

# Results of 15-year Russian-Norwegian collaboration in TB control and ways of future cooperation

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## Table of contents

Acknowledgements.....	4
Abbreviations .....	5
Preface.....	7
Executive summary .....	11
Introduction .....	14
Background and the origin of cooperation .....	16
Start of collaboration.....	19
The Legal Framework of Collaboration.....	20
Roles of the collaborative partners .....	23
Financing.....	30
Ways of cooperation.....	32
Reorganization of TB services in the period 1997-2013.....	34
Infection control in hospitals .....	36
Options For Out-patient Treatment.....	36
TB care in the penitentiary system of Arkhangelsk region. ....	40
Case Finding.....	41
Treatment.....	44
Drug management.....	48
Social and psychological support. ....	50
Health communication.....	53
Supervisory visits. ....	55
TB / HIV.....	58
Training of health personnel and technical assistance to other regions .....	61
Scientific support of the TB program in Arkhangelsk region.....	63
Additional factors contributing the improvement of epidemiological situation on TB in Arkhangelsk region.....	70
The main epidemiological trends of TB in Arkhangelsk region.....	71
TB policies and epidemiological trends in Norway 1995-2014 .....	82
The importance of the cooperation for Norway .....	90
Lessons learned from Russian-Norwegian collaboration in TB control in Arkhangelsk .....	91
Recommendations for continual improvement of TB control activities in the Arkhangelsk region.....	94
Conclusion .....	96

Annex 1.....97  
Annex 2.....98

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## Abbreviations

AIDS	Acquired immunodeficiency syndrome
ART	Anti-retroviral therapy
ARTD	Arkhangelsk Regional TB Dispensary
DFPS	Department of the Federal Penal Services in Arkhangelsk Region
DOT	Directly observed treatment
DST	Drug susceptibility testing
EB Fund	Charity Fund “Easy Breathing”
EQA	External quality assurance
FILHA	Finnish Lung and Health Association
GFATM	Global Fund to Fight AIDS, TB and Malaria
GLC	Green Light Committee
HIV	Human immunodeficiency virus
ICC	Interagency Coordinating Committee
IFRC	International Federation of Red Cross and Red Crescent Societies
LHL	Norwegian Lung and Heart Association
LHLI	LHL International
MDR	Multidrug resistance
MDR-TB	Multidrug-resistant tuberculosis
MoH	Ministry of Health
MoU	Memorandum of understanding

NArFU	Northern Arctic Federal University
NGO	Nongovernmental organization
NIPH	Norwegian Institute of Public Health
NSMU	Northern State Medical University
NWFD	North-West Federal District
PHC	Primary Health Care
QA	Quality assurance
RAMS	Russian Academy of Medical Sciences
TB	Tuberculosis
The Union	International Union Against Tuberculosis and Lung Disease
WHO	World Health Organization
XDR-TB	Extensively drug-resistant tuberculosis

## Preface

The Norwegian Ministry of Health and Care Services and the Ministry of Health of Arkhangelsk region made the following greetings to the inter-regional Conference in Arkhangelsk city from 6<sup>th</sup> till 8<sup>th</sup> October, 2014 where the experiences of the Russian-Norwegian Collaboration in TB Control in the Barents region were presented and discussed. Greetings from more partners are found in the annexes: INFIL, Norwegian Reference Laboratory for Mycobacteria at the Norwegian Institute of Public Health.

Oslo 29 September 2014

Dear conference participants!

The aim of the health collaboration in the Barents Region is to find solutions that are beneficial for everyone and can help improve public health and social well-being in our countries.

After 15 years of cooperative efforts by committed TB specialists, organisations and institutions in Norway and Russia, we see significant results in Arkhangelsk in the form of improved TB control, with better registration, diagnostics and treatment both in the ordinary and in the prison health system – and fewer TB patients. Other regions in Russia and specialists in Norway benefit from the expertise and experience gained in Arkhangelsk. Today tuberculosis is increasingly seen as a curable disease by both doctors and patients.

The situation has improved, but there are still challenges ahead. More patients are diagnosed with MDR or XDR-TB in the Barents region. HIV and TB co-infection is a growing concern. Patients experience stigmatisation associated with the disease.

The current program *Stop TB in North West Russia in our life time* has received 1.870.000 NOK in financial support from the Norwegian Ministry of Health and Care Services in 2014, and will receive funding also next year, provided the consent of the Storting.

An important aspect of the programme is raising awareness among the patients about their rights and responsibilities in society. Central to the work is the understanding of the patient as a resource and partner in the fight against the disease.

The application for the abovementioned programme was discussed in the Steering Committee of the Barents TB Programme, in which specialists from Russia, Norway, Sweden and Finland are members. The Barents TB Programme was prepared in line with WHO guidelines and the priorities of the member countries.

I would like to congratulate the health authorities in Arkhangelsk, the prison authorities, the Easy Breathing Charity Fund, the Arkhangelsk Clinical TB Dispensary, the Northern State Medical University and the LHL International and their Norwegian and Russian partners on the occasion of the 15 years anniversary.

The work you are doing in order to fight TB in the Barents Region, and to improve treatment and quality of life for the patients in Arkhangelsk, is not only invaluable for the individual patients concerned, but also contributes to improving the health care services in Russia and Norway.

Good luck with the conference!



Cecilie Brein-Karlsen

State Secretary

Norwegian Ministry of Health and Care Services

**Dear colleagues, Russian and foreign guests!**  
**Dear friends!**

On behalf of the Ministry of Health of Arkhangelsk region let me greet you at the inter-regional Theoretical and practical conference with international participation "Results of realization of the Russian-Norwegian program on reducing the spread of tuberculosis in the Barents region"

The main goal of the healthcare system of Arkhangelsk region is to care about health of the population of the region, to achieve real improvement of quality of life and increase life expectancy, to ensure access and quality of medical care, to strengthen all levels and units of the healthcare system.

Arkhangelsk region was one of the first in Russia to start – in 1998 – to implement international experience and recommendations in TB control, in 2003 got approval from the Ministry of Health of Russian Federation and World Health Organization for implementation of the project of treatment of MDR-TB patients.

In May, 2014 we celebrated 15 years of collaboration with our Norwegian partners – Nongovernmental organization Lung and Heart association which gave us considerable consultative, financial and technical support in realization of Russian-Norwegian program "On reducing the spread of tuberculosis in Arkhangelsk region".

For the 15 year period medical workers of healthcare facilities of all levels were trained in modern principles of TB activities by experts of Arkhangelsk regional TB Dispensary and Phthisiopulmonology Department of the Northern State Medical University.

Reorganization of the laboratory system allowed to improve considerably the quality of TB diagnostics and to organize drug resistance monitoring. In TB Dispensary laboratory was created to do high-technology tests.

Treatment of all patients is organized in accordance with international standards.

Uninterrupted TB drugs procurement was organized. Starting from 2007 the region has a sufficient reserve supply of medicines necessary for treatment of MDR-TB patients.

Activities for prevention of TB infection among patients and medical workers have been realized in-patient department of TB Dispensary.

Due to comprehensive and task-oriented measures from 2000 to 2013 it became possible to decrease TB incidence by 59%, TB death rate by 65,3%, to reduce significantly the number of patients with MDR-TB

Dear participants of the conference! Reports based on practical experience of specialists of TB services of the Barents region on the subject of all main directions of TB work will be presented to your attention today.

We would like to express our gratitude for collaboration to the Ministry of Health of Kingdom of Norway, nongovernmental Heart and Lung Patient Organization, administration and scientists of the Northern State Medical University, workers of the Department of the Federal Penal Services.

I wish all participants of the conference constructive work, new ideas, mutual understanding and good collaboration!

Menshikova L.I.  
Minister of Health of  
Arkhangelsk region.  
Ministry of Health of  
Arkhangelsk region.



## Executive summary

The report describes the development and achievements of a Russian-Norwegian collaboration on TB control in Arkhangelsk, Northwest Russia. The report focuses on a period of fifteen years, from 1997/1998-2013.

### Background for collaboration

The collapse of the USSR and the socio-economic crisis in 1991-1995 led to an increase in TB incidence and mortality in all countries of the former Soviet Union. The most difficult TB situation was observed in the penitentiary system. In 1997 Director of Health Care Department of Arkhangelsk region Administration Sergey Emmanuilov appealed to the Council of the Barents Region to assist in the implementation of TB control. Shortly after a collaborative agreement between relevant actors in Norway and Arkhangelsk was signed.

### Purpose of this report

The report describes the development and organization of cooperation, activities carried out, achievements, challenges, and recommendations for further work. The report both documents and shares experiences from the collaboration.

### Initial challenges in TB control in Arkhangelsk

The main challenges identified *in the beginning* of the co-operation included: an increased morbidity and mortality from tuberculosis, high level of drug-resistant tuberculosis, and extremely high levels of TB in the prison system in Arkhangelsk. The system for reporting and recording of TB was not in line with recommendations from The Union and WHO. In addition, the TB treatment regimens were not in line with WHO standards, and with long-term hospitalization and low cure rate. Furthermore, the diagnosis of tuberculosis was found to be imperfect (the main diagnostic method was a radiological; sputum smear microscopy was used very rarely and was of poor quality) and the infection control at TB facilities and in health care facilities was unsatisfactory. Last, but not least, there was irregular supply of anti-TB drugs.

### Program design

To respond to these challenges a collaborative program was designed. Later on, additional challenges emerged that needed attention so the nature of the program collaboration changed accordingly. First phase of collaboration, 1997-2001, focused on reorganization of basic TB services in line with the international recommendations. The second phase, 2002-2006, dealt with diagnosis and treatment of multidrug-resistant TB. The third phase, 2007 -

present focused on the development and implementation of an electronic recording and reporting system for tuberculosis, scientific conferences, training sessions and seminars to exchange experience and best practices among health care professionals of the North-West Federal Region, and the introduction of health communication and social and psychological support for patients and TB affected communities.

#### Key achievements

Further growth of TB has been prevented in Arkhangelsk. Of particular importance is the prevention of further increase of MDR-TB and XDR-TB, which is increasing in many parts of Russia and also globally. Over the last decade TB notification rate has been reduced by approximately 50 percent. This is also the case for MDR TB. Furthermore, the mortality rate of TB is reduced by more than 70 percent. The data for the region show promising results, and where compared to the Russian Federation as a whole, Arkhangelsk is doing better. Management of TB; infection control, recording and reporting, diagnostics, treatment and follow-up of patients have greatly been improved as a result of the collaboration.

#### Future challenges and how to mitigate

Despite the positive development of TB control in the region, there are still challenges that need addressing. Firstly, the fatality rate of TB, even though declining, still remains high in the Arkhangelsk region (15 % of TB cases notified in 2013). Secondly, there is still a high rate of patients lost to follow-up of TB treatment. Thirdly, the increase in HIV among the population (in particular in prison) requires special attention to prevent TB. In addition, lack of knowledge in the general population about TB and the lack of qualified health personnel remains a challenge. MDR TB, even though declining, still remains a high percentage of all TB cases and must be dealt with in the future collaboration. The socioeconomic implications of TB must also be addressed more.

The program has identified ways in which these challenges may be met. First of all there is a need for delay studies to identify factors associated with patients delay in going to the doctor, as well as doctors delay in diagnosing and starting treatment. In addition, the social aspect of the disease must be given more attention and include exploring different types of measures and individually tailored approaches to motivate patients to stay on treatment. This includes continuation of cooperation with various public organizations that provide social, legal and psychological support. Furthermore, the spread of quality information about the disease should be an ongoing task in TB control. In Arkhangelsk, we suggest increased efforts to tackle the HIV/TB co-infection. We also strongly believe in sustained and improved supervisory visits to the districts, in technical conferences where capacity and motivation

among people involved in TB control is strengthened. Lastly, we would like elements of health communication to be included in the curricula of higher medical institutions.

