

Development of the NHIS Technology Platform

Basic Overview of Tuberculosis Epidemiology in the Czech Republic in 2017

Czech Health Statistics

Published by the Institute of Health Information and Statistics of the Czech Republic

Palackého nám. 4, Prague, Czech Republic

www.uzis.cz



European Union
European Social Fund
Operational Programme Employment



Institute of Health Information and Statistics of the Czech Republic
Institute of Biostatistics and Analyses of the Masaryk University
Joint workplace

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Basic Overview of Tuberculosis Epidemiology in the Czech Republic in 2017

Introduction

The publication “Basic Overview of Tuberculosis Epidemiology in the Czech Republic in 2017” picks up the threads of the publication “Tuberculosis and Respiratory Diseases”, which was regularly published by the Institute of Health Information and Statistics of the Czech Republic (IHIS) 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), namely by its Department of Strategy and Management of Public Health Protection and Promotion. 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 will be developed during the year 2018, providing a better insight into this issue; the tool will be designed in an interactive way, offering many different (and adjustable) points of view.

Methodology

The tabular outputs summarise TB epidemiology in the Czech Republic in 2017, based on data from RTB valid as of 20 June 2018. 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 2016. 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 2017, a total of 505 TB cases (i.e. 4,8 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 slightly (in 2017, there were 12 less than in 2016). 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 33 persons who had been previously treated with antitubercular agents (Table 3).

From the total number of reported TB cases in 2017, definitive diagnosis of TB was confirmed in 372 cases – 73,7% (in the Hradec Králové Region, only 12 out of 27 reported TB cases (44,4%) were positive culturally), of which 307 cases were verified from sputum or from the laryngeal swab (LS). Sputum smear microscopy was positive in 184 patients (36,4%) (Table 1).

According to RTB data, pulmonary TB was reported in 439 cases (86,9%); these cases also involved patients who had both pulmonary and extrapulmonary TB. By contrast, extrapulmonary TB only was reported in 66 cases (Table 4).

TB occurred much more frequently in men than in women: men accounted for over than 70% of cases. The highest numbers of patients were in older age categories. TB was most frequently reported in people aged 40–59 years; when recalculated per 100 000 population, people aged over 80 years were most frequently affected. When compared to 2016, the number of patients in younger age groups was lower; there was a year-on-year decrease in TB cases reported among patients younger than 20 years: 13 (in 2017, there were 5 less cases than in 2016) and in the age group of 25–29 years: 34 (6 less cases). Among patients there were 6 in the age group of 0–14 years (in 2017, there were 4 less cases than in 2016), of which 5 were under 5 years of age and 1 aged 10–14 years (Tab. 2).

Just as in previous years, the Capital of Prague was the residence of most TB patients (95; 7,4 per 100 000 population) reported in 2017. Higher numbers of TB cases than the national mean of 4,8 per 100 000 population were also reported in the Plzeň Region (7,6 per 100 000), the Ústí nad Labem Region (6,7 per 100 000), the Pardubice region (5,6 per 100 000), the South Moravian Region (5,6 per 100 000), the Liberec Region (5,0 per 100 000) and the Hradec Králové region (4,9 per 100 000). By contrast, the lowest absolute numbers of TB cases were reported in the Karlovy Vary Region (8; 2,7 per 100 000) and the lowest relative numbers in South Bohemian Region (16; 2,5 per 100 000) (Table 1).

TB cases in 159 foreign nationals (i.e. persons born outside the Czech Republic) were reported into RTB in 2017, accounting more than 31,5% of the total number of reported TB cases. Most of these people were citizens of Ukraine (30 persons), Slovakia (25), Vietnam (23), Mongolia (16) and Romania (16) (Table 6).

In 2017, sensitivity to antitubercular agents was tested in 350 patients. Isoniazid, streptomycin, pyrazinamid, rifampicin and ethambutol resistance were detected in 16 (4,6%), 15 (4,3%), 14 (4,0%), 8 (2,3%) and 7 (2,0%) cases, respectively. Multidrug-resistant TB was detected in 8 cases (2,3%). More information on resistance to antitubercular drugs is available in Table 5.

From the total number of newly detected TB cases in 2016 that were verified from sputum or from the laryngeal swab (299 cases), evaluation of antituberculosis therapy at 12 months after its start (Treatment outcome monitoring) has shown that 206 persons (68,9%) were successfully treated and 39 persons (13,0%) died, out of which 12 died from TB. After one year, treatment continued

in 8 persons (2,7%). Nine persons (3,0%) moved elsewhere; treatment was interrupted or data on treatment were missing in 37 persons (12,4%) (Table 7).

In 2017, a total of 36 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 (8 persons) (Table 8).

