

## EPIDEMIOLOGICAL FEATURES OF TUBERCULOSIS IN THE REPUBLIC OF MACEDONIA

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### ABSTRACT

**Aim:** To describe epidemiological characteristics of tuberculosis in the Republic of Macedonia.

**Material and methods:** The data are taken from annual reports on the work of dispensaries and the health facilities for lung diseases and tuberculosis as well as from the Central Registry for tuberculosis in Macedonia, provided at the Public Health Institution, Institute for Pulmonary Diseases and Tuberculosis, in 2007. Descriptive epidemiological method, statistical processing and data analysis are applied for the realization of the targets. The data are shown by indicators set out in the national tuberculosis program.

**Results and Discussion:** TB remains a major medical and social problem worldwide. In the Republic of Macedonia in the period from 2003 to 2014 were registered a total of 5921 cases of tuberculosis, with an average annual rate of disease of 25.5 per 100 000 inhabitants. The tuberculosis in the country continuously decreased from 2003 to 2014. During this period the highest number of patients with tuberculosis were registered in 2003, 697 patients and incidence rate of 34.4 / 100,000 inhabitants, while the lowest number of patients was registered in 2014, 285 patients and incidence rate of 13.6 / 100,000 inhabitants. In the period from 2003 to 2012 were registered 248 deaths from tuberculosis, with an average annual mortality rate of 1.18 per 100 000 inhabitants. The percentage of registered men with tuberculosis is higher. In the same period, the highest incidence is observed in the age group of 45-54 years, which coincides with the most productive period of these individuals. Pulmonary forms of tuberculosis dominated among the registered patients, but it is distinctive that the total percentage of the other forms of TB maintained on around 25%. The percentage of successfully treated, among new cases of tuberculosis is growing continuously, and in the year 2013 it is 95%.

**Conclusion:** The number of cases of tuberculosis in the country is constantly decreasing as a result of implementation of measures from the National Strategy for tuberculosis. Today, with a rate of 17.2 / 100,000 inhabitants, Macedonia is among the European countries with low rates of tuberculosis. The maintaining and improving this situation, need rigorous implementation of the adopted principles for the control of tuberculosis.

**Key words:** *tuberculosis, epidemiological characteristics, National Strategy Program, incidence, prevalence.*

### Introduction

Tuberculosis is still current, medical and social problem in our country and the world, despite the successful implementation of the preventive measures and the implementation of effective antituberculosis drugs. The emergence of resistant forms of TB and HIV/AIDS, contributed to the increase in the number of TB patients in the world [1,2,3].

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis* discovered by Robert Koch (1882) and in his honor called bacillus Koch. If it is left untreated, for a year, every patient with active tuberculosis can infect 10-15 people. Worldwide, more than 8 million people are diagnosed, and over 2 million people die from tuberculosis every year [3].