#### Lessons learned

First of all, sharing of knowledge is key to a positive development in TB control. Supporting collegial technical cooperation should be part of all interventions. We also found that long term perspective is needed, together with a holistic (both medical and social) approach to TB control. The importance of forming partnerships with a variety of actors relevant for TB control must also be highlighted here. In addition, ownership is imperative and must be secured in all types of collaborative actions. TB control programs must also manage to be flexible, with the ability to change according to needs and learning. Another key learning from this collaboration is that the most vulnerable and marginalized groups in society must be actively addressed in TB control. We have also seen that peer support (former TB patients helping TB patients) and the use of TB patient organization is helpful in achieving higher treatment success rates. Furthermore, systematic training of health personnel and supportive supervision of the districts is needed and should not be underestimated. As part of this a joint electronic recording and reporting system has proved to help the management of TB. Agreement between the various stakeholders on a standard regimen for treatment of TB was also a contributing factor to the success in Arkhangelsk. Last, but not least, infection control must always be dealt with and secured at an early stage.

The collaborative partners in Arkhangelsk hope that these experiences will be helpful for others involved in combating TB in the North West region and in other parts of Russia.

The collaboration has been important also for Norwegian partners by strengthening professional and personal relations across the border, strengthening competence in clinical and programmatic aspects of TB control, for LHL's development of health communication and by contributing to the global fight against tuberculosis.

## Introduction

In 2013 the Russian and Norwegian partners celebrated 15<sup>th</sup> anniversary of collaboration in reducing the spread of tuberculosis in Arkhangelsk region. The partners are: Ministry of Health (MoH) of Arkhangelsk region, Northern State Medical University (NSMU), Arkhangelsk Regional TB Dispensary (ARTD), Department of the Federal Penal Services in Arkhangelsk Region (DFPS), non-profit organization “Easy Breathing” charity fund (EB Fund), Norwegian Institute of Public Health (NIPH) and Norwegian Heart and Lung Patient Association (hereinafter LHL), from 2013 reorganized into a Foundation called LHL’s International TB Foundation (hereinafter LHLI). During these years of cooperation the specialists have collected a unique experience in combating this infectious disease following Russian standards and international recommendations. Since the situation on TB and MDR-TB has significantly improved over these years, the experience of Arkhangelsk region was acknowledged in other regions of Russia and on the international level. The purpose of this report is to describe the development, organization of cooperation, activities carried out in the framework of this collaboration, including both achievements and challenges, and to develop recommendations for further work. We hope that the experience of Arkhangelsk region will be useful for strengthening TB control activities in other regions.

This report has been developed in a collaborative manner between the parties. Information has been compiled from annual and bi-annual reports and through questionnaires to former stakeholders and staff involved in the program. The three main authors of the report have also been key in the development of the program from the very beginning and have therefore been able to verify the information compiled and submitted by others. A conference was held in Arkhangelsk in 2014 in order to share the experiences to a larger audience.

### Arkhangelsk region: brief information



Arkhangelsk region is located in the north of the European part of Russia. Its coast along 3 thousand km is washed by the cold waters of 3 Arctic seas: the White, Barents and Kara. Arkhangelsk region has an area of 589,913 square km. The Nenets Autonomous District belongs to the territory of the region, as well as the islands of Novaya Zemlya and Franz Josef Land. From January 2006 the territory of the region

includes 226 municipalities: 7 urban districts; 19 municipal districts; 20 urban settlements; 180 rural settlements. The main settlements are located in the basins of major rivers in the region.

The population of Arkhangelsk Region is 1 159 500 people (01.01.2013). The population density is low (2.02 persons per sq km.). 74.7% of the population live in cities, 25.3% - in rural areas. The average age of the population is 37 years and 64.3% are of working age. Administrative center of the region is Arkhangelsk, founded by Tsar Ivan the Terrible on March 5, 1584 in the mouth of the Northern Dvina River. The largest cities are: Severodvinsk, Kotlas, Novodvinsk, Korjashma, Mirny.

The ethnic composition of Arkhangelsk region is relatively homogeneous. 94.2% is Russian, 2.1% Ukrainians, 0.8% Belarusians, 0.6% Nenets, 0.4% Komi, 1.9% other ethnic groups (Tatars, Chuvash, Mordva and others).

Closeness of the seas and oceans has significant influence on region climate, which is transitional between maritime and continental. Winter is usually long (up to 250 days) and cold, with low temperature, in average - 26 degrees and strong winds. The average summer temperature is about 15 degrees Celsius.

The region has a surplus of water resources. There are 70 thousand big and small rivers with

a total length of 275 thousand. km. Four major rivers (Northern Dvina, Pechora, Onega and Mezen) flow into the Arctic Sea. Broad and deep Northern Dvina creates favorable conditions for navigation and is the main waterway.

Arkhangelsk region has significant forest resources and mineral reserves. The area covered by forest is 22.3 million hectares. The region has numerous resources of limestone, dolomite, cement raw material, gypsum and anhydrite, sands, clays and low-melting loams, building stones, groundwater, manganese, copper ore, zinc, lead, amber, agate jewelry, and other minerals. There is a significant great resource base for the production and processing development of oil and gas (Nenets Autonomous Okrug), bauxite (Plesetsk District). The diamond mine, the only one in Europe, is open in Arkhangelsk region

Regional industry is represented by a large wood processing industry, but also there are fish farms, the center of submarines production (Severodvinsk) and space center.

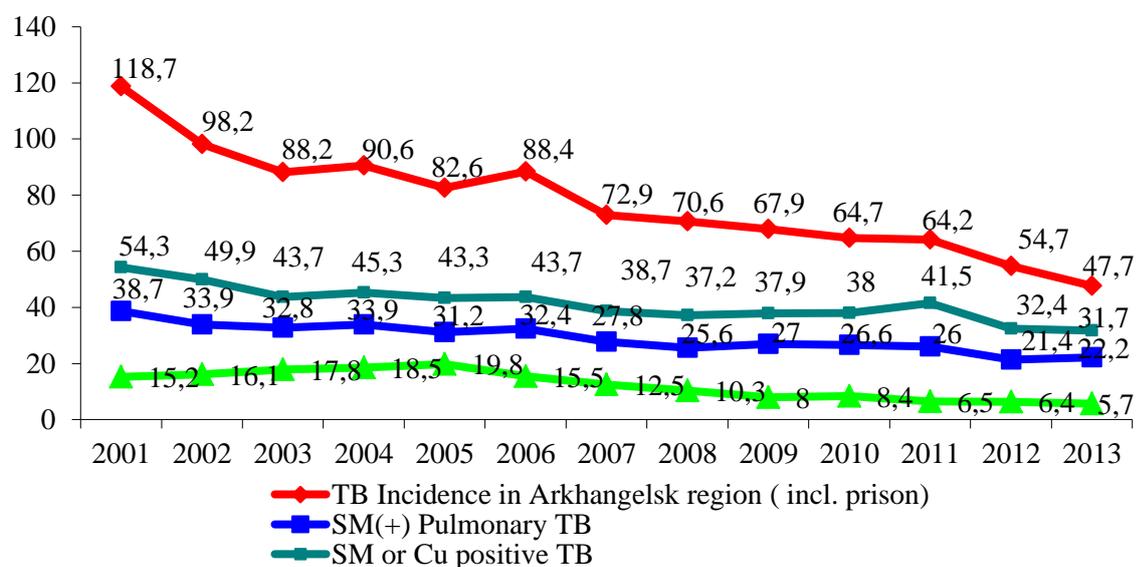
The region has 20 penal colonies and 4 trial centers (with a total number of 11,000 prisoners), which are under Federal Government (Ministry of Justice).

Source: Arkhangelsk region government (from website <http://www.dvinaland.ru/region/>)

## Background and the origin of cooperation

Caused by the collapse of the USSR and the crisis in the economy, socio-economic situation in 1991-1995 led to the deterioration of the epidemiological situation on TB in all countries of the former Soviet Union. In Russia during this period there was an increase in TB incidence and mortality. A significant reduction in the resources of health facilities led to the need for further measures to contain the spread of tuberculosis, to improve TB detection and organize comprehensive treatment. In these circumstances, it became apparent that in such political, socio-economic and epidemiological conditions, the traditional measures did not have the desired impact on the prevalence of tuberculosis. The most difficult epidemiological situation with tuberculosis was observed in the penitentiary system, where the incidence was more than four times higher than the epidemic rate. In 1999-2000 TB incidence in the region was much higher than the mean national rates and it reached an epidemic rate.

Figure 1. Incidence of Tuberculosis (new cases and relapses) and mortality in Arkhangelsk region (including prison) in 2001 – 2013.



To solve these problems a Regional interagency target program was adopted: "Urgent measures to combat tuberculosis in the Arkhangelsk region in 1996-1998". (Resolution of the head of the regional administration from 05.06.1996, №262).

In 1997 Director of Health Care Department of Arkhangelsk region Administration Sergey Emmanuilov appealed to the Council of the Barents Region with a request to assist in the implementation of TB control activities planned in the Program. Later Sergei Emmanuilov several times approved and signed multilateral collaboration agreements between the partners of Arkhangelsk region and Norway. Since November 2010 Minister of Health, Professor Larisa Menshikova has been supporting Norwegian-Russian projects on TB control.

The first step of the Russian-Norwegian collaboration on TB management in the region was made in 1995 in strengthening laboratory services for TB diagnostics. One of the main TB expert of the Arkhangelsk region, doctor Nina Nizovtseva, together with the specialists from Phthiopolmonology Department of NSMU and Norwegian partners - Norwegian Institute of Public Health (NIPH) and the Norwegian Heart and Lung Association made a decision that the laboratory of Arkhangelsk TB Dispensary would function as a regional reference laboratory, performing drug resistance monitoring. After extensive laboratory renovation, held in 2002, the gradual introduction of quality assurance (QA) system, by exchanging samples of WHO test panels, training of laboratory doctors and the purchase of modern equipment,

the laboratory started to serve as the reference laboratory for both civil sector and penitentiary system.

In February 1997, in the framework of cooperation in the Barents region, a meeting of the Working Group on Health and Social Issues was held in Rovaniemi, Finland. The meeting concluded that infectious diseases, especially tuberculosis, must be on the list of prioritized health interventions in the North-West of Russia. This was due to the deterioration of the epidemiological situation with TB, increased mortality and incidence rate. The Working Group recommended Norway to take responsibility in assisting in the development of TB control in Arkhangelsk region, and Finland to support the Murmansk Region and the Republic of Karelia.

On March 4, 1997 in Harstad, Norway, there was a meeting between the head of the Department of Health in Tromso region, Finn Bye, the senior TB specialist of Norway, Adviser of the Ministry of Health on drug-resistant TB, the International Union Against Tuberculosis and Lung Diseases (IUATLD, the Union), the LHL consultant Knut Øvreberg and a representative of the Healthcare Department of Arkhangelsk region, Svetlana Manankova. They came to an agreement that it was necessary to conduct an assessment visit to Arkhangelsk Region. LHL was already at that time concerned with the alarming TB situation in northwest Russia. LHL's members - survivors of TB and the founding fathers of LHL in the 1940s were concerned and urged the LHL administration to find ways to assist if possible. In 1995 the head of LHL TB department, Mette Klouman, visited Ivanovo Region as part of an WHO and IUATLD delegation to assess the TB situation. LHL had for many years cooperated with Knut Øvreberg on international TB control programs in different countries and had profound experience in assisting TB control programs globally. LHL was ready to join in when Knut Øvreberg asked for collaborative measures with Arkhangelsk Region. LHL agreed to provide the necessary financial support in organizing the first visit.

Dityatev V.I., Ph.D., Associate Professor, Head of TB department of NSMU in 1980-2000, recalls:

When showing the Norwegian experts the work of TB service, we were sure that this service was one of the best in the world. The USSR paid great attention to the organization of TB services, because this disease belonged to the category of "social", and significant funds were allocated for the development of TB control activities.

