

# The incidence of pulmonary tuberculosis among the homeless in north-eastern Poland

Rapid Communication

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**Abstract:** Tuberculosis (TB) is a disease particularly affecting the poorest socioeconomic groups. One such group in Central Europe are the homeless. We developed a prevention programme that targets, among others, homeless individuals in Warmia and Mazury Province (in the northeast of Poland). We investigated 121 homeless persons. We performed surveys, X-rays and microbiological tests of the sputum for TB. Five cases of pulmonary TB were found. The prevalence of TB in this community was estimated at 4132 per 100,000 (4.13%). Efficient TB control justifies continued prevention programmes aimed at the systematic monitoring of the homeless population.

**Keywords:** *Tuberculosis • homelessness • poverty • risk groups • Poland*

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## 1. Introduction

For over a hundred years tuberculosis (TB) has been a classic example of a disease of social significance that frequently affects the poorest socioeconomic groups [1]. The homeless are an example of a particularly predisposed community in Central Europe. The scale of homelessness is unclear and any available data are only rough estimates. In our region (Warmia and Mazury, north-eastern Poland), the number of homeless people is estimated by the Marshall's Office at about 1250 (the total number of inhabitants is about 1.5 million) [2]. It is also known that in many countries homeless people account for a considerable percentage of patients diagnosed with TB. It is estimated, for instance that 6.3% of all new cases of TB in the United States are diagnosed

in the homeless [3]. Finding reverse information on the number of homeless people suffering from TB is much more difficult. It requires organisationally-difficult studies which must be carried out in an unfavourable environment

## 2. Material and methods

We developed a prevention programme that targets, among others, homeless individuals in the Warmia and Mazury Province (north-eastern Poland). The programme was carried out between 1<sup>st</sup> September 2010 and 30<sup>th</sup> January 2011. Participation in the programme was entirely voluntary and free of charge. All participants signed a form confirming informed consent. No procedures that would depart from standard care

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were used in the programme. A homeless person was defined as a person without a permanent place of residence, living in severe poverty (inhabitants of suburban camps, temporary shelters or night shelters). Patients were invited to participate in the study directly or through social workers. The following were performed sequentially: a questionnaire and an X-ray. All participants were referred for radiographic evaluation, regardless of their survey responses. If the chest X-ray showed any abnormal findings, the following bacteriological tests were performed: sputum microscopy with fluorescent staining, (confirmed – in positive cases – by the Ziehl-Neelsen method), culture using the standard method on Löwenstein-Jensen medium; culture using a quick method with fluorescent confirmation using Mycobacteria Growth Indicator Tube (MGIT, Becton Dickinson, Sparks, MD, USA) and molecular genetic tests using the Becton Dickinson ProbeTec™ ET System. All tests were performed in the Independent Public TB and Pulmonary Diseases Unit (regional centre), where the programme's medical records were also archived. Patients with any positive microbiological test results were offered hospitalization for further verification of the case and potential treatment. In accordance with Polish law, treatment of TB is completely free of charge, even for patients without insurance. As this study was based on the analysis of data from a routine preventive health program, ethical approval was not required.

### 3. Results

A total of 147 homeless people from our province were enrolled in the study. Of these, 146 were referred for an X-ray (one refused referral) and an X-ray was obtained in 121 patients (82.3%). Based on the X-ray findings, 41 (27.9%) patients were referred for sputum examination. All 41 patients underwent the examination as referred. Genetic testing yielded positive results in 5 cases. All the positive genetic results were confirmed by culture using the classical method or MGIT and treated. The prevalence of TB in this community (based on the group which completed survey) was calculated at 4132 per 100 000 (4.1%).

### 4. Discussion

We conducted similar studies in the same area in 2004, 2005 and 2006, estimating the prevalence of TB at 3000, 1960 and 4290 per 100 000, respectively (Table 1) [4-6]. In Poznan (Poland), in 2005, a similar study employing a simpler methodology (without the genetic testing), found

**Table 1.** The incidence of tuberculosis in the homeless population and in the general population (Warmia and Mazury Region, Poland).

| Year | Incidence                      |                                   |                 |
|------|--------------------------------|-----------------------------------|-----------------|
|      | Homeless people<br>[n/100,000] | General population<br>[n/100,000] | Incidence ratio |
| 2004 | 3000                           | 24.9                              | 120             |
| 2005 | 1960                           | 24.3                              | 81              |
| 2007 | 4290                           | 22.0                              | 195             |
| 2011 | 4132                           | 13.4                              | 308             |

a prevalence of TB in the homeless community of 1900 per 100 000 (although not all of the cases were confirmed bacteriologically) [7]. Adopting the microbiological criterion as the leading criterion, as was the case with the studies conducted in northeast Poland, the prevalence would be 1330 per 100 000. We found it interesting to observe that this time we did not find a single case of TB in the night shelter for homeless people in Olsztyn, the largest one in our region, where such diagnoses had been made by us previously. This may be a result of increased epidemiological surveillance at this facility. Of note is the stable, and unfortunately high, incidence of TB in the group of homeless people. The incidence rates within the range of 2–4% are also reported by other investigators. For instance, in Moscow, at the beginning of the 2000s, the incidence was estimated at 2.91% [8]. A better situation is reported by Hungarians. In Budapest, in 2002, the incidence in this population was estimated at 0.68% [9]. The ratio of the incidence in the general population and the incidence in the homeless population is interesting in our data. Homeless persons are at several hundred fold higher risk of TB. A similar situation has also been reported in London where, in the 1990s, TB was observed among homeless people 150 times more often than in the general population [10]. In the data from Poznan mentioned above the ratio (328 times more common in the homeless) is similar as in our material [7]. According to Beijer *et al* there is a correlation between the prevalence of TB in the general population and in the homeless [11]. Clinical guidelines from the UK National Institute for Health and Clinical Excellence (2012) showed that screening and treatment of tuberculosis is cost saving (US\$ 32 000 per quality-adjusted life year) in homeless populations with a high tuberculosis prevalence [12].

### 5. Conclusion

Efficient TB control justifies continued prevention programmes aimed at the systematic monitoring of the

homeless. A population with such a high proportion of TB patients is a dangerous source of infection.

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