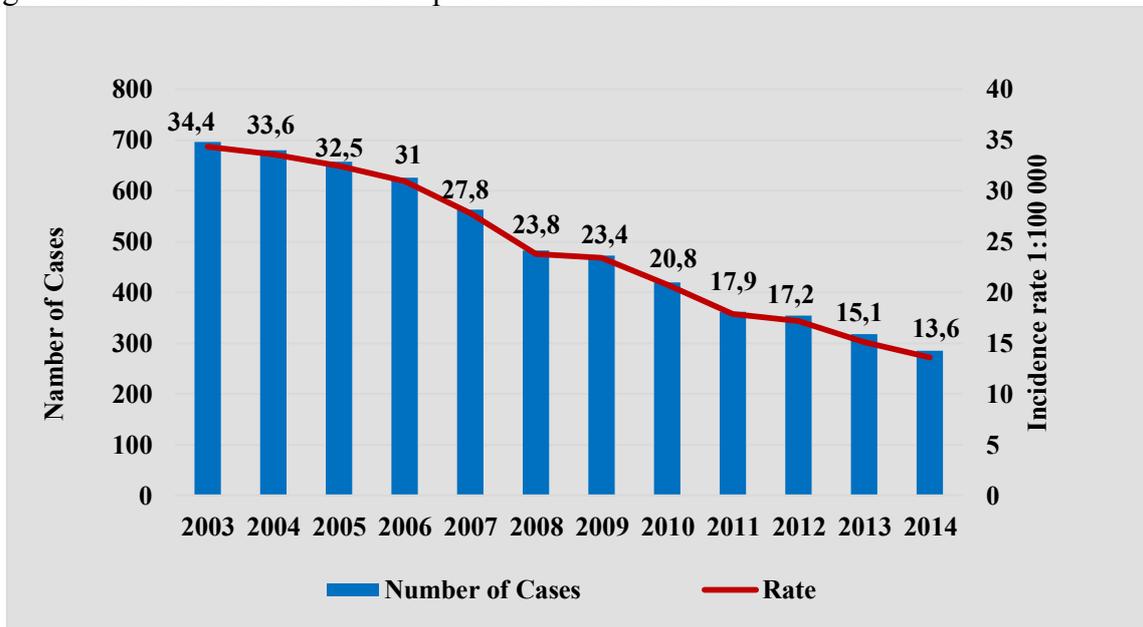
In 1993 World Health Organization proclaimed TB as a global health problem. In response to this situation, WHO has developed a new strategy called DOTS (DOTC / directly observed treatment, short course) with five basic principles, whose incorporation into national programs of each country promises a successful fight against TB and its eradication [4,5,6,7].

The tuberculosis was a significant health problem in the Republic of Macedonia, especially after the Second World War. The first dispensary of tuberculosis was established in 1928 in the Hygiene Institute in Skopje in 1929, as an open city department, which in 1946 grew into Thoracs Clinic, and in 1956, in the Institute of Tuberculosis [8,9]. Today this multidisciplinary Institute, treats problems of all pulmonary diseases including the tuberculosis.

In Macedonia, in 2000. It was developed five-year national program to control tuberculosis, adopted by the Ministry of Health . The program is consistently applied, and in 2008 it was revised [8,9]. Today, almost all cases of new infected of tuberculosis detected on time, are completely cured. You should strive to begin the treatment sooner, while the bacillus failed to destroy the tissue or to cause irreversible changes in the body.

**Results**

From 2003 until 2014 a total of 5921 tuberculosis cases were reported in the Republic of Macedonia, at an average annual rate of disease from 531,8 per 100 000 inhabitants with an average annual rate on disease of 25.5 per 100 000 inhabitants.



**Figure 1: Tuberculosis (TB) in the Republic of Macedonia, 2003-2014 (Number of Cases and Incidence Rates per 100 000 Population)**

Tuberculosis in the country continuously decreases by 2003 to 2014. During this period the highest number of patients with tuberculosis were registered in 2003, 697 patients and incidence rate of 34.4 / 100,000 inhabitants, while the lowest number of patients was registered in 2014, 285 patients and incidence rate of 13.6 / 100,000 inhabitants (Figure 1, Table 1).

The rate of prevalence of tuberculosis varies from 48.7/100,000 inhabitants in 2003 to 22.9/100,000 inhabitants in 2013 and highest in 2005 (53.1/100,000).

In the period from 2003 to 2012 were registered 248 deaths from tuberculosis, with an average annual mortality rate of 1.18 per 100 000 inhabitants. The mortality shows significant variability. The lowest ratre was noticed in 2003 and 2005, 0.7 per 100 000 inhabitants (15 deaths). It reaches highest values in 2007 with 1.8 per 100 000 inhabitants (38 deaths). The death rate from tuberculosis in 2003 to 0.7 / 100,000 population is about five time smaller than that of 1993, when it was 3.4 / 100,000 inhabitants.