We showed experts the system of TB prevention, TB detection and organization of the regular medical check-up and treatment of the patients. Unfortunately in 1991 - 1995 due to

the collapse of the Soviet Union and the restructuring of the society, some problems emerged: the deterioration of living standards, insufficient financing of health systems, the lack of TB drugs; all these led to the increase in TB Incidence and mortality.

### Start of collaboration.

The first visit of the Norwegian experts to Arkhangelsk region was held on 18-25 July, 1997. The Norwegian delegation consisted of Knut Øvreberg and Einar Heldal, head of the National Register of Tuberculosis at the National Health Screening Service of Norway (which in 2002 was integrated into the Norwegian Institute of Public Health). They visited ARTD, two district hospitals in Shenkursk and Vinogradovskiy area, rural health posts and sanatorium for adults in Shenkursky district.

Nina Nizovtseva, Head Doctor of Arkhangelsk Regional TB Dispensary in 1991-2007, recalls:

I will never forget the first trip to the districts of the region (from Arkhangelsk to Shenkursk and back) with V. Dityatiev, T.Eliseeva and Norwegian partners Knut Øvreberg and Einar Heldal in July, 1997. For the Norwegian partners it was the first visit, and I was trying to tell them how well we provided TB care at all levels - from the Regional Tuberculosis Dispensary to the rural health post in Shenkursk area. And, indeed, there was something to be proud of: free medicine and planned examination (x-ray screenings plan was made by the experts of TB services and the Center of State Sanitary and Epidemiological Supervision, it was approved by the chairman of the district executive committee and the directors were in charge if there was a delay in employee's screening), and there were sanatoriums for rehabilitation both in the region and all over the country. But when visiting the clinical diagnostic laboratory in Vinogradovsky Central District Hospital Knut Øvreberg drew my attention to the register book where they had registered the results of testing sputum for Mycobacterium tuberculosis by smear microscopy method. The register book was used for more than 20 years, and it was accurately filled in. And over these years only one SM(+) result was registered! All good things in our work were overshadowed by that fact! I realized: we would have something to work at!

During the visit there were discussions with Nina Nizovtseva, Head Doctor of ARTD, Valentin Dityatiev, Ph.D., Associate Professor, Head of the TB Department in NSMU, Andrey Maryandyshev, Ph.D., assistant chair of TB Department in NSMU. The visit resulted in the

meeting with the Director of the Healthcare Department of Arkhangelsk Region, Dr. Sergei Emmanuilov, where the main challenges were discussed.

During the first visit of Norwegian experts the following challenges of TB control in Arkhangelsk region were identified:

1. Increase in TB incidence and mortality rates, drug-resistant tuberculosis (8% of MDR among new cases, as reported by ARTD in 1996).
2. Extremely high level of TB in the prison system.
3. A significant difference in TB recording and reporting system from WHO and IUATLD recommendations.
4. Imperfect diagnosis of tuberculosis (the main diagnostic method was X-ray, sputum smear microscopy was used very rarely and was of poor quality).
5. Unsatisfactory level of infection control both in TB facilities, and in the general health care facilities.
6. The TB treatment regimens were not in line with WHO standards, and as a result, long-term hospitalization and low cure rate.
7. Irregular supply of TB drugs.

Thus during the visit a set of problems was identified, and these problems demanded joint efforts to be solved.

## The Legal Framework of Collaboration

The Director of the Health Care Department of Arkhangelsk region Mr. Sergey Emmanuilov and the president of LHL at the time, Mr. Svein Erik Myrseth signed an agreement on the Russian-Norwegian program "On the reduction of the prevalence of tuberculosis in Arkhangelsk region" for the period from May 15, 1998 to December 31, 2000. This program was developed on the basis of international experience in TB control as recommended by the Union and WHO, scientific research of the NIPH and the TB Department of NSMU. The

program was reviewed by the Research Institute of Tuberculosis of Russian Academy of Medical Sciences in 1998.



*On the photo: the visit of Norwegian partners to Arkhangelsk in 1998 (from left to right – Dominique Caugan, Nina Nizovtseva, Natalia Zhdanova, Svein Erik Myrseth, Anne Horgheim)*

#### **Objectives of the first program.**

The main aim and objectives of the Program on the reduction of the prevalence of tuberculosis in Arkhangelsk region (Annex №2 to the Order №215-0 from 31.08.1998 "On additional measures to reduce the prevalence of tuberculosis in Arkhangelsk region"):

1. Introduce sputum smear microscopy as a main method of diagnosis of infectious forms of tuberculosis in health care facilities of Arkhangelsk region; provide a systematic QC of microscopy and bacteriological methods of TB detection.
2. Introduce internationally recommended standard regimens of short course chemotherapy, to monitor the treatment outcomes by smear microscopy and culture methods.
3. Develop and implement a new system for TB monitoring in line with the international guidelines.

4. Organize regular trainings for health workers and provide the healthcare facilities with the necessary equipment and consumables.
5. Ensure uninterrupted supply of TB drugs.
6. To take measures for improving infection control in health care facilities of TB services and primary health care net.

The Healthcare Department of Arkhangelsk region supported the development of the program and approved the immediate implementation of TB control activities by order №215-0 dated 31.08.1998 "On additional measures to reduce the prevalence of tuberculosis in the Arkhangelsk region."

In 1999 the director of the Arkhangelsk DFPS General Evgeny Malov, the Head Doctor of ARTD Nina Nizovtseva, the chair of the TB department of NSMU Valentin Dityatev and the President of LHL Svein Erik Myrseth signed an annex to the agreement on the implementation of the above-mentioned additional TB control activities in the prison system.



*On the photo: joint Russian-Norwegian conference in 2002 (from left to right – Torunn Hasler, Tamara Rumiantseva, Andrey Mariandyshev, Nina Nizovtseva, Evgeniy Malov)*

In 2000 the second unit of the prison system in the region joined the Norwegian-Russian TB program (annex to the Agreement signed by the head of the Correctional Institution-250 of the Ministry of Justice of Russian Federation Anatoly Radchenko).

Thus, since 2000 standard unified approach to identify, diagnose, treat and monitor tuberculosis has been used throughout Arkhangelsk region both in the civilian sector and the prison system.

In the end of 2000 the agreement on cooperation in the field of TB control in Arkhangelsk region was prolonged for the period from January 1, 2001 until December 31, 2005, and then from January 1, 2006 till December 31, 2010.

In 2011 the Memorandum of Cooperation for the period until December 31, 2015 was signed between the Ministry of Health of Arkhangelsk region (Russia), the Department of the Federal Penal Service of Russia in Arkhangelsk Region, Northern State Medical University (Russia), the non-profit organization Foundation "Easy Breathing" (Russia) and the Norwegian Organization of Heart and Lung Patients LHL (Norway).

In January 2013 the department of International Cooperation of LHL was reorganized into an independent public organization - the International Foundation for the fight against tuberculosis "LHL International". In this regard, on March 1, 2013 the Chairman of Charity Fund "Easy Breathing" Nina Nizovtseva and executive director of the International Fund for the fight against tuberculosis "LHL International" Trude Bang signed a new agreement for the period until March 31, 2015.

In June 2014 the Ministry of Health of the Arkhangelsk Region, Department of the Federal Penal Service of Russia in Arkhangelsk region, Northern State Medical University, Charitable Foundation "Easy Breathing" and the International Fund for the fight against tuberculosis "LHL International" (Oslo, Norway) signed a Memorandum on collaboration, valid from 01.01.2014 till 31.12.2018.

## Roles of the collaborative partners

Health Care Department of Arkhangelsk region (later - the Ministry of Health of Arkhangelsk region):

- Ensures compliance with the regulations of the Ministry of Health and Social Development of Russian Federation, recommendations and standards of TB control developed by the Union and WHO, including GLC.
- Provides planning, management and monitoring of the implementation of the TB program.

- Provides TB detection and monitoring of the effectiveness of TB treatment, based on bacteriological methods of examination and quality control system.
- Ensures TB drugs supplies for TB patients.
- Sets the system of TB drug supply to avoid interruption at all stages of treatment.
- Keeps responsibility for the establishment of infection control in TB facilities in order to prevent nosocomial infection.
- Provides funding:
  - to acquire drugs for treatment of TB patients and equipment, including the equipment for the laboratory diagnosis of tuberculosis;
  - to improve material and technical base of TB facilities in order to establish infection control measures;
  - to keep monitoring system of tuberculosis;
  - to train medical staff at all levels in TB management;
  - to carry out scientific conferences on tuberculosis.

Arkhangelsk Regional TB Dispensary:

- Conducts TB treatment in accordance with international guidelines and regulations of the Russian Federation.
- Organizes the work of the Central Medical Control Commission which determines the treatment regimens for all MDR TB patients in the region, including patients in the penitentiary system.
- Distributes TB drugs, and also controls TB drugs supplies. Provides reports on the availability and distribution of TB drugs to the Ministry of Health of Arkhangelsk region and to LHL.
- Makes drug susceptibility testing for all TB patients in Arkhangelsk region and performs analysis of drug resistance of Mycobacterium tuberculosis in the region.
- Provides free quality control of bacteriological diagnosis of tuberculosis throughout the region, including the prison system.

- Monitors and assesses the TB epidemiology in accordance with the guidelines of the Ministry of Health of the Russian Federation, IUATLD, and WHO.
- Conducts supervisory visits to evaluate the implementation of TB program in the region, including the penitentiary system.
- Organizes and conducts jointly with the Ministry of Health of Arkhangelsk region and TB Department of NSMU courses, seminars and scientific conferences on TB issues for the health personnel at all levels of the civil sector and the prison system.

Department of the Federal Penal Services in Arkhangelsk region:

- Provides organizational guidance and TB control in the penitentiary system in the Arkhangelsk region: TB detection and treatment of TB patients, monitoring of the epidemiological situation and the effectiveness of TB control.
- Organizes detection of TB patients, mostly using laboratory methods, in the period between the fluorography check which is conducted twice a year.
- Provides laboratory diagnosis of tuberculosis with sputum smear microscopy in all parts of the prison health care system in accordance with Russian regulations and international recommendations.
- Ensures the implementation by the regional bacteriological laboratory of Penitentiary Service the following functions:
  - Carrying out of studies on the diagnosis of tuberculosis with sputum smear microscopy and cultures and the TB drug resistance testing to anti-TB drugs.
  - Training of medical laboratory staff of penitentiary institutions to diagnosis of tuberculosis using sputum smear microscopy, on safety measures at work and quality control.
  - Cooperation with bacteriological laboratory of Regional TB Dispensary, including the sending of all cultures of Mycobacterium of tuberculosis to the Regional TB Dispensary and medical department of the Federal Penitentiary Service of Russia for quality control and data bank.
  - Carrying out of the analytical work on prevalence of drug resistance of TB Mycobacterium in the penitentiary system in the Arkhangelsk region.
- Ensures compliance of the penitentiary institutions with infection control measures.

- Conducts the distribution of patients' flow in order to prevent cross-infections between patients.
- Conducts TB treatment in accordance with the regulations of the Russian Federation and international recommendations.
- Refers TB patients with multidrug resistance to the Central Control Commission of the regional medical clinical tuberculosis dispensary to define jointly the tactics of treatment.
- Provides TB patients with the drugs.
- Conducts monitoring of tuberculosis in accordance with the guidelines of the Ministry of Health and Social Development of the Russian Federation, the International Union Against Tuberculosis and other lung diseases, and the World Health Organization.
- Conducts supervisory visits to penitentiary institutions together with specialists of the Regional Clinical TB Dispensary, TB Department of the Northern State Medical University and external experts of the program for its the objective evaluation at least four times a year.
- Ensures participation of medical personnel of the penitentiary system in the courses and seminars organized by Ministry of Health of the Arkhangelsk Region, Regional Clinical TB Dispensary, TB Department of the Northern State Medical University; World Health Organization; International Union Against Tuberculosis and other lung diseases on the modern organization of TB control, the laboratory diagnosis of tuberculosis, treatment of patients, including patients with multidrug-resistant tuberculosis and TB monitoring.

