Centre for the development of technology platform used in registries of the National Health Information System, modernisation of data mining within these registries and extending their information capacity.
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Basic Overview of Tuberculosis Epidemiology in the Czech Republic in 2016

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Introduction

The publication “Basic Overview of Tuberculosis Epidemiology in the Czech Republic in 2016” 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 established 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 2017, 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 2016, based on data from RTB valid as of 24 May 2017. 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 2015. 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 2016, a total of 517 TB cases (i.e. 4.9 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 remained almost unchanged (in 2016, there was one less than in 2015). 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 28 persons who had been previously treated with antitubercular agents (Table 3).

From the total number of reported TB cases in 2016, definitive diagnosis of TB was confirmed in 380 cases – 73.5% (in the Hradec Králové Region, only 9 out of 22 reported TB cases (40.9%) were positive culturally), of which 312 cases were verified from sputum or from the laryngeal swab (LS). Sputum smear microscopy was positive in 193 patients (37.3%) (Table 1).

According to RTB data, pulmonary TB was reported in 448 cases (86.7%); these cases also involved patients who had both pulmonary and extrapulmonary TB. By contrast, extrapulmonary TB only was reported in 69 cases (Table 4).

TB occurred much more frequently in men than in women: men accounted for almost 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 2015, the number of patients in younger age groups was higher; there was a two-fold year-on-year increase in TB cases reported among patients younger than 20 years: 18 (in 2016, there were 9 more cases than in 2015) and in the age group of 25–29 years: 40 (21 more cases). Among patients were 10 in the age group of 0–14 years (in 2016, there were 5 more cases than in 2015), all of them under 5 years of age (Tab. 2).

Just as in previous years, the Capital of Prague was the residence of most TB patients (105; 8.3 per 100,000 population) reported in 2016. Higher numbers of TB cases than the national mean of 4.9 per 100,000 population were also reported in the Plzeň Region (8.5 per 100,000), the Liberec Region (6.6 per 100,000), the Pardubice Region (6.0 per 100,000) and the Ústí nad Labem Region (5.6 per 100,000). By contrast, the lowest numbers of TB cases (both absolute and relative) were reported in the South Bohemian Region (11; 1.7 per 100,000) (Table 1).

TB cases in 151 foreign nationals (i.e. persons born outside the Czech Republic) were reported into RTB in 2016, accounting for almost 30% of the total number of reported TB cases. Most of these people were citizens of Ukraine (41 persons), Slovakia (21), Vietnam (21) and Romania (21) (Table 6).

In 2016, sensitivity to antitubercular agents was tested in 361 patients. Streptomycin, isoniazid, rifampicin and ethambutol resistance was detected in 22 (6.1%), 17 (4.7%), 7 (1.9%) and 5 (1.4%) cases, respectively. Multidrug-resistant TB was detected in 6 cases (1.7%). More information on resistance to antitubercular drugs is available in Table 5.

From the total number of newly detected TB cases in 2015 that were verified from sputum or from the laryngeal swab (302 cases), evaluation of antituberculosis therapy at 12 months after its start (Treatment outcome monitoring) has shown that 210 persons (69.5%) were successfully treated and 54 persons (17.9%) died, out of which 13 died from TB. After one year, treatment continued in 12 persons (4.0%). Seven persons (2.3%) moved elsewhere; treatment was interrupted or data on treatment were missing in 18 persons (6.0%) (Table 7).

In 2016, a total of 26 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 (5 persons) (Table 8).

Apart from tuberculosis, cases of other mycobacterial infections are reported into RTB, too. In 2016, there were 106 reported cases of other mycobacterial infections (in 2015, there were 116 cases), i.e. 1.0 cases per 100,000 population. Within these cases, there were 83 cases with pulmonary location and 23 cases with extrapulmonary location. M. avium (47 cases) and M. kansasii (18 cases) were the most frequently isolated strains (Table 9). Mycobacterial infections are notably most frequently reported in the Moravian-Silesian Region (24 cases) and the Plzeň Region (13 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	517	4.89	380	3.60	312	2.95	193	1.83
Capital of Prague	105	8.25	91	7.15	78	6.13	49	3.85
Central Bohemian	62	4.65	46	3.45	42	3.15	26	1.95
South Bohemian	11	1.72	9	1.41	4	0.63	3	0.47
Plzeň	49	8.48	38	6.58	32	5.54	17	2.94
Karlovy Vary	14	4.71	12	4.04	8	2.69	7	2.35
Ústí nad Labem	46	5.59	36	4.38	31	3.77	16	1.95
Liberec	29	6.59	19	4.32	18	4.09	16	3.63
Hradec Králové	22	3.99	9	1.63	6	1.09	5	0.91
Pardubice	31	6.00	21	4.07	17	3.29	7	1.36
Vysočina	18	3.54	12	2.36	8	1.57	7	1.37
South Moravian	47	3.99	30	2.55	27	2.29	16	1.36
Olomouc	24	3.79	15	2.37	11	1.73	4	0.63
Zlín	14	2.40	8	1.37	6	1.03	6	1.03
Moravian-Silesian	45	3.71	34	2.81	24	1.98	14	1.16