**Table 1: Tuberculosis (TB) in the Republic of Macedonia, 2003-2012**  
**Number of Cases, Rate of prevalence and mortality**

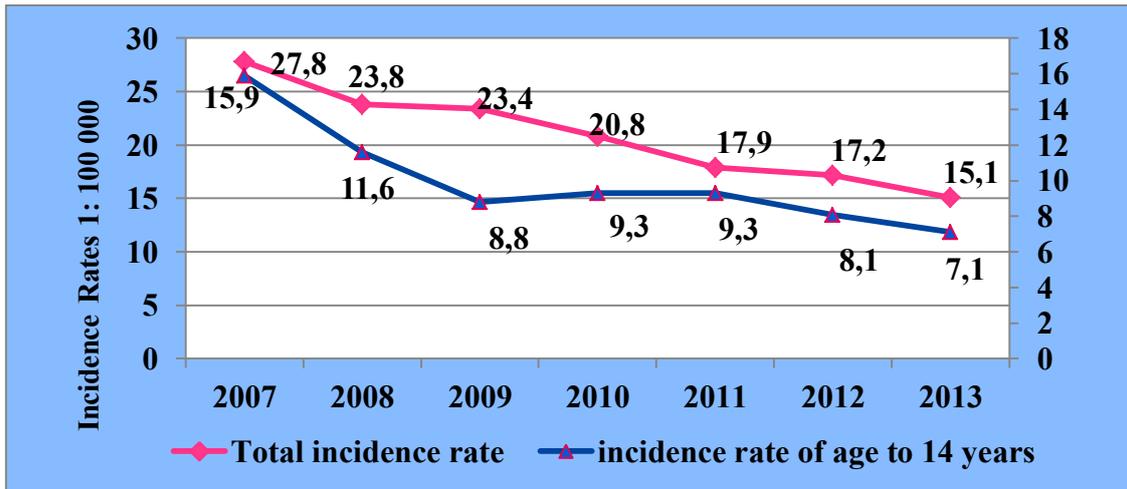
Year	Prevalence		Mortality	
	Number of Cases	Rate 1:100 000	Number of Cases	Rate 1:100 000
2003	988	48,7	15	0,7
2004	1020	50,4	20	0,9
2005	1075	53,1	15	0,7
2006	961	47,5	34	1,7
2007	920	45,7	38	1,8
2008	755	37,3	28	1,3
2009	632	31,2	17	0,8
2010	592	29,2	34	1,7
2011	527	26,1	19	0,9
2012	437	22,9	28	1,3

In the same period, the highest incidence is observed in the age group of 45-54 years, which coincides with the most productive period of these individuals. In the period 2007-2012, the percentage of tuberculosis registered cases among men is higher. This percentage is highest among men in 2007 (61.8%) and among women in 2008 (43.1%).

However, until 2011, dominated new cases of tuberculosis, the percentage of previously treated is high, even 15.2% in the year 2011. In the year 2012, for the first time is below 10%, which is good epidemiological fact.

In 2007 was recorded the largest percentage of resistant isolates from positive cultures (35%), followed by 2010 continuously decreasing proportion of these isolates. The percentage of successfully treated, among new cases of tuberculosis is growing continuously, and in 2011 was 94%.