Northern State Medical University:

- Carries out scientific and practical training of health personnel;
- Carries out consultative service in all areas of TB control program;
- Organizes and conducts research;
- Performs planning and conducting operational research in cooperation with other parties;
- Develops guidelines for the implementation of TB control activities.

The Norwegian Heart and Lung Patient Organization (LHL):

- Provides technical, consultative and financial support to the following areas of TB program:
  - Training of health staff at all levels, including the penitentiary system;
  - Purchase of medicines for the treatment of TB patients which cannot be acquired by any other sources;
  - Improving of infection control in TB facilities;
  - Improving the quality of laboratory diagnosis of tuberculosis;
  - Improving the functioning of the monitoring system of tuberculosis;
  - Carrying the supervisory visits to districts and towns of the Arkhangelsk region, including the institutions of penitentiary system;
  - Social support of TB patients and the activities necessary for the successful implementation of the TB program.
- Applies for financial support from the Government of Norway, from a Norwegian umbrella organization for people with disabilities, also involved with TB support, the Atlas Alliance, and from other donors on the basis of the annual plan for implementation of the TB program.
- Carries out supervisory visits to the Arkhangelsk region at least twice a year to monitor the implementation of the TB program in the civilian sector and the penitentiary system, provides consultative service and the revision of the budget.
- Involves LHL consultants, experts from the International Union Against Tuberculosis and other lung diseases, and the World Health Organization as external consultants to assess the implementation of the TB program in the Arkhangelsk region.
- Presents the reports of the supervisory visits with the recommendations of the Russian and Norwegian partners and sponsors.



*On the photo: joint supervising visit in Kotlasskiy and Krasnoborskiy districts in 2003 (from left to right – Einar Heldal, Torunn Hasler, Nina Nizovtseva, Valeriy Panasik)*

A Charity Foundation for TB patients was established in 2005. Its main mission is to assist the public health institutions in preventing the spread of tuberculosis in the Arkhangelsk region.

According to the Charter 2005 the main activities of the Foundation in order to assist in the diagnosis, treatment, social adaptation and rehabilitation of TB patients are as follows:

- charitable activities;
- material support to medical facilities for TB control activities;
- assistance to scientific and practical conferences, seminars, courses, training on TB issues;
- TB drugs procurement;
- social, psychological, anti-substance abuse and other forms of support to TB patients
- improving the conditions for TB patients staying in TB facilities in order to meet infection control measures;
- social support for children with latent TB;

- health education for population;
- assistance in supervisory visits.

In 2009 the Foundation expanded its activities by giving more support to the communities affected by TB (TB patients and their families), ensuring access for patients with lung and heart diseases to the most modern and effective methods of diagnosis, treatment and rehabilitation, strengthening social security and improving the quality of life of TB patients, overcoming social exclusion and stigmatization of TB patients, development of organizations and associations of patients.

The foundation changed its name and became known as Charitable Foundation for patients with lung and heart diseases "Easy Breathing". It was done in order to reduce stigma towards TB patients as previous name caused rejection among TB patients, their families and community.

Today the Charitable Foundation works in three main areas: spreading knowledge among healthy population about prevention of pulmonary diseases, especially tuberculosis, and promotion of healthy lifestyles; social and psychological support for the most vulnerable to tuberculosis groups (children and adolescents, persons in prisons, HIV infected and other groups), as well as the enhancement of the skills of health workers (conferences, seminars, trainings).

Thus, the foundation started to implement components 4 and 5 of the WHO Stop TB strategy (2006), namely:

- "4. Engage all care providers: Involve all public, voluntary, corporate and private providers through Public-Private Mix (PPM) approaches".
- "5. Empower people with TB, and communities through partnership: Pursue advocacy, communication and social mobilization. Foster community participation in TB care, prevention and health promotion."

During the years Russian-Norwegian cooperation developed in the following priority areas:

**Phase I:** 1997-2001 Reorganization of TB services in line with the international recommendations.

**Phase II:** 2002-2006 Diagnosis and treatment of multidrug-resistant TB.

**Phase III:** 2007 - present:

- Development and implementation throughout the area of an automated monitoring system for tuberculosis
- Organization and carrying out of scientific conferences, training sessions and seminars to exchange experience and best practices among health care professionals of the North-West Federal District
- Introduction of elements of health communication and social and psychological support for patients and TB affected communities

## Financing

Basic TB control activities in both the civil and penal systems were financed by the Russian side (federal, regional, municipal budgets). The Norwegian side has allocated from different sources and channeled through LHL for the period from 1997 - 2013 approximately 42.4 million NOK. In 2002 the Atlas-alliance organized a TV marathon on Norwegian TV, so a significant amount of funds was drawn, some of which was spent on support of TB activities in Arkhangelsk region through LHL. Other donors were the Norwegian Ministry of Foreign Affairs, Barents program / Norwegian Ministry of Health, donations from the local branches of LHL, INFIL and the Norwegian Institute of Public Health. In 2013 funding through the Atlas Alliance stopped.



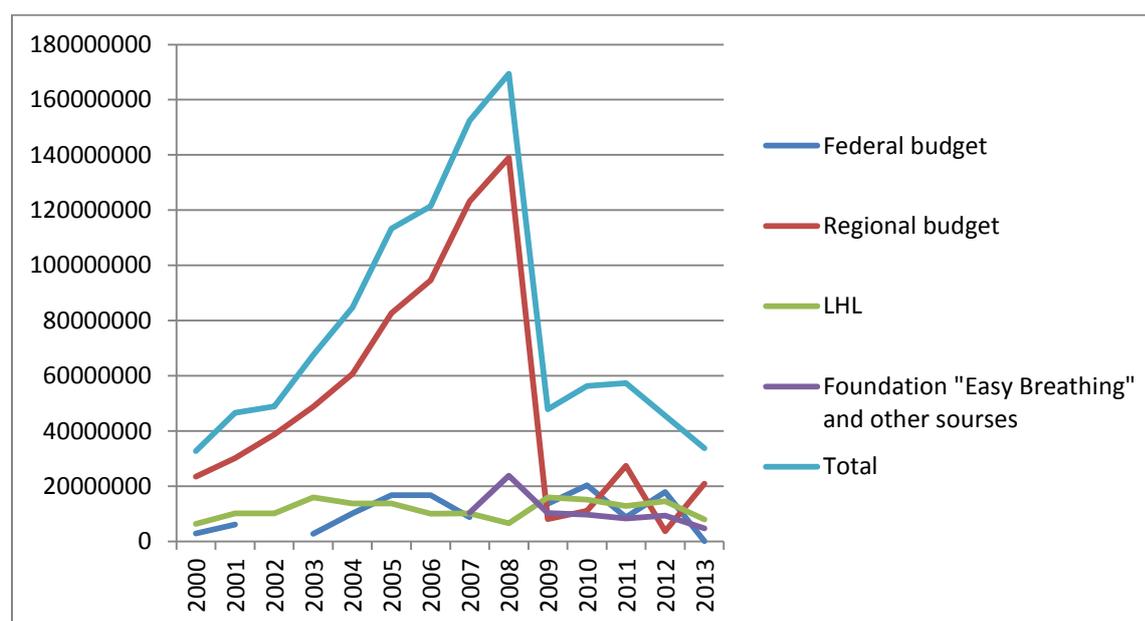
*On the photo: Renate Helgestad and Elin Dahl, representatives of a local branch of LHL donates a gift to the TB program in Arkhangelsk to Nina Nizovtseva*

Additional funds have been raised by the Charitable Foundation "Easy Breathing" through the grant applications and proposals. Russian and international organizations for the implementation of target programs aimed at strengthening laboratory diagnosis, improved monitoring of TB infection control and improvement of conditions for hospitalized patients, enhancement of the skills of health workers and health education activities among the healthy population, and others.

Table1: Funding for TB control activities in 2000 - 2013

	Federal budget (rubles)	Regional budget (rubles)	LHL (rubles)	EB Fund and other sources	Total (rubles)	Total (NOK)	Total (USD)
2000	2918100	23446071	6396000		32760171	5323528	824829
2001	6166122	30177300	10200000		46543422	7563306	1171861
2002	-	38734893	10220000		48954893	7955170	1232576
2003	2780230	48824604	15900000		67504834	10969536	1699623
2004	10199970	60733308	13780000		84713278	13765908	2132893
2005	16800930	82734000	13780000		113314930	18413676	2853020
2006	16757660	94642278	10080000		121479938	19740490	3058597
2007	8820120	123174523	10132000	10344703	152471346	24776594	3838892
2008	No data	13046488	6640767	23778343	169465598	27538160	4266770
2009	13605452	8061951	15938055	10237769	47843227	7774524	1204587
2010	20359773	11057796	15146265	9703730	56267564	9143479	1416693
2011	8836326	27427032	12813397	8329213	57405968	9328470	1445356
2012	17913707	3715400	14511545	9418306	45558958	7403331	1147074
2013	57451	20946500	8001606	4786251	33791808	5491169	850803

Figure 2: Funding for TB control activities in 2000 - 2013



Increase in funding before 2008 and reduced funding in the ensuing years is explained by the end of the process of replacement of expensive X-ray equipment at ARTD and also by reduce in funding for anti-TB drugs needed for treatment of all MDR-TB patients who waited for treatment during previous years. Since 2007 all patients with MDR-TB were provided with all necessary drugs and since 2009 the need in TB drugs was reduced as only new cases were started on treatment. The cost of 2.line drugs and regimens have also decreased in recent years.

Other organizations providing consultative and financial support to TB control activities of Arkhangelsk region during the period of co-operation:

1. Norwegian Institute of Public Health: laboratory support, improving TB diagnostic work and laboratory biosafety, exchange visits.
2. University of Oslo, Center for International health (prof. Gunnar Bjune): training master and PhD students. .
3. Task Force on infectious diseases in the Baltic region: renovation of MDR department in the Regional prison hospital.
4. Expert Group on TB / HIV NDPSH: developed TB/HIV plan.
5. World Health Organization/GLC/Global Fund for AIDS, TB, malaria: GLC gave in 2003 access to purchase quality ensured 2.line drugs with reduced price. From 2007 drugs were paid by Global fund until Federal Ministry of Health took over in 2010 Global Fund also supported management of TB and MDR-TB patients. The organization "Russian health care" was established to distribute TB drugs provided by the Global Fund.
6. The Norwegian Red Cross / Russian Red Cross/International Federation of the Red Cross: Norwegian Red Cross provided food incentives in 1998, Russian Red Cross food support to ambulatory TB patients. IFRC implemented projects all over Russia, including Northwest Russia, supporting conferences.
7. The Union (International Union against TB and lung disease): reviewed the TB program in Arkhangelsk under the leadership of Prof. Donald Enarson in 2001 and 2008.
8. INFIL foundation: supported renovating for infection control in the regional TB dispensary and a module for XDR-TB patients in the prison hospital in Puksa.
9. Partners in Health: Provided training TB specialist in Tomsk and one training course in Arkhangelsk.

### Ways of cooperation.

In the period from 1997-2011 the representatives and consultants of LHL and NIPH came to Arkhangelsk twice per year. External experts from other international organizations were also

involved in the supervisory visits: the World Health Organization, WHO "Green Light Committee" (GLC), the Union, and others. During the visits the experts visited the Ministry of Health of Arkhangelsk region (previously - Department of Health), Arkhangelsk Regional TB Dispensary, Department of the Federal Penal Services in Arkhangelsk region, the Regional Prison Hospital. Supervisory visits were conducted to different parts of the region (including the penitentiary system). Starting from 2006 the visits became more of a thematic character. Since 2012 the Norwegian partners have visited Arkhangelsk at least once per year. With the development of IT it became possible to hold most of consultations via video conferences.

