

**THE MONOGRAPH “TUBERCULOSIS.
EPIDEMIOLOGY AND DISEASE PREVENTION
AND CONTROL IN CONTEMPORARY SETTINGS
OF THE HIGH NORTH (THE CASE OF SAKHA
REPUBLIC (YAKUTIA))”**

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*We present a review of the monograph written by a group of authors and edited by Professor Savilov E.D., Honored Scientist of the Russian Federation. The monograph is the first presenting consolidated data from collaborative work between the Research-and-Practice Center for Tuberculosis of the Sakha Republic (Yakutia) and Irkutsk Scientific Center for Problems of Family Health and Human Reproduction, shedding light on the aspects of tuberculosis control and prevention in Yakutia, a region with low population density, on the molecular genetic characteristics of *M.tuberculosis* circulating in the region, and its drug resistance profile. The monograph is intended to all professionals engaged in tuberculosis control.*

Keywords: *tuberculosis; epidemiology; monitoring; *Mycobacterium tuberculosis*; multidrug-resistance; molecular genetic characterization; genotypes; tuberculosis prevention and control.*

Although tuberculosis (TB) incidence and mortality rates in the Russian Federation have been tending to show a stable decrease for the last years, based on the WHO reports (2013) Russia is still estimated to be among 22 countries (countries of the post-soviet area) with the highest TB burden, ranking third in the world for multidrug-resistant TB (MDR-TB), after China and India. This requires foregrounding the research that would address the issues of TB diagnosis, treatment and prevention, both in Russia overall, and in individual federal districts of the Russian Federation.

It was pointed out by the Chief TB Specialist of the Health Ministry of the Sakha Republic, Dr. A.F. Kravchenko, during the Meeting of the Parliamentarians of the Federal Assembly of the Russian Federation and the State Assembly of the Sakha Republic (Il Tumen) in 2015, that “based on key epidemiological rates of TB incidence, Sakha Republic still ranks statistically average, while TB mortality rates are among the lowest in Russia, lower than overall Russian rates by a factor of 2.5”.

Sakha Republic (Yakutia) is the largest region of the Russian Federation mostly located in the Arctic and northern areas. Remarkable facts about Yakutia are its low population density which is 0.3 per km², high annual temperature range sometimes reaching 100°C, weak infrastructure and transport service (the roads are seasonal).

Despite its climatic, geographic, social complexity, Sakha Republic has been until now the region demonstrating the lowest epidemiological rates for TB among the regions of the Far Eastern Federal District of Russia. This applies both to mortality (7 cases per 100 000 pop., i.e. 2.8 times lower compared to the Far Eastern Federal District, 1.7 times lower compared to Russia), and to incidence (75.3 to 68 per 100 000, i.e. 1.4 times lower than in the Far East Federal District). But there is a growing concern caused by alarmingly wide spread of multidrug-resistant *M.tuberculosis* (MDR MTB). Yakutia has been conducting research on TB for over 60 years now. However in more recent times, as a result of the fruitful collaboration with the epidemiologists and microbiologists in Irkutsk, the research today has gained whole new focus.

The monograph presented here was prepared by the team of contributors under the editorship of the Honored Scientist of the Russian Federation, Prof. E.D. Savilov, and is deemed to be the first attempt in summarizing results of the latest studies performed collaboratively by the staff of the Yakutsk Research-and-Practice Center for Tuberculosis and Irkutsk Scientific Center of Family Health Problems and Human Reproduction (Irkutsk) highlighting the issues in TB epi-

miology and TB control measures to address the special needs and necessities existing in regions of the High North.

Data accumulated over many years of extensive studies on TB infection, is compiled to 7 chapters, each providing insight to a major focus area. This is certainly one of the strengths of this monograph, along with competent and coherent narration.

Epidemiological analysis was performed using data collected over long term periods; these periods were divided to low-rate periods or increased-rate periods. The chapter “Review of the epidemiological situation for TB in the Sakha Republic” presents comprehensive assessment of the epidemiological situation for TB in Yakutia by colleagues from Yakutsk and Irkutsk, who collectively acknowledge that in general the situation in Yakutia is fairly favorable, compared to the regions of the Far Eastern Federal District. For the first time, assessment of the epidemiological situation for TB in Yakutia was done by calculating the so called integral indexes and illustrative indicators, which were derived from 17 parameters describing TB morbidity. As a result, 5 estimates of the epidemiological situation were formulated and accordingly, administrative districts of Yakutia were defined as having optimal, favorable, typical, unfavorable, or extremely unfavorable epidemiological situation for TB. Use of evidence-based prevention of TB in beef cattle helped to ensure animal welfare for bovine tuberculosis in Yakutia.

The chapter “Biological features of *M.tuberculosis* circulating in Yakutia” describes the activities of the Bacteriologic Laboratory of the Yakutsk Research-and-Practice Center for TB and presents the results from collaborative research with the Irkutsk Scientific Center of Family Health Problems and Human Reproduction aimed at studying the biological properties of MTB circulating in Yakutia, and, for the first time, presenting the molecular genetic characterization of the most prevalent genotypes. This research was the first to establish that the strains belonging to Beijing and S families, two most frequently detected families, were endemic for Yakutia. The explanations of

how the S strains were brought in (hypothetically from Canada or Europe) to low-populated isolated republic with limited migration pressure are disputable to date, and lack solid confirmation.

The next chapters shed light on the efficient work of the Centralized Bacteriologic Diagnostic Service for TB, paying tribute to the timely transportation of the diagnostic specimens to the central laboratory, establishment of the Central Medical Panel for the purposes of implementing centralized control measures, the approaches used for successful intensive treatment phase outcomes in 70-75% of cases, medical and social assessment of patients registered with TB facilities. As the data showed, TB patients were predominantly native residents of the Sakha Republic, of employable age, and without permanent job, most often, individuals from prison population or transferred from the facilities of the Federal Penitentiary Service of Russia. Also, poor treatment compliance was fairly common among the socially maladjusted patients.

The chapter on pathomorphosis of TB and surgical treatment presents the strategy designed to improve the effect of surgical treatment on the TB infection reservoir. The strategy includes 2 steps: 1) well-timed surgical intervention; 2) individualized surgical interventions for almost/completely inoperable patients with chronic destructive forms of TB. It is concluded that only by individualized approach to the use of contemporary surgical techniques and at the appropriate time, we can ensure the reduction in the numbers of this patient cohort.

The studies highlighted in the chapters 6 and 7 illustrate the major medical risk factors for primary TB-related disability, and describe the specifics of TB prevention and control measures in pediatric population at the sites of TB infection in rural hard-to-access or remote areas of the High North.

Employing the data obtained from all these studies the authors were able to develop and effectively implement in routine practice the scientifically-grounded organizational approaches and methods

to fight TB in the complicated settings of the Arctic and north of Russia.

We believe this monograph should definitely catch readers' attention and will be of interest to all professionals who need to be updated on current situation with TB infection, including clinicians, epidemiologists, and biologists.

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