

Tuberculosis incidence and surveillance in Belgium

by

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Abstract

After decennia of regular decrease, tuberculosis incidence in Belgium remains almost constant since 1992. In 1996, 1,352 cases of newly detected active tuberculosis were reported, i.e. 13.3/100,000 population. The recent change in trend is mainly due to an increase of tuberculosis incidence in non-Belgians, particularly of non-Western origin. The highest incidence rates are observed in Brussels and other major cities, where a large part of the population is of low socio-economic status. The new cases of multi-drug resistant tuberculosis represent less than 1% (0.8-0.5) of the yearly registered sputum-positive patients.

The three main pillars of tuberculosis surveillance are early diagnosis and treatment, close contact tracing and systematic screening in groups at risk. The Mantoux tuberculin skin test is the appropriate screening method in persons who recently had contact with infectious patients and, obviously, also in health care workers and other professionally exposed individuals. Chest radiography is the most effective screening method in the highest risk groups, such as asylum seekers, prisoners and socially marginalised people.

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Transmission of tuberculosis infection should be prevented by strict isolation of contagious patients, coughing hygiene, provision of ample daylight and proper ventilation in patients' rooms, and the wearing of a protective mask by patients or visitors. Health care workers should be informed of their tuberculin and HIV serologic status as both conditions influence their resistance to infection. BCG immunisation, for which there are hardly any indications left in countries like Belgium, should still be considered for health care workers in services and settings, which regularly deal with multi-drug resistant cases and where strict adherence to preventive measures is problematic.

Key-words

Tuberculosis, Epidemiology, Surveillance, Belgium.

Introduction

For more than a century, tuberculosis incidence (i.e. the yearly number of reported new and relapse cases of active tuberculosis disease per 100,000 general population) has been declining at an exponential rate in all industrial countries. In the latest ten years however, this regular decrease has been interrupted or even reversed into a temporary increase (1). Factors which have contributed to this change are: immigration from high tuberculosis prevalence countries, increased intercontinental travelling, social marginalisation in big cities, HIV infection and — in some nations — the dismantling of the tuberculosis control programmes (2, 3). This paper reports on the tuberculosis incidence and surveillance in Belgium in the last few years.

1. Tuberculosis morbidity incidence

Tuberculosis cases in Belgium have been decreasing at an exponential rate from 2,959 in 1979 to 1,335 in 1992. Since, the incidence has stabilised and in 1996 still 1,352 cases were registered (an incidence of 13.3/100,000) (figure 1). The recent change in trend is mainly due to an increase of tuberculosis incidence in non-Belgians, particularly of non-Western origin (4) (figure 2). From 1992 to 1996, tuberculosis incidence in Belgians and foreign-born of Western origin decreased from 10.4 to 9.9 per 100,000, while in foreign-born of non-Western origin, who constitute little more than 3% of the total population in Belgium, inciden-

ce increased from 94.2 to 113.9 per 100,000. As a result, their contribution to the total tuberculosis incidence in Belgium raised from 24.3 to 28.1% (table 1).

Tuberculosis incidence in Belgium varies with the regions. Whereas the national incidence in 1996 was 13.3 per 100,000, in the Flemish and Walloon regions it was 10.4 and 11.6 respectively, while in the Brussels region it amounted to 37.3 (figure 3). The highest incidence is found in those municipalities within the Brussels area, where a large part of the population is of low socio-economic status (figure 4). Likewise, in Flemish and Walloon cities with more than 100,000 inhabitants, tuberculosis incidence is higher than in smaller cities and municipalities (table 2).

Pulmonary tuberculosis constitutes the major part (3/4 on average) of the registered cases. Some 70% of them are sputum-positive: 2/3 on smear examination and 1/3 only in culture. Smear-positive patients are the main source of contagion. In 1996, pulmonary cases amounted to 1,089;

TABLE 1
Contribution of non-Western foreign-born to the total population
and the tuberculosis incidence in Belgium

	1992	1993	1994	1995	1996
Number of foreign-born of non-Western origin (%)	342,952 (3.4)	347,254 (3.4)	351,533 (3.5)	349,002 (3.5)	334,424 (3.3)
Number of new cases of tuberculosis in foreign-born of non-Western origin (%)	323 (24.3)	416 (27.8)	419 (27.7)	385 (27.9)	381 (28.1)
Tuberculosis incidence per 100,000					
– in foreign-born of non-Western origin	94.2	119.6	119.2	110.3	113.9
– in Belgians and foreign-born of Western origin	10.4	11.1	11.2	10.2	9.9

* The «non-Western» part of the population includes Asians (except Japanese), Africans, Central- and South-Americans and East-Europeans

TABLE 2
Tuberculosis incidence per 100,000 inhabitants in major cities
(> 100,000 inhabitants), 1994-1996

	1994	1995	1996
Brussels	38.0	34.93	7.4
Antwerpen	18.8	21.1	18.6
Liège	31.2	18.2	22.0
Charleroi	24.6	17.4	14.1
Gent	18.4	17.1	22.1
Brugge	14.6	9.5	15.5
Namur	13.4	15.2	15.2
Cities > 100,000 inhabitants	27.9	25.2	26.5
Other cities and municipalities	11.5	10.5	9.8
Belgium	15.1	13.6	13.3

tuberculous meningitis was registered in 13 cases, among them one child under the age of 15. A low incidence of tuberculous meningitis in children is a well-known indicator of a declining tuberculosis infection risk.