A.O. Maryandyshev., Prof., Corresponding Member of the Russian Academy of Sciences, since 2000 the Head of the TB Department of NSMU, recalls:

Financial Aid of LHL - the Norwegian Heart and Lung Patient Organization, in the times of economic instability, allowed not only to improve TB control, but also to organize social assistance with food to patients and medical staff.

But the most important activities of LHL were the consultative visits of our friends - Per Sandven, Knut Øvreberg, Einar Heldal and other experts. We were looking forward to their visits and preparing questions for discussion. After hours of discussions during the supervisory visits we chose the most urgent and priority actions that should have been implemented in the TB program of Arkhangelsk region. Without waiting for the official report we carried out urgent measures and LHL helped to finance them. Educational process was of highest priority during the visits and planning the activities.

After each visit a detailed report, including recommendations agreed among the partners, and basic epidemiological data for the current period were prepared. The first two reports were written in Norwegian, then in English, all of them were translated into Russian. Recommendations given by the experts were used to improve TB control in health care facilities of Arkhangelsk region.



*On the photo: one of the first visits in Severodvinsk TB dispensary (from left to right – Natalia Zhdanova, Nadezhda Antipina, Nina Nizovtseva, Anne Horgheim, Anna Podolskaya, Andrey Mariandyshev, Knut Øvreberg, Valentin Ditiatov)*

### Reorganization of TB services in the period 1997-2013

An important part of the Russian-Norwegian TB program were measures to reform the specialized TB services, aiming at a more rational use of available resources and compliance with infection control in medical institutions and in patients' places of residence.

In the early 2000s in Arkhangelsk region there were 460 hospital beds for adults with TB: in the regional center (in Arkhangelsk Regional TB Dispensary and in the Arkhangelsk city tuberculosis hospital in Maimaksa), in Severodvinsk TB Dispensary and in the south of the region (in Kotlas and Velsk central city and district hospitals), for surgical treatment of tuberculosis - in the thorax department of the Arkhangelsk Regional Clinical Hospital. There were three tuberculosis sanatoriums for children with tuberculosis, as well as for those having a high risk of disease (in Arkhangelsk, in Velsk and Krasnoborsk districts).

As the revised TB control activities were implemented and the number of patients declined and due to out-patient treatment options established in the region which are described later on the costly twenty-four-hour inpatient and sanatorium beds (represented in Figure 3 and 4) were gradually reduced.

Figure 3. Number of twenty-four-hour hospital beds for treating adult TB patients (civil sector) 2000 -2014.

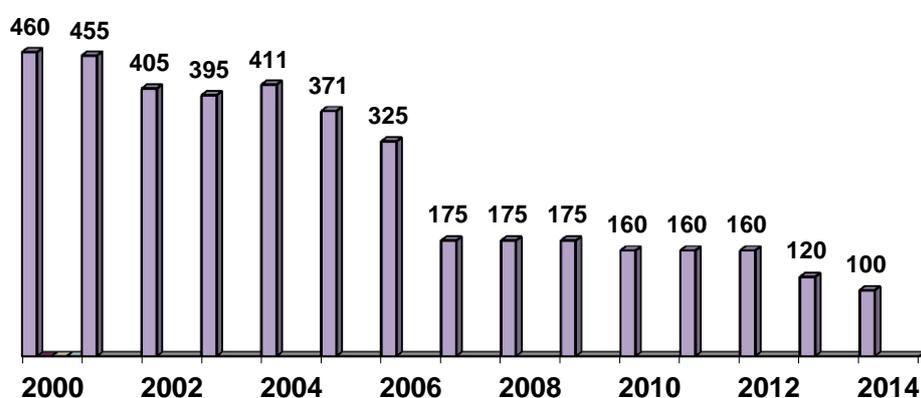
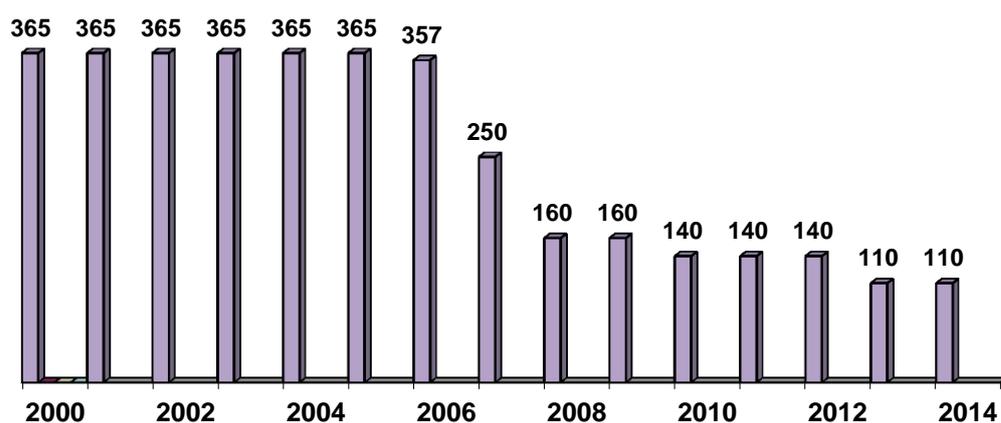


Figure 4. Number of beds in TB sanatoriums for children 2000-2014



At the moment (September 2014) there is one central TB institution in the region, which includes a hospital for adult patients with tuberculosis for 100 beds – state budgetary healthcare institution “Arkhangelsk Regional TB Dispensary”, located in the city of Arkhangelsk. All smear positive patients from all districts and cities of the region are admitted to ARTD, as well as patients suffering from adverse effects of TB drugs that require management in hospital. For patients with drug-susceptible TB there are 35 hospital beds and 65 hospital beds for patients with MDR-TB.

Children with tuberculosis of pre-school age are treated in a sanatorium department of the Arkhangelsk Regional TB Dispensary (50 beds), secondary school students are treated in state budgetary healthcare institution “Children's TB Sanatorium named after M.N. Favorskaya” (60 beds).

## Infection control in hospitals

In 2002, the ARTD was one of the first in Russia to reorganize inpatient units and to divide the patients into separate flows based on the degree of infectiousness and taking into account the drug resistance patterns for the prevention of nosocomial infection between patients. Later separation of patients was done in the Arkhangelsk city tuberculosis hospital under the supervision of Dmitry Perkhin who became the Head doctor of ARTD in 2008.

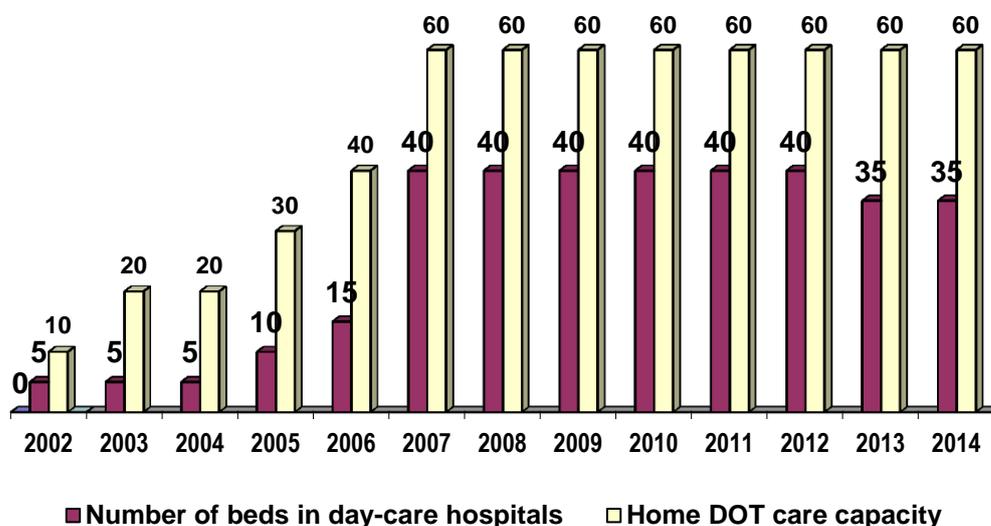
With the financial support in 2003-2006 from the Norwegian foundation INFIL and LHL it was possible to carry out the modernization and reconstruction of inpatient units in ARTD in order to improve infection control and living conditions for the patients. Two units, each for 8 patients, for isolation of patients with XRD-TB were constructed in the penitentiary facilities with financial support from INFIL and LHL in 2005 and 2006. Thanks to the financial support from LHL extensive training programs were carried out for the medical personnel and patients in the basic principles of infection control and the medical personnel was fully provided with special 3M respirators.

Arkhangelsk Regional TB Dispensary has for more than ten years had separate inpatient departments for patients with SM(+) drug-susceptible tuberculosis and SM(+) patients with MDR-TB. Separate wards for patients with XDR-TB were also established.

## Options For Out-patient Treatment.

From the beginning of the Russian-Norwegian collaboration it became obvious that opportunity of organizing treatment of not infectious patients closer to the place of residence ensures better adherence to treatment regimen and therefore out-patient treatment forms have been used since 2002: day care hospital and home based DOT. (Figure 5). Cars for the home based care nurses were purchased, a team of mainly male nurses was established and the first patients could start with this new service.

Figure 5. Number of beds in day-hospital and home-based DOT capacity.



Torunn Hasler, project coordinator for LHL from 2000 – 2011, recalls:

I remember I thought this was great. A sign of warmth, humanity and dignity for the patients and a milestone for the TB services too. The TB health services coming home to give treatment to the patient in a quite discrete way! I congratulate the TB services of Arkhangelsk with this measure of reorganizing the treatment. During the first two years I visited Arkhangelsk TB hospitals it was quite usual that TB patients were hospitalized up to one year even for sensitive TB. Even patients with smear and culture negative tuberculosis were hospitalized and completely isolated from family and social life. And it was unnecessary. With the strengthening of the TB bacteriological laboratory – people could be safely sent home for TB treatment at home based on sound evidence from the bacteriological tests and quality approved knowledge. With home based TB treatment and hospital at home service the average time of hospitalization were reduced by several months. Hospital is a safe place to be for very sick people, but home is much better!

A short story from a field visit:

We followed the home based care nurse to give DOT (directly observed treatment) and visited a middle aged male TB patient. We entered a tidy, clean and sparsely furnished room with flower-patterned tapestried walls. He lived in a two-rooms flat together with his wife. He was sitting on the sofa, dressed in a white T-shirt. He warmly but also little shy welcomed the group of nurses, doctors and the foreign Norwegian lady. His face opened up into a big smile when he understood that I spoke Russian. After going through the general medical

questions we started the social chat and exchanged news on where we had been travelling around the world. He had been working as a fisherman and had seen many places around the world. He told me with a “Mona Lisa” – smile on his lips that he was very familiar with Norway and knew every fjord as his own pocket. We both laughed. I asked him if he had seen the fjords through a periscope and he nodded.. It seems like both Norwegian and Russian submarines are very familiar with the fjords of our northern shores on both sides of the borders! It was a relief to make a joke about the previous cold war and how little we knew about each other lives in Norway and Russia. It was a truly interesting meeting. Home-based DOT reduces stigma, enables people with TB to recover more quickly – in a mentally stronger sense, keep family ties and social networks of friends. It saves a lot of money for the society and state budgets. I think of home based care as one of the greatest achievements of the TB program in Arkhangelsk and a truly patient friendly measure for the patients in Arkhangelsk.

Today, for the treatment of the inhabitants of Arkhangelsk city (population 350 000), there are 20 day care beds and 50 patients may use home based care. For the residents of Kotlas, located 300 km from the regional center (population 50,000) there are functioning 15 day care beds and 10 patients may be served at home. The indication for treatment in the day care hospital is the emergence of adverse effects of TB drugs, the treatment of which does not require twenty-four-hour monitoring. In day care hospitals the directly observed treatment is performed by nurses seven days a week. Medical assistants (“feltshers”) work for home based DOT, they daily deliver TB drugs to patients who live in the cities at a considerable distance from the place of treatment - from 5 up to 30 km.

