemian</b>	6	0.41	4	0.28
<b>South Bohemian</b>	1	0.15	1	0.15
<b>Plzeň</b>	2	0.33	3	0.49
<b>Karlovy Vary</b>	4	1.36	-	-
<b>Ústí nad Labem</b>	4	0.49	1	0.12
<b>Liberec</b>	4	0.89	1	0.22
<b>Hradec Králové</b>	7	1.26	1	0.18
<b>Pardubice</b>	6	1.13	1	0.19
<b>Vysočina</b>	-	-	-	-
<b>South Moravian</b>	15	1.23	4	0.33
<b>Olomouc</b>	7	1.11	-	-
<b>Zlín</b>	3	0.52	-	-
<b>Moravian-Silesian</b>	25	2.10	5	0.42

<sup>1)</sup> Regions of patients' residence are reported