

## Development of the NHIS Technology Platform

# Basic Overview of Tuberculosis Epidemiology in the Czech Republic in 2021

Czech Health Statistics

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# Basic Overview of Tuberculosis Epidemiology in the Czech Republic in 2021

## 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 organisations.

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/>).

## Methodology

The tabular outputs summarise TB epidemiology in the Czech Republic in 2021, based on data from RTB valid as of 1 June 2022. 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 2020. 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 standardised indicators.

## Summary of Results

In 2021, a total of 357 TB cases (i.e. 3.4 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 decreased (in 2020, there were 11 more than in 2021). There has been a continuous downward trend in TB incidence in the Czech Republic in the long term, and the burden has been low when compared to other countries. Among the reported patients, there were 25 persons who had been previously treated with antituberculous (Table 3).

From the total number of reported TB cases in 2021, definitive diagnosis of TB was confirmed in 288 cases – 80.7% were culture positive, of which 230 cases were verified from sputum or from the laryngeal swab (LS). Sputum smear microscopy was positive in 151 patients (42.3%) (Table 1).

According to RTB data, pulmonary TB was reported in 322 cases (90.2%); these cases also involved patients who had both pulmonary and extrapulmonary TB. By contrast, extrapulmonary TB only was reported in 35 cases (Table 4).

TB occurred much more frequently in men than in women: men accounted for 70% of cases. TB was most frequently reported in people aged 55–59 years; when recalculated per 100,000 population, men between 55-59 years and women between 25-29 years and over 90 years were most frequently affected. When compared to 2020, there was significant increase in TB cases reported among patients 0-14 years old; there were 19 cases of TB reported among patients younger than 20 years (in 2020 there were 5 cases) and the number of patients in the age group of 20–29 years increased to 42 (9 cases more) (Tab. 2).

Just as in previous years, the Capital of Prague was the residence of most TB patients (85; 6.7 per 100,000 population) reported in 2021. Higher numbers of TB cases than the national mean of 3.4 per 100,000 population were also reported in the Hradec Kralove Region (4.1 per 100,000), Plzeň Region (4.0 per 100,000), Ústí nad Labem Region (3.9 per 100,000) and South Moravian Region (3.8/100,000). By contrast, the lowest absolute and relative number of TB cases were reported in the Zlín Region (7; 1.2 per 100,000) (Table 1).

TB cases of 132 persons born outside the Czech Republic were reported into RTB in 2021, accounting for 37% of the total number of reported TB cases. Most of these people originated from Ukraine (35 persons), Romania (17 persons), Slovakia (15 persons), Vietnam (15 persons), Mongolia (12 persons) and India (10 persons) (Table 6).

In 2021, sensitivity to antituberculous was tested in 274 patients. Isoniazid, streptomycin, pyrazinamide, rifampicin and ethambutol resistance were detected in 26 (9.5%), 24 (8.8%), 8 (2.9%), 11 (4.0%) and 7 (2.6%) cases, respectively. Multidrug-resistant TB was detected in 10 cases (3.6%). More information on resistance to antitubercular drugs is available in Table 5.

From the total number of newly detected TB cases in 2020 that were verified from sputum or from the laryngeal swab (201 cases), evaluation of antituberculosis therapy at 12 months after its start (Treatment outcome monitoring) has shown that 131 persons (65.2%) were successfully treated and 26 persons (13%) died, out of which 13 died from TB (6,5%). After one year, treatment continued in 8 persons (4.0%). Five persons (2.5%) moved elsewhere; treatment was interrupted or data on treatment were missing in 30 persons (14.9%) and the treatment failed in 1 case (Table 7).

In 2021, a total of 37 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 (13 persons) (Table 8).

Apart from tuberculosis, cases of other mycobacterial infections are reported into RTB, too. In 2021, there were 77 reported cases of other mycobacterial infections (in 2020, there were 87 cases), i.e. 0.81 cases per 100,000 population. Within these cases, there were 60 cases with pulmonary location and 17 cases with extrapulmonary location. *M. avium* (32 cases), *M. xenopi* (10 cases), *M. intracellulare* (8 cases) a *M. kansasii* (8 cases) were the most frequently isolated strains (Table 9). Mycobacterial infections are most frequently reported in the Moravian-Silesian Region (15 cases), Central Bohemian Region (13 cases), South Moravian Region (12 cases) and Capital of Prague (9 cases), when recalculated per 100,000 population, there were most cases in the Moravian-Silesian Region (1.27 per 100,000 population) or in the Pardubice Region (1.16 per 100,000 population) (Table 10).