In Severodvinsk (population 180,000) the outpatient treatment is carried out in the room for medical procedures of the tuberculosis department, which works seven days a week.

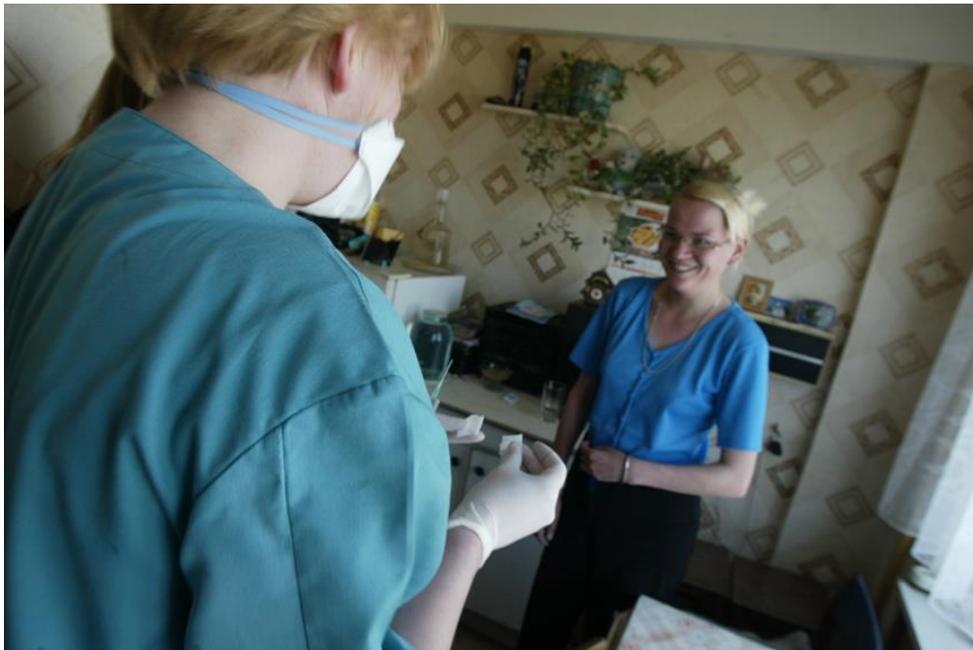
A significant part of TB patients receives outpatient treatment domiciliary in the districts and cities of the region. If a patient lives in a district or town center, observed treatment is managed by health professionals of TB cabinets, which exist in all 24 central district and city hospitals. Patients living at a considerable distance from the district center, are treated under the supervision of health workers of local hospitals and rural health stations, if necessary, the teams of emergency medical care are involved.

At the moment on average 350 patients in the region, half of them – are MDR-TB patients, receive directly observed treatment in day care hospitals, home based DOT and as out-patients.

The expansion of outpatient treatment, as well as the implementation of infection control measures led to a reduction and elimination of cases of TB among health care workers of the TB services. Since 2012 no cases of tuberculosis among health care workers in TB facilities of the Arkhangelsk region were recorded. The number of patients with tuberculosis among medical staff of primary healthcare services and prison staff of Arkhangelsk region decreased to a few sporadic cases.



*Photo: Home based care nurse Elena Schmoskaya*





*Photo: MDR-TB patient Maria Uglovskaya (published in Nordlys newspaper in 4/6 2005).*

### TB care in the penitentiary system of Arkhangelsk region.

The reorganization of TB control activities in penitentiary system was carried out simultaneously with the reorganization of TB services in the civil sector of the Arkhangelsk region. In early 1999, due to the increased number of patients with tuberculosis local areas for isolation and treatment were organized in colonies. Patients were started on treatment where they were detected TB and then they were transferred to TB department of the Regional Prison Hospital. The initiator of the close interaction between TB penitentiary institutions with ARTD was the head of the tuberculosis department of the Regional Prison Hospital Alexandr Kuznetsov.

In 1999, the penitentiary system of Arkhangelsk region, headed by colonel of internal service Evgeny Malov, signed a multilateral agreement on cooperation to prevent the spread of tuberculosis in Arkhangelsk region. Since that time, all activities carried out in the region, were performed simultaneously in the civil and prison sectors. Subsequently, close cooperation was continued through close collaboration of Valery Panasik, senior TB physician of the penitentiary system of Arkhangelsk region, with the ARTD. During the period of joint activities the provision of TB care to prisoners became one of the best in the Russian Federation, and the success of prison TB facilities was recognized by the Director General of the Federal Penal Service of Russian Federation. The incidence in prisons has declined by more than 8 times, and 2013 was the first year with no deaths from TB registered. Currently

Anatoly Kilanov, the head of the DFPS of Russia in Arkhangelsk region, major-general of the internal service, supervises and assists the implementation of prioritized TB control activities



*On the photo: a meeting of partners (from left to right – a representative from Sørum local branch of The Norwegian Heart and Lung Patient Association Sergey Terentiev (interpreter), Aleksandr Kuznetsov)*

## Case Finding

For a long time tuberculosis in the Russian Federation was mainly detected by active case finding, during X-ray examinations. If pathological changes in the lungs were detected, the patient was immediately referred to the Regional TB Dispensary, where he/she underwent additional X-ray and laboratory tests, later he/she was admitted to the hospital as a suspected TB case.

If there were no obvious signs of active TB, the patient was taken under the supervision by the "0" group of dispensary follow-up with clinical and radiological examination every 6 months. Sometimes patients were prescribed tentative TB treatment – 3 months of outpatient treatment without observation by medical workers. After the course of treatment the patient was re-examined, if there was a “positive dynamics” of X-ray, the patient was diagnosed "active tuberculosis" and referred to the TB inpatient department for further treatment.

First program activities were focused on strengthening the primary health care services to identify infectious patients. In 1998, with the first grant from the Norwegian Ministry of

Foreign Affairs high quality microscopes and the necessary laboratory equipment for all medical institutions were purchased and imported, in addition to high quality standard Tb drugs regimens for 1000 TB patients through IUATLD. Training of laboratory technicians was conducted. Currently, more than 70% of infectious TB patients are diagnosed in the clinical laboratories of primary healthcare network, which is the best level in the Russian Federation.

Figure 6. Proportion of cases with bacteriologically confirmed TB in the civil sector of Arkhangelsk region.

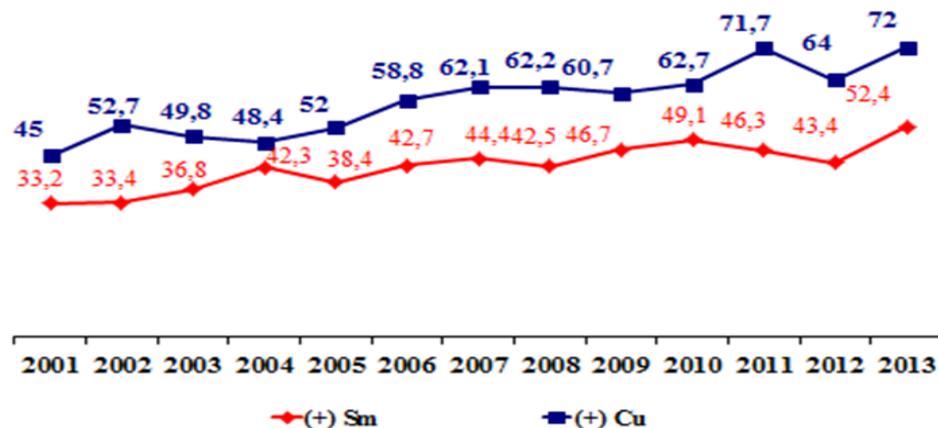
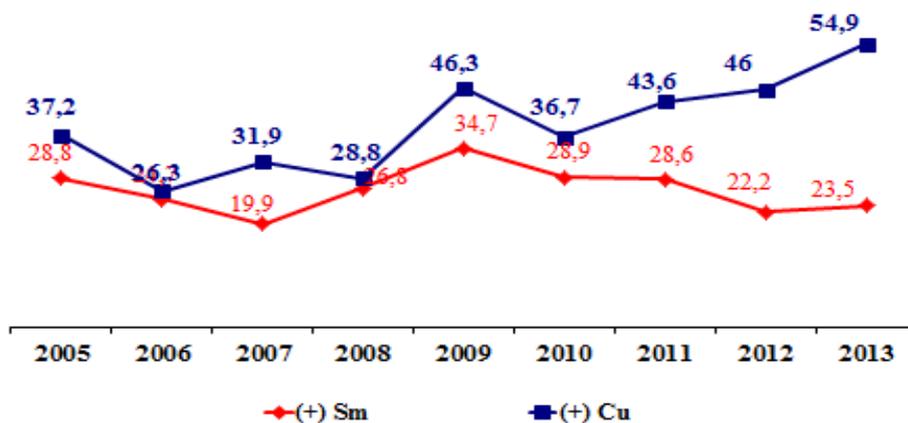


Figure 7. Proportion of cases with bacteriologically confirmed TB in the prison system of Arkhangelsk region.



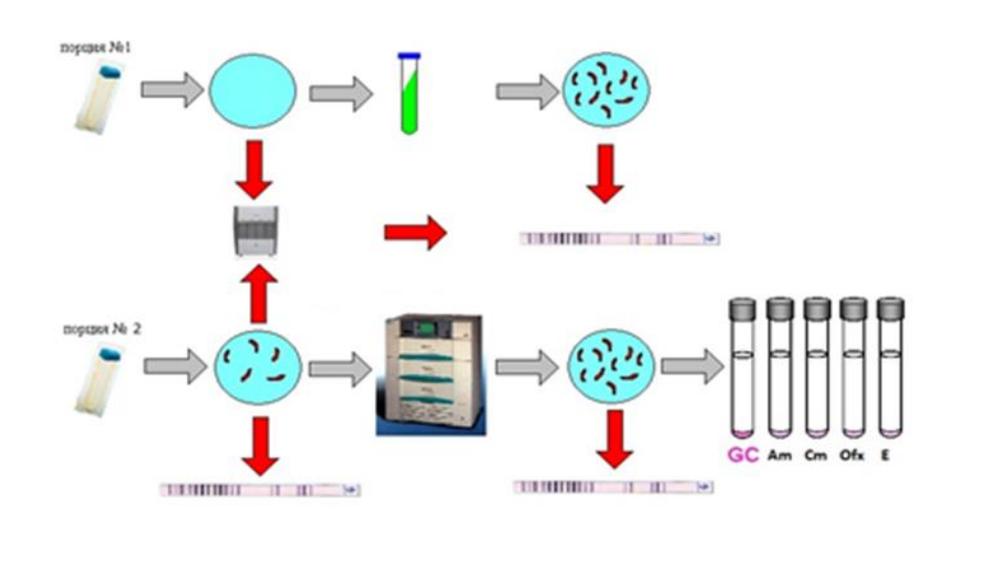
The Bacteriological Laboratory of ARTD has been gradually modernized and is today equipped with modern high-tech equipment, and thereby the time of diagnosis of tuberculosis has been reduced from three months to a few hours.

The Arkhangelsk Regional TB Dispensary was the first among regional institutions of our country to open molecular genetics laboratory, which allows implementing the scientific research results of molecular epidemiology into practical activity of the hospital. Currently the whole range of tests for the diagnosis of tuberculosis is performed in the laboratory of the Dispensary.



On the photo: Bacteriological Laboratory in the Regional Clinical TB Dispensary, Arkhangelsk.

Figure 8. Algorithm of laboratory diagnosis of tuberculosis.



## Treatment

One of the key innovations in the Arkhangelsk region in the late 1990s was introducing directly observed treatment of tuberculosis when all patients, regardless of previous treatment history, social status, the presence of alcohol or drug addiction, imprisonment history, take TB drugs only in the presence of medical personnel.