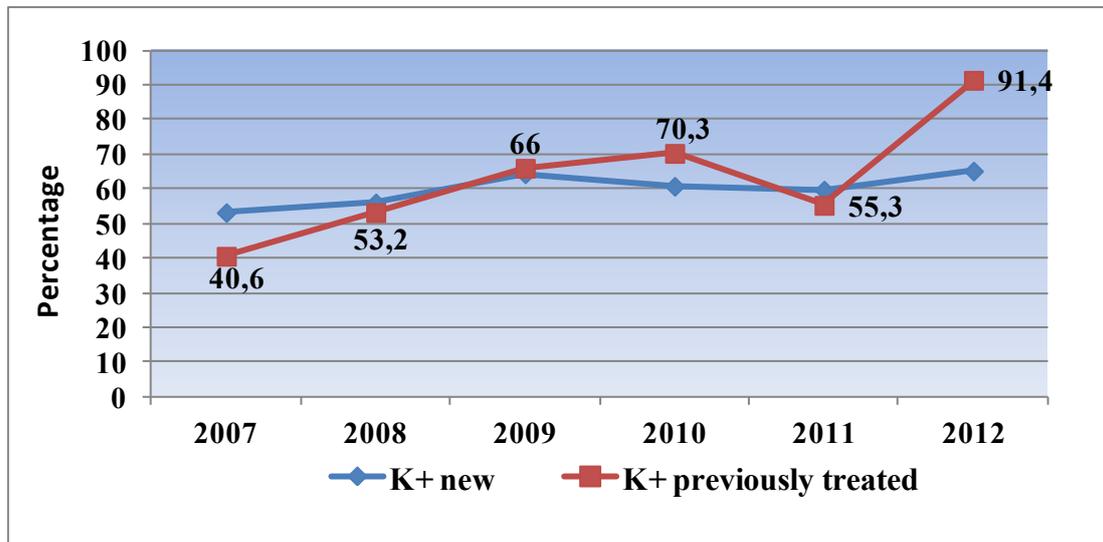
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**Figure 2. Tuberculosis in the Republic of Macedonia, 2007-2013 Incidence Rates per 100 000 in the total population and age group 0-14 years**

The proportions of non pulmonary forms of tuberculosis ranged from 22.3 to 25.8% of the total registered. The percentage of representation of non pulmonary tuberculosis, negative impact on the overall bacteriological verification of tuberculosis in the country, given the fact that the percentage of bacteriological verification of non pulmonary forms of tuberculosis is very low.

In the period 2007-2011, followed the growth of verified bacteriological culture of *Mycobacterium tuberculosis* (Figure 3) .



**Figure 3: Percentage of verified bacteriological culture among new and previously treated TB cases in the total number of new and previously treated TB cases in the period 2007-2012**

In previously treated cases of pulmonary tuberculosis, this verification varies from 40.6% in 2007 to 91.4% in 2012 th year, while in new cases of pulmonary tuberculosis, from 53.2% to 65.2%.

**Discussion**

The emergence of resistant forms of tuberculosis and pandemic of HIV / AIDS has contributed to increasing the number of TB in the world. A rise in the incidence of tuberculosis is

detected in developed countries and in developing countries, wherever Macedonia remains an important medical and social problem [8, 9, 10].

Since 2011, in this country the incidence rate was decreased to 17.6 / 100,000 inhabitants, which for the first time ranked it among countries with a low incidence rate [8, 11,12]. . The death rate from tuberculosis in 2003 to 0.7 / 100,000 population is lower by 50% compared to that of 1993, when it was 3.4 / 100,000 inhabitants.

The rate of tuberculosis in the age group 0-14 years varies from 15.9 / 100,000 population in 2007 to 7.1 / 100,000 population in 2013. There are countries with significantly higher tuberculosis rate among the countries of the European Union, but with a lower rate of incidence of child tuberculosis [12]. .

Within the countries of the European Union and the European Economic Community, the percentage of non pulmonary forms of TB is significantly higher, particularly in countries with high HIV prevalence.

From 2010 onwards the percentage of bacteriological confirmed cases by direct microscopy increases, at the new and in previously treated cases of pulmonary tuberculosis. These rate standards should be higher than 85% [12]. . Such a trend permits realistic chances this percentage to reach in the coming years .

In the new cases of pulmonary tuberculosis, the percentage of verified bacteriological culture is lower because not all who are treated for tuberculosis, had made culture verification, especially those who are treated-patients.

A problem that requires further close monitoring is tuberculosis in risk groups, particularly in prisons and psychiatric hospitals.

**Conclusion:** The number of cases of tuberculosis in the country is constantly decreasing as a result of implementation of measures from the National Strategy for tuberculosis. Today, with a rate of 17.2 / 100,000 inhabitants, Macedonia is among the European countries with low rates of tuberculosis. The maintaining and improving this situation, need rigorous implementation of the adopted principles for the control of tuberculosis.

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