Apart from tuberculosis, cases of other mycobacterial infections are reported into RTB, too. In 2016, there were 89 reported cases of other mycobacterial infections (in 2016, there were 106 cases), i.e. 0,84 cases per 100 000 population. Within these cases, there were 71 cases with pulmonary location and 18 cases with extrapulmonary location. *M. avium* (47 cases) and *M. kansasii* (12 cases) were the most frequently isolated strains (Table 9). Mycobacterial infections are most frequently reported in the Moravian-Silesian Region (17 cases) and the Olomouc Region (11 cases) (Table 10).

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

Territory, region ¹⁾	Reported TB cases in total		Culturally positive TB cases		Culturally 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
Czech Republic	505	4.77	372	3.51	307	2.90	184	1.74
Capital of Prague	95	7.38	82	6.37	67	5.21	41	3.19
Central Bohemian	49	3.64	39	2.90	33	2.45	17	1.26
South Bohemian	16	2.50	14	2.19	10	1.56	8	1.25
Plzeň	44	7.60	33	5.70	29	5.01	13	2.24
Karlovy Vary	8	2.70	7	2.36	6	2.03	5	1.69
Ústí nad Labem	55	6.70	40	4.87	35	4.26	20	2.44
Liberec	22	4.99	14	3.18	14	3.18	12	2.72
Hradec Králové	27	4.90	12	2.18	10	1.82	3	0.54
Pardubice	29	5.61	20	3.87	17	3.29	7	1.35
Vysočina	13	2.56	9	1.77	5	0.98	4	0.79
South Moravian	66	5.59	47	3.98	35	2.96	18	1.52
Olomouc	21	3.32	15	2.37	14	2.21	11	1.74
Zlín	15	2.57	12	2.06	9	1.54	3	0.51
Moravian-Silesian	45	3.73	28	2.32	23	1.90	22	1.82

¹⁾ 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	5	4	1	0.90	1.40	0.37
5-9	-	-	-	-	-	-
10-14	1	1	-	0.20	0.38	-
15-19	7	1	6	1.52	0.42	2.68
20-24	22	13	9	4.08	4.71	3.42
25-29	34	23	11	4.99	6.60	3.30
30-34	38	27	11	5.23	7.21	3.12
35-39	41	31	10	4.92	7.23	2.48
40-44	47	37	10	5.09	7.79	2.23
45-49	45	33	12	6.19	8.86	3.39
50-54	59	47	12	8.46	13.28	3.50
55-59	55	44	11	8.81	14.14	3.51
60-64	39	32	7	5.53	9.43	1.92
65-69	40	33	7	5.82	10.37	1.89
70-74	20	12	8	3.63	4.99	2.58
75-79	21	13	8	6.01	9.18	3.86
80-84	21	11	10	9.21	13.28	6.89
85-89	6	1	5	4.28	2.25	5.22
90-94	4	2	2	8.09	15.81	5.44
Total	505	365	140	4.77	7.01	2.60

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

Territory, region ¹⁾	Reported TB cases			
	absolute numbers previously treated		per 100,000 population previously treated	
	yes	no	yes	no
Czech Republic	33	472	0.31	4.46
Capital of Prague	7	88	0.54	6.84
Central Bohemian	-	49	-	3.64
South Bohemian	2	14	0.31	2.19
Plzeň	4	40	0.69	6.91
Karlovy Vary	-	8	-	2.70
Ústí nad Labem	5	50	0.61	6.09
Liberec	2	20	0.45	4.53
Hradec Králové	4	23	0.73	4.18
Pardubice	3	26	0.58	5.03
Vysočina	-	13	-	2.56
South Moravian	4	62	0.34	5.25
Olomouc	-	21	-	3.32
Zlín	2	13	0.34	2.23
Moravian-Silesian	-	45	-	3.73

¹⁾ Regions of patients' residence are reported

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

Territory, region ¹⁾	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
Czech Republic	439	4.15	66	0.62
Capital of Prague	84	6.53	11	0.85
Central Bohemian	44	3.27	5	0.37
South Bohemian	13	2.03	3	0.47
Plzeň	42	7.25	2	0.35
Karlovy Vary	8	2.70	0	0.00
Ústí nad Labem	48	5.85	7	0.85
Liberec	19	4.31	3	0.68
Hradec Králové	20	3.63	7	1.27
Pardubice	26	5.03	3	0.58
Vysočina	10	1.97	3	0.59
South Moravian	55	4.66	11	0.93
Olomouc	17	2.69	4	0.63
Zlín	14	2.40	1	0.17
Moravian-Silesian	39	3.23	6	0.50