### **Personnel, training, skills.**

The first step in the implementation of TB program activities, developed on the basis of the WHO strategy, and its main component – directly observed treatment - was the training of health professionals at all levels and NGOs. Conferences and seminars were held for the employees of the Healthcare Department that supervised this section of the work, chief physicians of TB institutions, central district and city hospitals and clinics, doctors, medical assistances and nurses of TB services and primary health care sector, including employees of rural health stations. The main purpose of training was to achieve a mutual understanding of all participants of administrative activities and treatment concerning the importance of directly observed treatment.

All primary health care professionals are annually trained on TB treatment. The trainings are carried out during the conferences and Medical Assistant's Days by the experts of Arkhangelsk Regional TB Dispensary and TB offices. The issues of tuberculosis prevention and organization of DOT are included into the program of refresher courses for nurses.

An additional point concerning DOT for TB patients was included into the job descriptions of the primary health care staff.

Training of the staff in effective communication skills with patients is conducted by psychologists of the medical and social unit of the Arkhangelsk Regional TB Dispensary as well as by medical assistances and nurses participated in the courses "Effective communication" in the period of 2008 – 2013.

### **Directly observed treatment in in-patient departments of TB facilities.**

In in-patient department and children's sanatoriums intake of drugs under observation is carried out in room for medical procedures every day, including weekends and holidays. First-line drugs are taken once a day in the morning, second-line drugs are divided into two or three doses depending on the tolerance (in the morning, afternoon and evening). If the daily dose is divided into two or three doses, the drug is taken by a patient also only under observation of the medical personnel.

If a patient has for any reason not received the daily TB drugs dosage in the in-patient department this information is passed on to a district TB physician in order to organize and provide an outpatient treatment for this day: a visiting nurse care or a district nurse is sent home to the patient with the daily dose of drugs. If necessary, a psychologist is involved for the communication with the patient.

In case a patient leaves hospital without permission similar measures are taken, but a formal discharge from the hospital is registered in three days, during which the patient is searched. The doctor of the in-patient department fills in a special form of follow up indicating the reason for which the patient has not taken drugs and left the hospital, as well as a possible place of his/her location and additional information that may help in his/her search.

The terms of a planned hospital discharge and the ability to organize outpatient treatment is agreed in advance with the local/district TB physician. Even before treatment start and obligatory before discharge from hospital a joint meeting of the patient, the in-patient physician and a district or regional service coordinator is conducted. Different issues of outpatient treatment are repeatedly discussed at this meeting. A TB physician of the urban area / TB office specialists receives a discharge epicrisis, treatment card/MDR-TB treatment card, protocol of monitoring of TB drugs adverse effects and X-ray information.

Indication for discharge from hospital is negativation of smear microscopy as well as opportunity for a patient to take TB drugs once or twice daily. For some patients living in Arkhangelsk the "transition" from three-time intake of the full drug dose to a single intake of all drugs is carried out in a day care hospital.

#### **Directly observed treatment in out-patient departments and home-based services.**

In a pre-arranged, convenient time for the patient, he/she comes to the day care hospital / TB office / room for medical procedures / rural health-post station. At first the healthcare worker administers the injectable TB drug, then the patient takes (swallows, drinks with water) oral drugs directly observed by a healthcare worker.

The working hours of the room for medical procedures of out-patient department of ARTD are from 08.00 to 20.00. If a patient for any reason fails to take the medications before the procedure room is closed, the drugs are carried to inpatient department of the dispensary, where they can be taken by a patient under the observation of the ward nurses.

When the patient is treated at home medical worker visits the patient in a pre-agreed time (if necessary, a patient can change the time, informing about it over the phone), and in the presence of a healthcare worker takes the drugs.

If a patient takes drugs in TB offices of central district and city hospitals or in rural health posts, there is no delay with delivery of drugs. Each TB office has a supply of first-line TB drugs for at least six months; second-line drugs - at least for one month. In addition, the planned discharge from the hospital is agreed in advance, so a healthcare worker from a TB office can make a request for delivery of the missing drugs. TB drugs are transferred from TB offices to local hospitals / rural health stations in supply not more than for ten days

At all points of the directly observed treatment the intake of TB drugs is carried out only under the supervision of healthcare workers, seven days a week, including weekends and holidays. First line TB drugs are taken by a patient once a day, second-line drugs - once or twice a day. In case, if the daily dose is divided into two stages, the drug is taken by a patient also only under the supervision of medical personnel.

In the Arkhangelsk Clinical TB Dispensary the room for medical procedures is open from 08.00 to 20.00, day care hospital - from 08.00 to 15.00; hospital at home functions from 08.30 to - 17.00. On weekends and holidays, as well as after the working hours of the above-mentioned departments patients take anti-TB drugs in twenty-four-hour hospital at any time convenient for them. In the TB dispensary department of the "Severodvinsk Hospital № 1" the room for medical procedures functions seven days a week from 08.00 to 18.00. In "Kotlas Central City Hospital" the administration of drugs in the room for medical procedures and in day care hospital is organized seven days a week from 08.00 to 18.00. In TB offices of other hospitals and in primary health care institutions the administration of drugs is carried out from 08.00 to 15.00.

In that case, if a patient doesn't come within the specified time, a medical worker takes the daily dosage of drugs in order to ensure that a patient takes them under the control at home.

If a patient has not come to take his drugs, searching for him/her and conversation to clarify the reasons for refusal of treatment are carried out. If necessary, the interviews are conducted with relatives and friends of the patient, including the involvement of psychologists.

### **Monitoring.**

Head of the department, physician and a senior nurse supervise the work of nursing staff in hospitals, sanatoriums, day care hospitals, home DOT.

The monitoring of DOT in TB offices of central district and city hospitals is performed by a regional TB physician, in local hospitals and in rural health posts - by specialists of TB

offices. Besides, the monitoring of this part of work is an obligatory part for the supervisory visits of specialists from the Arkhangelsk Regional TB Dispensary.

The Arkhangelsk Regional TB Dispensary monthly (up to the 2nd of the month following the reporting period) gets the information about the treatment of all patients, including the number of doses taken and the reasons for interruption of drugs intake, if any, and the measures taken to address them. In case, if a patient has missed the intake of drugs five times, he/she is discussed by the Central Medical Commission of ARTD to determine the tactics of further management.

Thanks to well-established coordination of in-patient and outpatient doctors in organizing non-interrupted treatment, there are practically no interruptions in treatment after discharge from the hospital. Therefore, there is no need to keep the track of the start dates of outpatient treatment. The information comes to the Arkhangelsk Clinical TB Dispensary only in those rare cases when a patient does not come to the place of treatment, then a search for him/her is organized.



*On the photo: patients' room for patients with MDR TB in the Regional Clinical TB Dispensary, Arkhangelsk, 2006.*

## Drug management.

In the 1990s TB drugs were purchased at the federal and regional levels under the Russian law. Perestroika and the collapse of the Soviet Union led to economic chaos in consequence of which health care system was financed by the "leftovers" principle, and in the 2000s the drug supplies were irregular and not the whole range of drugs required according to the schemes of chemotherapy for the treatment of patients but one-of-a-kind drugs was purchased.

During the first years of cooperation a few hundred MDR-TB cases was recorded per year. In 2000, approximately 500 patients with MDR-TB did not get treatment due to lack of drugs. Patients from civil sector had to be hospitalized for isolation in Maymaksa city tuberculosis hospital. Some of the patients were also treated in the Medical Correctional Institution № 8 of DPSR, where with the financial support of LHL isolation modules for patients not receiving MDR treatment were built. Only approximately 60 patients could be provided with second-line drugs each year from the regional budget. During these years, there were federal deliveries, but the control system and the calculation of the required number of drugs at that time did not yet exist, so these irregular deliveries could not solve the problem of the treatment of MDR-TB patients.

In 2003, the Arkhangelsk region became one of the first areas of the Russian Federation, which was approved by the Green Light Committee (GLC) of the WHO for the purchase of quality approved drugs for the treatment of patients with MDR TB at concessional prices. In August 2005 the first shipment of drugs for 100 patients was received. The drugs were funded by the Norwegian Prime Minister's Office and the Atlas-Alliance/LHL. The cost of treating one patient with MDR TB in different years ranged from 800 thousand to 1 million rubles, so the treatment of all MDR-TB patients was possible only since 2007, when the fund "Russian Health Care" and the Federal Target Program "Prevention and Control of Social Diseases for 2007-2011" began to deliver drugs in the required quantity. Part of the drugs was acquired from the regional budget.



*On the photo: the first batch of second-line drugs for 100 patients arrived in Arkhangelsk (from left to right: Anastasia Samoiloova, Oksana Mironuk, Nina Nizovtseva)*

Central Medical Commission makes the decision on the treatment of patients with MDR-TB from both civilian and penitentiary sectors. Representatives of NSMU and the prison system are present on the meetings of this Commission.

In recent years, drugs of first, second and partly of the third line are purchased with regional sources. Linezolid, Imipenem, Amoxiclav and others are purchased for a few patients with pre-XDR and XDR-TB also with the regional budget. The Arkhangelsk Regional TB Dispensary participates in a clinical trial of new drugs Bedaquiline and SQ 109.



*On the photo: Drugs for treatment of MDR TB patients.*

## Social and psychological support.

Treatment of tuberculosis is long (from 6 up to 18 months) and is associated with numerous adverse effects. A significant proportion of patients with tuberculosis have social problems (lack of a permanent place of residence and work, alcohol and psychoactive substances consumption, criminal convictions, etc.) Therefore, some patients have weak motivation for recovery and, accordingly, they experience difficulties with adhering to a daily intake of TB drugs. Over the years, the level of interrupted treatment of patients with multidrug-resistant TB has ranged from 25 to 31%. To solve this problem the TB program implemented from the beginning measures of social and psychological support to patients, which was to be carried out throughout the whole period of chemotherapy.

Firstly, it was necessary to create good living conditions in the wards. From 2003-2006 LHL together with INFIL funded the complete renovation of three TB departments of the TB dispensary, providing new bathrooms, windows, floors and refurbishing the walls. It became also evident that patients needed to organize free time since they stayed for a long time in hospital. To do this, in 2004 at the expenses of LHL televisions and board games were purchased for TB patients' rooms of the TB dispensary; health care workers and patients' relatives collected books and established a library. At the same time occupational therapy was introduced - at the request of some of the patients sewing machines, fabric, knitting accessories were purchased.

In 2001 the first social worker was employed in the Arkhangelsk Regional TB Dispensary, in 2003 - psychologists. Also in 2003 "School of tuberculosis" for patients was opened.

In 2007 the medical-social department was established, where social workers, psychologists and medical patronage nurses work to help patients complete long-term treatment. A patient may be referred to the department for psychological consultation and prescription of proper therapy, but patients can also come themselves in order to get information on social assistance, employment, contact phone numbers about Employment Service, to issue the necessary documents.

**Patient-friendly information booklet: You get well from tuberculosis!**



In order to strengthen the motivation of the TB patients to stay on treatment and to overcome the physical, social and emotional consequences of the disease it was decided to make patient-friendly information materials for the TB patients. In 2007 LHL started training of the health care workers and some former TB patients to do interviews and assessments of patients needs of information. Several focus group discussions were conducted with patients on treatment and former TB patients to assess what kind of topics were of interest to learn for a patient with tuberculosis. The patients were also asked to share stories and experiences of how they had managed and coped with the disease and share good advice with other patients. Most patients told that doctors kept patients well informed about the medication, drugs and treatment but that they wanted to learn more on how to cope better with the emotional distress, fear, stigma, isolation, issues of sex, kissing, food, drink, family life, coping with neighbors fear of infection and how to reintegrate into social life.

The process involved needs assessments, pretesting of draft versions, discussions with patients and health workers and resulted in the booklet: You get well of tuberculosis. Why this optimistic title? Because it is true. Because most TB patients survive TB, if they get diagnosed and properly treated in time.