[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	10	6	4	1.81	2.12	1.49
5–9	-	-	-	-	-	-
10–14	-	-	-	-	-	-
15–19	8	3	5	1.75	1.28	2.24
20–24	22	14	8	3.85	4.78	2.86
25–29	40	22	18	5.82	6.26	5.35
30–34	34	25	9	4.64	6.62	2.53
35–39	31	23	8	3.58	5.16	1.90
40–44	47	40	7	5.24	8.68	1.60
45–49	48	41	7	6.81	11.36	2.04
50–54	55	40	15	7.97	11.43	4.41
55–59	51	38	13	7.94	11.91	4.02
60–64	36	28	8	5.02	8.14	2.15
65–69	36	24	12	5.20	7.52	3.22
70–74	29	17	12	5.64	7.61	4.13
75–79	21	12	9	6.33	8.97	4.55
80–84	25	13	12	10.84	15.59	8.15
85–89	20	7	13	14.62	16.37	13.82
90–94	4	1	3	8.32	8.22	8.36
Total	517	354	163	4.89	6.82	3.03

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	28	489	0.27	4.63
Capital of Prague	4	101	0.31	7.94
Central Bohemian	8	54	0.60	4.05
South Bohemian	-	11	-	1.72
Plzeň	1	48	0.17	8.31
Karlovy Vary	-	14	-	4.71
Ústí nad Labem	-	46	-	5.59
Liberec	2	27	0.45	6.13
Hradec Králové	2	20	0.36	3.63
Pardubice	1	30	0.19	5.81
Vysočina	-	18	-	3.54
South Moravian	3	44	0.25	3.74
Olomouc	2	22	0.32	3.47
Zlín	2	12	0.34	2.05
Moravian-Silesian	3	42	0.25	3.47

[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	448	4.24	69	0.65
Capital of Prague	97	7.62	8	0.63
Central Bohemian	55	4.13	7	0.53
South Bohemian	8	1.25	3	0.47
Plzeň	43	7.44	6	1.04
Karlovy Vary	11	3.70	3	1.01
Ústí nad Labem	42	5.11	4	0.49
Liberec	28	6.36	1	0.23
Hradec Králové	16	2.90	6	1.09
Pardubice	29	5.61	2	0.39
Vysočina	14	2.75	4	0.79
South Moravian	42	3.57	5	0.42
Olomouc	19	3.00	5	0.79
Zlín	11	1.88	3	0.51
Moravian-Silesian	33	2.72	12	0.99

[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	16	100.0	345	100.0	361	100.0
Any resistance to:						
isoniazid (H)	5	31.3	12	3.5	17	4.7
rifampicin (R)	3	18.8	4	1.2	7	1.9
ethambutol (E)	3	18.8	2	0.6	5	1.4
streptomycin (S)	4	25.0	18	5.2	22	6.1
Resistance only to:						
isoniazid (H)	1	6.3	4	1.2	5	1.4
rifampicin (R)	1	6.3	-	-	1	0.3
ethambutol (E)	-	-	-	-	-	-
streptomycin (S)	1	6.3	10	2.9	11	3.0
Mono-resistance in total	3	18.8	14	4.1	17	4.7
H + R	-	-	-	-	-	-
H + R + E	-	-	-	-	-	-
H + R + S	-	-	3	0.9	3	0.8
H + R + E + S	2	12.5	1	0.3	3	0.8
Multidrug resistance (MDR) in total	2	12.5	4	1.2	6	1.7
H + E	1	6.3	-	-	1	0.3
H + S	1	6.3	3	0.9	4	1.1
H + E + S	-	-	1	0.3	1	0.3
R + E	-	-	-	-	-	-
R + S	-	-	-	-	-	-
R + E + S	-	-	-	-	-	-
E + S	-	-	-	-	-	-
Poly-resistance in total (other than MDR)	2	12.5	4	1.2	6	1.7

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					
		Slovakia	Ukraine	Vietnam	Romania	other	
2016	151	21	41	21	21	47	29.2

Table 7. Evaluation of antituberculosis therapy at 12 months after its start in TB cases reported into RTB in 2015 (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 2015		518	x	302	x
TB was excluded		-	x	-	x
Verified TB cases reported in 2015		518	100.0	302	100.0
Cured / treatment completed		351	67.8	210	69.5
Death	**from TB**	30	5.8	13	4.3
	from another cause	67	12.9	41	13.6
Treatment interrupted / missing data / missing follow-up report		29	5.6	18	6.0
Still on treatment		24	4.6	12	4.0
Patient transferred		12	2.3	7	2.3
Treatment failed		5	1.0	1	0.3

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	26	0.25
Capital of Prague	5	0.39
Central Bohemian	2	0.15
South Bohemian	1	0.16
Plzeň	2	0.35
Karlovy Vary	2	0.67
Ústí nad Labem	-	-
Liberec	-	-
Hradec Králové	4	0.73
Pardubice	4	0.77
Vysočina	-	-
South Moravian	-	-
Olomouc	2	0.32
Zlín	-	-
Moravian-Silesian	4	0.33

[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	83	0.79
Extrapulmonary mycobacterial infection	23	0.22
Reported infections in total	106	1.00
out of which, the following strains were isolated:		
M. avium	47	0.44
M. intracelullare	9	0.09
M. kansasii	18	0.17
M. xenopi	15	0.14
other M.	17	0.16

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	83	0.79	23	0.22
Capital of Prague	5	0.39	5	0.39
Central Bohemian	3	0.23	3	0.23
South Bohemian	8	1.25	1	0.16
Plzeň	12	2.08	1	0.17
Karlovy Vary	5	1.68	-	-
Ústí nad Labem	5	0.61	1	0.12
Liberec	3	0.68	1	0.23
Hradec Králové	1	0.18	2	0.36
Pardubice	6	1.16	2	0.39
Vysočina	3	0.59	1	0.20
South Moravian	6	0.51	4	0.34
Olomouc	3	0.47	-	-
Zlín	-	-	1	0.17
Moravian-Silesian	23	1.90	1	0.08

[1)] Regions of patients' residence are reported