In Belgians tuberculosis incidence is markedly higher in men than in women (sex ratio 2.2) and increases considerably with age, especially in men. In people from developing countries the sex ratio is 1.5 and there are two peak incidences: the first one in young adults (men and women) and the second one in older men from the age of 50. Figure 5 shows the tuberculosis incidence in Belgians and foreign-born, by sex and age groups, registered in 1996.

HIV-infection data are rarely communicated to the tuberculosis registration in Belgium. Although in 1996 HIV-serologic status was known in no more than 13.5% of the registered tuberculosis cases, 57 (4.2%) co-infections were found, the greater part of which (43) in the Brussels region.

A few years ago, a Belgian working group on multi-drug resistant tuberculosis was founded (5,6), with the aim of collecting data on patients infected with multi-drug resistant strains (i.e. resistant to at least rifampicin and isoniazid). Laboratories that perform drug susceptibility tests send quarterly reports to the antituberculosis organisations VRGT and FARES, where the data are analysed, doubles eliminated and case-related clinical information is available. Patients who are labelled as multi-drug resistant by the laboratory and who subsequently recovered under standard chemotherapy, are not included in the list. From 1992 to 1995, 0.77 to 0.48% of the yearly registered sputum positive patients

TABLE 3
 Number of tuberculosis patients with multi-drug resistant strains
 Belgium (1992-1995)

	Number of registered patients positive in culture	Number of newly registered patients with MR strains	Percentage of MR in newly registered cases	Incidence of MR tuberculosis per 100,000 inhabitants
1992 *	1,290	10	0.77	0.10
1993 *	1,266	10	0.79	0.101
1994 *	1,168	6	0.51	0.06
1995 **	832	4	0.48	0.04

* From 1992 to 1994 it was not possible to completely eliminate all doubles.

** In 1995 all doubles have been eliminated.

appeared to be new multi-drug resistant cases (table 3). This percentage is comparable with the findings in neighbouring countries (7-10) and in strong contrast to the situation in some of the bigger cities in the USA.

Some 20% of the patients registered in 1996 belonged to one or more specific risk groups: 13 were detained persons, 52 asylum seekers, 75 socially marginalised people, 8 intravenous drug users, 35 illegal immigrants, 28 inhabitants of homes for the retired and 33 health care workers.

2. Tuberculosis surveillance

The exponential decline in tuberculosis incidence having come to an end, increased vigilance is needed. The three main pillars of tuberculosis surveillance are: early diagnosis and treatment of all cases of active tuberculosis, close contact tracing and systematic screening in groups at risk.

Data collected by VRGT and FARES indicate that 90% of the yearly registered patients are detected by general practitioners or specialists. This confers them a task of utmost importance: not only should they keep in mind that tuberculosis remains a possible cause of disease but, once the diagnosis is confirmed, without delay they should start correct chemotherapy and carefully monitor patient compliance. In some cases (unco-operative patients, or those infected with multi-drug resistant strains) directly observed therapy (DOT) should be applied by health care workers who administer the drugs under close supervision (11-15).

Contact tracing needs a narrow and sustained collaboration between medical practitioners and preventive health care workers. Not only housemates of newly detected infectious patients should be examined, but also contact persons at school and in occupational and recreational settings. Even international contacts should be traced, for example when a group infection is detected in individuals who made a long journey by bus, cruise or plane (16).

The Mantoux tuberculin skin test is the appropriate method to detect a tuberculosis infection in contact persons. Strong reactors and particularly tuberculin converters (i.e. those showing a positive reaction following a substantiated negative test) should be X-rayed and, when no pulmonary abnormalities are seen, be given a course of isoniazid therapy. This measure offers a 90% protection against tuberculosis reactivation, if the drug is taken correctly and for as long as one year (17). In 1995, contact tracing was effectuated by VRGT-nurses in 6,962 individuals: 33 patients with primary tuberculosis and 65 cases of tuberculin conversion were detected. This represents an infection incidence of 14 per 1,000, which is in sharp contrast to the overall infection incidence in Belgium, nowadays estimated at 0.3 per 1,000 per year.

The *Restriction Fragment Length Polymorphism method* (RFLP), a new molecular technique that determines the "finger print" of a given mycobacterial strain, is a helpful tool to identify the source of group infections and mini-epidemics. A rather costly method, it is not yet in general use, but should be considered when tracing contact persons of patients with multi-drug resistant tuberculosis (18-19).