Table 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 population	absolute numbers	per 100,000 population	absolute numbers	per 100,000 population	absolute numbers	per 100,000 population
<b>Czech Republic</b>	357	3.40	288	2.74	230	2.19	151	1.44
<b>Capital of Prague</b>	85	6.71	78	6.16	59	4.66	38	3.00
<b>Central Bohemian</b>	42	3.04	34	2.46	33	2.39	24	1.74
<b>South Bohemian</b>	15	2.36	14	2.20	12	1.89	8	1.26
<b>Plzeň</b>	23	3.98	14	2.43	13	2.25	10	1.73
<b>Karlovy Vary</b>	9	3.17	7	2.47	6	2.12	4	1.41
<b>Ústí nad Labem</b>	31	3.88	24	3.00	17	2.13	15	1.88
<b>Liberec</b>	11	2.52	8	1.83	6	1.37	3	0.69
<b>Hradec Králové</b>	22	4.05	17	3.13	15	2.76	6	1.11
<b>Pardubice</b>	17	3.31	12	2.34	10	1.95	6	1.17
<b>Vysočina</b>	13	2.58	12	2.38	10	1.99	2	0.40
<b>South Moravian</b>	45	3.81	36	3.04	23	1.95	15	1.27
<b>Olomouc</b>	9	1.44	6	0.96	4	0.64	4	0.64
<b>Zlín</b>	7	1.22	6	1.05	5	0.87	4	0.70
<b>Moravian-Silesian</b>	28	2.37	20	1.69	17	1.44	12	1.02

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

Table 2. Reported numbers of TB cases by age groups and sex

Age group (years)	Reported TB cases					
	absolute numbers			per 100,000 population		
	total	men	women	total	men	women
0–4	7	3	4	1.25	1.05	1.47
5–9	2	-	2	0.36	-	0.75
10–14	3	2	1	0.52	0.67	0.35
15–19	7	4	3	1.42	1.57	1.25
20–24	16	7	9	3.37	2.87	3.91
25–29	26	13	13	4.43	4.28	4.59
30–34	25	17	8	3.66	4.81	2.42
35–39	28	20	8	3.92	5.41	2.32
40–44	30	22	8	3.54	5.03	1.95
45–49	35	30	5	3.97	6.62	1.16
50–54	37	30	7	5.36	8.54	2.07
55–59	40	32	8	5.99	9.53	2.41
60–64	23	20	3	3.77	6.71	0.96
65–69	31	26	5	4.66	8.38	1.41
70–74	16	9	7	2.59	3.30	2.03
75–79	15	8	7	3.49	4.58	2.75
80–84	9	5	4	3.63	5.47	2.56
85–89	4	3	1	2.94	6.88	1.08
90–94	2	-	2	3.74	-	5.13
95+	1	-	1	9.41	-	11.67
<b>Total</b>	<b>357</b>	<b>251</b>	<b>106</b>	<b>3.40</b>	<b>4.85</b>	<b>1.99</b>

**Table 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>	25	332	0.24	3.16
<b>Capital of Prague</b>	5	80	0.47	6.31
<b>Central Bohemian</b>	6	36	0.43	2.61
<b>South Bohemian</b>	1	14	0.16	2.20
<b>Pízeň</b>	-	23	-	3.98
<b>Karlovy Vary</b>	-	9	-	3.17
<b>Ústí nad Labem</b>	-	31	-	3.88
<b>Liberec</b>	4	7	0.69	1.60
<b>Hradec Králové</b>	-	22	-	4.05
<b>Pardubice</b>	-	17	-	3.31
<b>Vysočina</b>	1	12	0.20	2.38
<b>South Moravian</b>	4	41	0.34	3.47
<b>Olomouc</b>	2	7	0.32	1.12
<b>Zlín</b>	1	6	0.17	1.05
<b>Moravian-Silesian</b>	1	27	0.08	2.29

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



**Table 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>	322	3.07	35	0.33
<b>Capital of Prague</b>	74	5.84	11	0.87
<b>Central Bohemian</b>	39	2.83	3	0.22
<b>South Bohemian</b>	14	2.20	1	0.16
<b>Plzeň</b>	23	3.98	-	-
<b>Karlovy Vary</b>	7	2.47	2	0.71
<b>Ústí nad Labem</b>	28	3.50	3	0.38
<b>Liberec</b>	10	2.29	1	0.23
<b>Hradec Králové</b>	20	3.68	2	0.37
<b>Pardubice</b>	15	2.92	2	0.39
<b>Vysočina</b>	11	2.18	2	0.40
<b>South Moravian</b>	41	3.47	4	0.34
<b>Olomouc</b>	8	1.28	1	0.16
<b>Zlín</b>	7	1.22	-	-
<b>Moravian-Silesian</b>	25	2.12	3	0.25