¹⁾ 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	%
Patients with TB resistant to certain drugs	18	100.0	332	100.0	350	100.0
Any resistance to:						
isoniazid (H)	4	22.2	12	3.6	16	4.6
rifampicin (R)	4	22.2	4	1.2	8	2.3
ethambutol (E)	2	11.1	5	1.5	7	2.0
streptomycin (S)	4	22.2	11	3.3	15	4.3
pyrazinamid (Z)	3	16.7	11	3.3	14	4.0
Resistance only to:						
isoniazid (H)	-	-	3	0.9	3	0.9
rifampicin (R)	-	-	-	-	-	-
ethambutol (E)	-	-	1	0.3	1	0.3
streptomycin (S)	-	-	3	0.9	3	0.9
pyrazinamid (Z)	1	5.6	9	2.7	10	2.9
Mono-resistance in total	1	5.6	16	4.8	17	4.9
H + R	-	-	-	-	-	-
H + R + E	-	-	-	-	-	-
H + R + S	1	5.6	-	-	1	0.3
H + R + Z	-	-	-	-	-	-
H + R + E + S	1	5.6	2	0.6	3	0.9
H + R + E + Z	-	-	1	0.3	1	0.3
H + R + S + Z	1	5.6	-	-	1	0.3
H + R + E + S + Z	1	5.6	1	0.3	2	0.6
Multidrug resistance (MDR) in total	4	22.2	4	1.2	8	2.3
H + E	-	-	-	-	-	-
H + S	-	-	5	1.5	5	1.4
H + Z	-	-	-	-	-	-
H + E + S	-	-	-	-	-	-
H + E + Z	-	-	-	-	-	-
H + S + Z	-	-	-	-	-	-
H + E + S + Z	-	-	-	-	-	-
R + E	-	-	-	-	-	-

Table 5. Resistance to antitubercular drugs

Resistance	Reported TB cases					
	previously treated yes		previously treated no		total	
	abs. numbers	%	abs. numbers	%	abs. numbers	%
R + S	-	-	-	-	-	-
R + Z	-	-	-	-	-	-
R + E + S	-	-	-	-	-	-
R + E + Z	-	-	-	-	-	-
R + S + Z	-	-	-	-	-	-
R + E + S + Z	-	-	-	-	-	-
E + S	-	-	-	-	-	-
E + Z	-	-	-	-	-	-
E + S + Z	-	-	-	-	-	-
S + Z	-	-	-	-	-	-
Poly-resistance in total (other than MDR)	-	-	5	1.5	5	1.4

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	Slovakia	Vietnam	Mongolia	Romania	other	
2017	159	30	25	23	16	16	49	31.5

Table 7. Evaluation of antituberculosis therapy at 12 months after its start in TB cases reported into RTB in 2016 (Treatment outcome monitoring)

Treatment outcome	Reported TB cases in total		Newly diagnosed TB cases, verification from sputum or LS	
	abs. numbers	%	abs. numbers	%
Total number of reported TB cases in 2016	517	x	299	x
TB was excluded	1.0	x	-	x
Verified TB cases reported in 2016	516	100.0	299	100.0
Cured / treatment completed	348	67.4	206	68.9
Death from TB	29	5.6	12	4.0
Death from another cause	57	11.0	27	9.0
Treatment interrupted / missing data / missing follow-up report	56	10.9	37	12.4
Still on treatment	10	1.9	8	2.7
Patient transferred	15	2.9	9	3.0
Treatment failed	1	0.2	-	-

Table 8. Reported numbers of TB deaths in regions of the Czech Republic ²⁾

Territory, region ¹⁾	Number of deaths	
	absolute numbers	per 100,000 population
Czech Republic	25	0.24
Capital of Prague	6	0.47
Central Bohemian	2	0.15
South Bohemian	1	0.16
Plzeň	3	0.52
Karlovy Vary	2	0.68
Ústí nad Labem	3	0.37
Liberec	-	-
Hradec Králové	2	0.36
Pardubice	2	0.39
Vysočina	1	0.20
South Moravian	1	0.08
Olomouc	-	-
Zlín	1	0.17
Moravian-Silesian	1	0.08

¹⁾ Regions of patients' residence are reported

²⁾ 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	71	0.67
Extrapulmonary mycobacterial infection	18	0.17
Reported infections in total	86	0.81
out of which, the following strains were isolated:		
M. avium	47	0.44
M. intracellulare	9	0.08
M. kansasii	12	0.11
M. xenopi	8	0.08
other M.	10	0.09

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

Territory, region ¹⁾	Reported cases of pulmonary mycobacterial infections		Reported cases of extrapulmonary mycobacterial infections	
	absolute numbers	per 100,000 population	absolute numbers	per 100,000 population
Czech Republic	71	0.67	18	0.17
Capital of Prague	6	0.47	1	0.08
Central Bohemian	5	0.37	1	0.07
South Bohemian	5	0.78	1	0.16
Plzeň	7	1.21	1	0.17
Karlovy Vary	1	0.34	-	-
Ústí nad Labem	4	0.49	1	0.12
Liberec	2	0.45	-	-
Hradec Králové	4	0.73	2	0.36
Pardubice	2	0.39	-	-
Vysočina	3	0.59	1	0.20
South Moravian	2	0.17	6	0.51
Olomouc	11	1.74	2	0.32
Zlín	2	0.34	1	0.17
Moravian-Silesian	17	1.41	1	0.08

¹⁾ Regions of patients' residence are reported