Active screening for tuberculosis is only beneficial when applied to specific risk groups. In the last three years, chest X-ray screening campaigns undertaken by the mobile team of the VRGT (table 4) were most effective in asylum seekers, socially marginalised people, prisoners and institutionalised psychiatric patients. On a total of 16,885 radiographs taken in company employees (mostly in application of the Belgian Labour Regulation Law) only in one case abnormalities due to active pulmonary tuberculosis were found. Because of this very low detection rate, yearly screening of that group is no longer required. The screening in homes for the retired and in health care workers failed to detect any case of active pulmonary tuberculosis. However, this should not lead to the conclusion that there is no increased tuberculosis risk in these groups. As figure 5 shows, tuberculosis incidence is highest in the oldest age group, particularly in men, but very few old men in homes for the

TABLE 4
Results of chest X-ray screening campaigns (1994-1995-1996)
in Flemish community of Belgium

	Number of chest radiographs	Detection rate of active TBC	
		number	/000
Asylum seekers	5,379	12	2.2
Socially marginalised	340	1	2.9
Detained persons	7,386	13	1.8
Institutionalised			
psychiatric patients	11,473	9	0.8
Elderly in homes for the retired	2,382	—	—
Health care workers	8,004	—	—
Company employees	16,885	1	0.06

retired, present themselves for X-ray screening. Individual follow-up of patients with complaints suggestive of tuberculosis has been shown to be more efficient. In health care workers regular tuberculin testing clearly indicates that the tuberculosis infection prevalence raises with the number of years employed in the health care sector. At age 40 about 10% of the health care workers have a positive tuberculin test, at age 50 some 20%, while in other sectors the corresponding numbers for the same age groups are 4 and 6% respectively (20). In student nurses the percentage of positive tuberculin tests at age 20 is decreasing in the last few years and at present it hardly exceeds about 2% (table 5). This implies that the major part of the young health care workers have not yet developed the immunological response that follows a primary tuberculosis infection. Healthy tuberculin positive persons instead have built up some acquired resistance and are at lower risk to develop tuberculosis disease when exposed to re-infection. Therefore it is important that

TABLE 5
Percentage of tuberculin-positive reactors in student nurses
(absolute numbers)

Year	Age group	
	15-19	20-24
1991-1992	1.8 (2,996)	3.2 (7,741)
1992-1993	1.1 (4,725)	2.3 (7,160)
1993-1994	1.5 (4,747)	2.2 (8,507)
1994-1995	0.9 (4,425)	2.7 (8,830)
1995-1996	0.9 (7,366)	2.4 (9,216)

Source: Medical Surveillance of School Children in Flemish community of Belgium

health care workers and other professionally exposed individuals know their tuberculin status and that those who are non-reactors should be submitted once or twice a year to Mantoux tuberculin skin testing. A chemoprophylactic course of isoniazid for at least 6 months is formally indicated when tuberculin conversion is observed (21). It is equally important that professionally exposed persons also know their HIV serologic status, as in HIV-infected individuals there is a 10 to 30 times higher risk that a casual tuberculosis infection develops into active tuberculosis disease. In tuberculin positive individuals who get HIV-infected, the risk of endogenous tuberculosis reactivation is estimated at 10% per year, while in tuberculin positive HIV-negative persons the risk is 10% over the whole life time. Therefore, a full year course of preventive isoniazid chemotherapy is recommended in tuberculin converters co-infected with HIV (21). In conclusion, occupational physicians and nurses should not neglect to inform professionally exposed employees that regular contact with infectious tuberculosis patients carries a particularly high risk for HIV-positive individuals. Recent changes in the Belgian Labour Regulation Law make it the responsibility of the occupational physicians to assess the health risks for their employees and to take measures in accordance with these risks. They should organise regular tuberculin testing sessions for health care workers and for employees in prisons and other settings, where professional contact with possibly undetected infectious tuberculosis is unavoidable.

3. Measures to prevent tuberculosis infection

Adherence to preventive measures by contagious patients and their surroundings is of paramount importance to avoid group infections (22-25). Patients with sputum-positive pulmonary tuberculosis, whether in hospitals or at home, should be isolated as long as they are infectious. Coughing hygiene, regular ventilation of the room and ample daylight are important factors in limiting infection transmission. The number of visitors shall be restricted and children not admitted. Hospitalised patients should wear an efficient mask every time they leave the room. Visitors and health care workers are advised to wear a suitable protective mask when entering the patient's room. This measure is compulsory when the patient is infected with a multi-drug resistant strain. With adequate therapy, coughing diminishes quickly and so does the risk of infection. Isolation may be discontinued when sputum smears are negative on three consecutive days which, in not too extensive lesions, occurs two to three weeks after the onset of treatment. On the other hand, tuberculosis is not transmitted by objects.

BCG immunisation confers, on average, a temporary protection in only half of the vaccinated and is hardly ever indicated in countries like Belgium, where the tuberculosis infection risk, particularly in children, is very low (26-28). BCG immunisation should only be considered for health care workers in services which regularly deal with multi-drug resistant cases and where strict adherence to the above-mentioned preventive measures is problematic. BCG however, should not be given to HIV-positive individuals. On the other hand, BCG is recommended in foreign-born children who regularly return to their country of origin, and in development workers and their family who reside for more than 6 months in countries with a high tuberculosis prevalence.

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