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

Table 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>	15	100.0	259	100.0	274	100.0
<b>Any resistance to:</b>						
isoniazid (H)	1	6.7	25	9.7	26	9.5
rifampicin (R)	1	6.7	10	3.9	11	4.0
ethambutol (E)	-	-	7	2.7	7	2.6
streptomycin (S)	1	6.7	23	8.9	24	8.8
pyrazinamid (Z)	-	-	8	3.1	8	2.9
<b>Resistance only to:</b>						
isoniazid (H)	-	-	4	1.5	4	1.5
rifampicin (R)	-	-	-	-	-	-
ethambutol (E)	-	-	-	-	-	-
streptomycin (S)	-	-	4	1.5	4	1.5
pyrazinamid (Z)	-	-	2	0.8	2	0.7
<b>Mono-resistance in total</b>	-	-	10	3.9	10	3.6
H + R	-	-	-	-	-	-
H + R + E	-	-	-	-	-	-
H + R + S	1	6.7	3	1.2	4	1.5
H + R + Z	-	-	-	-	-	-
H + R + E + S	-	-	3	1.2	3	1.1
H + R + E + Z	-	-	1	0.4	1	0.4
H + R + S + Z	-	-	1	0.4	1	0.4
H + R + E + S + Z	-	-	1	0.4	1	0.4
<b>Multidrug resistance (MDR) in total</b>	1	6.7	9	3.5	10	3.6
H + E	-	-	-	-	-	-
H + S	-	-	10	3.9	10	3.6
H + Z	-	-	2	0.8	2	0.7
H + E + S	-	-	-	-	-	-
H + E + Z	-	-	-	-	-	-
H + S + Z	-	-	-	-	-	-
H + E + S + Z	-	-	-	-	-	-
R + E	-	-	-	-	-	-
R + S	-	-	-	-	-	-
R + Z	-	-	-	-	-	-
R + E + S	-	-	1	0.4	1	0.4
R + E + Z	-	-	-	-	-	-
R + S + Z	-	-	-	-	-	-
R + E + S + Z	-	-	-	-	-	-
E + S	-	-	-	-	-	-
E + Z	-	-	1	0.4	1	0.4
E + S + Z	-	-	-	-	-	-
S + Z	-	-	-	-	-	-
<b>Poly-resistance in total (other than MDR)</b>	-	-	14	5.4	14	5.1

**Table 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	out of which							
		Ukraine	Romania	Slovakia	Vietnam	Mongolia	India	Others	
<b>2021</b>	132	35	17	15	15	12	10	28	37.0

**Table 7. Evaluation of antituberculosis therapy at 12 months after its start in TB cases reported into RTB in 2020 (Treatment outcome monitoring)**

Treatment outcome	Reported TB cases in total		Newly diagnosed TB cases. verification from sputum or LS	
	abs. numbers	%	abs. numbers	%
<b>Total number of reported TB cases in 2020</b>	368	x	201	x
<b>TB was excluded</b>	5	x	-	x
<b>Verified TB cases reported in 2020</b>	363	100.0	201	100.0
<b>Cured / treatment completed</b>	245	67.5	131	65.2
<b>Death</b> from TB	21	5.8	13	6.5
from another cause	37	10.2	13	6.5
<b>Treatment interrupted / missing data / missing follow-up report</b>	39	10.7	30	14.9
<b>Still on treatment</b>	11	3.0	8	4.0
<b>Patient transferred</b>	8	2.2	5	2.5
<b>Treatment failed</b>	2	0.6	1	0.5

**Table 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>	37	0.35
<b>Capital of Prague</b>	13	1.03
<b>Central Bohemian</b>	-	-
<b>South Bohemian</b>	4	0.63
<b>Plzeň</b>	2	0.35
<b>Karlovy Vary</b>	2	0.71
<b>Ústí nad Labem</b>	1	0.13
<b>Liberec</b>	1	0.23
<b>Hradec Králové</b>	3	0.55
<b>Pardubice</b>	3	0.58
<b>Vysočina</b>	-	-
<b>South Moravian</b>	5	0.42
<b>Olomouc</b>	1	0.16
<b>Zlín</b>	2	0.35
<b>Moravian-Silesian</b>	-	-

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

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

Table 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	60	0.57
Extrapulmonary mycobacterial infection	17	0.16
Reported infections in total	77	0.73
out of which. the following strains were isolated:		
M. avium	32	0.30
M. xenopi	10	0.10
M. intracellulare	8	0.08
M. kansasii	8	0.08
M. gordonae	2	0.02
MAI	1	0.01
M. marinum	1	0.01
M. others/undetermined	15	0.14

**Table 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>	60	0.57	17	0.16
<b>Capital of Prague</b>	7	0.55	2	0.16
<b>Central Bohemian</b>	9	0.65	4	0.29
<b>South Bohemian</b>	1	0.16	1	0.16
<b>Plzeň</b>	1	0.17	1	0.17
<b>Karlovy Vary</b>	1	0.35	-	-
<b>Ústí nad Labem</b>	7	0.88	1	0.13
<b>Liberec</b>	1	0.23	-	-
<b>Hradec Králové</b>	3	0.55	-	-
<b>Pardubice</b>	6	1.17	-	-
<b>Vysočina</b>	-	-	-	-
<b>South Moravian</b>	7	0.59	5	0.42
<b>Olomouc</b>	2	0.32	1	0.16
<b>Zlín</b>	1	0.17	1	0.17
<b>Moravian-Silesian</b>	14	1.19	1	0.08

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