*Photo: Tb patients receive the booklet on the TB day in 2007.*



*On the photo: a patient is applying for consultation in the Medical and Social Department of ARTD, Arkhangelsk.*

In 2010 "peer to peer" training was conducted for patients. At the same time patients' club was formed, where members were engaged in physical exercises in swimming pool, visited city cultural events. In 2010-2011 there were from 7 up to 15 participants in the club. In the same years the project "Harmony" was implemented in Arkhangelsk, similar to Tomsk project "Sputnik".

From 2007 the travel cost for all patients to the place of treatment (consultation) and back was covered. From 2007 to 2012 all patients who were under outpatient treatment were receiving food (protein) package once every one or two weeks on condition of daily drug taking. During several years LHL insisted that these support measures were to be financed from the regional budget, but, unfortunately, a social support was not provided from regional budget.

In 2012-2013 with funding from the Healthcare Ministry of Norway / LHL and then LHL International food support was organised for patients in prison who were receiving isoniazid preventive therapy. Food packages were given to the patient groups most vulnerable to develop TB, HIV-infected patients who had been in close contact with infectious TB patients.

In 2014 the Ministry on Local Government Development in the Arkhangelsk region funded the project "Satellites" in Severodvinsk. This grant included covering travel cost for TB patients' to the place of treatment and back, as well as giving out food packages for the whole period of outpatient treatment as an incentive to recovery.

During 2011-2014 partners paid special attention to provision of support to families affected by tuberculosis. In 2011 Moscow representative office of the Norwegian company Statoil ASA financed implementation of the project "Healthy Family - Healthy Children". In the framework of this project joint physical training groups were organized for children kept in Children's sanatorium department of the Arkhangelsk Regional TB Dispensary. Group exercises were conducted in the swimming pool and the gym; after exercises there were meetings of teachers, psychologists, medical professionals from children's sanatorium department with children's parents. During 2013-2014 the local offices of LHL collected money for purchasing playground equipment for children's sanatorium department. In 2014, which announced by the United Nation Organization as an International Year of the Family, the Fund implements two projects aimed at supporting children and young people in difficult life situations because of TB - the project "Planet of Health" (children's sanatorium department in the Arkhangelsk Regionall TB Dispensary) and the project "School with "special purpose" (Children's TB sanatorium named after M.N. Favorskaya in Krasnoborsk).

### Health communication.

Since 2007 LHL has developed a training program for TB health workers and peer supporters in "health communication", addressing the importance of health, mental stability, reliability, professional longevity and effectiveness, involved in long-term interpersonal communication with patients. The model of preventing "emotional burnout" within the approach of LHL to Health Communication includes the following areas of work: improving communication skills of health professionals using active methods of adult learning (teaching effective communication skills and resolution of conflict situations), motivation and self-development, mastering of self-regulation techniques, planning of personal and professional activities and the development of patient-friendly brochures / information materials based on patients' needs.

During 2008-2014 3 training cycles on health communication were conducted with the participation of LHL coaches on health communication and emotional management. In the first cycle, which took place in 2008-2009 in Arkhangelsk, Russia, Riga, Latvia, Vilnius, Lithuania, seven employees of the Arkhangelsk Regional TB Dispensary (psychologists, social workers, doctors, nurses) took part. The training was conducted by Ane Haaland, psychologist from University of Oslo and Sigurd Stubbsjøen, a specialist on neuro-linguistic programming, private practicing psychologist. All participants had additional training for trainers, received certificates with the ability to carry out similar activities for other health care specialists of TB service.



*Photo: Health communication trainer of trainer course in Siauliai, Lithuania. Ane Haaland is preparing with the Arkhangelsk trainers: Maxim Rakov, Tatiana Shevchenko, Maja Aivasova, Svetlana Martinenko.*

The second cycle of training was held in 2012 at the Northern State Medical University. 12 specialists from the ARTD, TB Department of Severodvinsk city hospital №1, DFPS of Russia in Arkhangelsk region, Children's sanatorium named after M.N. Favorskaya, two non-governmental organizations - Arkhangelsk regional branch of the "Russian Red Cross" and Charity Fund "Easy Breathing" participated in this training course. Psychologists Tatiana Shevchenko and Svetlana Martynenko, who were trained during the first cycle, facilitated this course. 8 people from 12 participants of the training received coach certificates.

In February - August 2014 the third cycle of training was conducted. Among the participants there were employees of the Arkhangelsk Regional Centre for the Prevention and Control of AIDS, specialists from offices for pre-and post-test HIV counseling of outpatient clinics in Arkhangelsk, Severodvinsk, Novodvinsk, representatives of Arkhangelsk regional TB institutions, unit for international cooperation of Medical information-analytical center, Department of Family Medicine in Northern State Medical University. The training was attended by 17 people.

The coaches trained more than 170 employees of TB institutions from civil and penitentiary sectors, general healthcare institutions.



*Photo: Training in Health Communication. From left to right: Svetlana Martynenko, Torunn Hasler, Sigurd Stubsjøen, Elena, Hedvig Amdal, Nina Nizovtseva, Anna Kondakova.*

#### Participants' comments on the training:

"These studies are very relevant, since a medical worker every day meets patients who come to him/her for help. They can have difficult character, bad mood, feeling, etc. Having communication skills, you can help a patient in the best way." Member of the training in 2014

"I believe that this information is very relevant for health professionals. This will help to communicate with patients, colleagues, and bosses more effectively, establish contact easier, to find common language and achieve the goals in the treatment process." Member of the training in 2014

"Participation in this training has allowed me to look from another side to well-known things, learn new techniques, and the most important thing that there has appeared a need for constant analysis of my communication style with patients and colleagues. Having improved my communication style, I will be able to provide more effective care for patients, improve the psychological climate in the workplace." Member of the training in 2012.

### Supervisory visits.

According to the Union and WHO recommendations, conducting supervisory visits is one of the priorities of TB control programs, allowing assessing the situation and identifying the problems specific to the municipality / medical organization / penal colony, as well as

providing on-site follow-up of training. Nina Nizovtseva, chief physician of Arkhangelsk Regional Clinical TB Dispensary became the main coordinator of TB activities; district TB specialists performed the functions of district coordinators.

In order to carry out supervisory visits a group of doctors was established in Arkhangelsk Regional TB dispensary. It included specialists from organizational and methodological office, TB specialists and laboratory assistants, if necessary, the group included members of the TB department of NSMU, when visiting the penitentiary system - the specialists of the medical department of FPS of Russia in the Arkhangelsk region. In the first years of the Russian-Norwegian TB program LHL consultants Knut Øvreberg, Einar Heldal, Torunn Hasler took an active part in these supervisory visits. For supervisory visits the Norwegian partners purchased a vehicle (vehicle "Gazelle") for the Tb Dispensary and later on also purchased a similar car for supervisory visits within the Penitentiary system in Arkhangelsk.



*On the photo: famous driver Valera, who took part in all supervising visits.*

During the visits the normative documents regulating TB control work were checked, the organization of identification, diagnosis and treatment of TB patients, provision of TB drugs, documentation of reporting treatment results and tuberculosis monitoring. The supervisory team provided also methodological help in solving identified problems. After the visit conferences for the medical staff were conducted, in which they were trained in modern approaches to anti-TB activities.

At the beginning of the Russian-Norwegian TB program supervisory visits were carried out in each district of the region, as a rule, every year, then - once every two years. In the following years the number of supervisory visits was reduced due to less need for training district TB

specialists on site and control of their work due to the low rotation of personnel in the districts, as well as for reasons of financial savings.

### Recording and reporting

One of the priorities of the Russian-Norwegian cooperation was to improve the recording and reporting systems, because well-functioning monitoring system allows not only to assess the epidemiological situation, but also to identify on the basis of the data the main challenges, plan for further improvement of TB activities and measure if implementation improves the situation. In 1998 the WHO recommended definitions of patients' groups and TB treatment outcomes were introduced in Arkhangelsk region. In addition to the Russian registration and reporting forms we began to use international monitoring forms modified and adjusted to the conditions of a particular area: individual forms of patients' treatment, TB registers, and quarterly reports on case finding and treatment outcomes.

It should be noted that the Arkhangelsk region has become one of the first in the Russian Federation which established a system of registration and evaluation of treatment outcomes of patients with M/XDR-TB. Currently the patient's forms are routinely used at treatment of TB patients, including patients with M / XDR-TB. Each TB office fills in unified registers of TB patients and, separately M / XDR-TB patients. Central registry of TB patients is kept on paper in the organizational and methodical unit of the ARTD. Quarterly reports are compiled on the notification of TB patients in each district, in the prison system and in the whole region; they also contain data about drug resistance among patients of all registration groups, the results of chemotherapy, including M / XDR-TB.

The process of modernization of the system of monitoring of tuberculosis in the Arkhangelsk region is led by the head of the organizational and methodical study of the ARTD MD Elena Nikishova; throughout the years of systematic advisory support was provided by WHO expert and the LHL TB consultant Einar Heldal.

From the first days of work on the introduction of new registration and reporting forms there was an urgent need for the development of an appropriate computer program. The initiative to create a computer database of patients with tuberculosis was taken by chair of Phthisiopulmonology of NSMU, MD, professor, corresponding member of RAMS Andrey Maryandyshev and Norwegian expert Einar Heldal. More than ten years, several programmers in ARTD together with a LHL consultant Eivind Lyche Melvaer worked on the creation of an electronic database, and only in 2010 the system was completely reorganized and completed by an information technology specialist, Ph.D., assistant professor of

electrical and power systems of the Northern (Arctic) Federal University (NARFU), Gregory Balantsev. Today, the computer program "Monitoring of tuberculosis" is unique and is of interest to specialists of TB service in all areas of the Russian Federation. The program brings together information on the passport data of patients who are entered in the registry of the Arkhangelsk Regional TB Dispensary, so it is both a hospital register and a TB register for the whole oblast. The results of all methods of laboratory and X-ray examination for tuberculosis are introduced in the laboratory and radiology department, respectively. Information about decisions of the Central Medical and Control Commission on registration groups of tuberculosis patients and assigned chemotherapy regimen and its correction are entered by heads of dispensary and inpatient departments and healthcare providers. The daily administration of TB drugs is entered in the computer program by a medical practitioner, having direct responsibility of chemotherapy. The results of treatment are entered from individual patients' treatment cards by a specialist of an organizational and methodical unit of the ARTD. Thus, computer software connects all the main divisions of the ARTD (via local area network - LAN) and TB offices of district and city hospitals, tuberculosis hospitals, penitentiary facilities for tuberculosis patients, and generates the reports required by Russian health authorities. Information about personal data is transmitted through the Internet and encrypted according to Russian safety standards. With financial support from LHL for some TB cabinets missing computer equipment was purchased. For all users training courses have been conducted on the use of this program. Users of the software have noted that the main advantages of the program "Monitoring of tuberculosis" are the completeness and quality of data, quick access to information on the results of the examination and treatment of each patient, both in the civil sector and in the prison system, reducing the time to fill in a number of paper documents .

## TB / HIV

Arkhangelsk region is a relatively favorable area in terms of HIV prevalence. The first case of HIV infection in Arkhangelsk region was recorded 20 years ago. Since the beginning of HIV-infection registration Arkhangelsk regional AIDS center has registered 1012 cases of HIV - infection. Among them, 786 people are residents of Arkhangelsk region and 181 people - residents of other regions, serving a sentence in the Federal Penitentiary Institutions of Arkhangelsk region, while 45 persons are foreign citizens and stateless persons. During the first 6 months 2014 58 patients were diagnosed with HIV. Among newly diagnosed cases - 34 men and 24 – women, more than half are persons aged 21 to 30 years (50.4%). There is

an increasing trend in the proportion of patients aged 31 - 40 years compared to persons older than 40 years (29.8%, in the same period 2013 - 27.7%).

The prevalence of HIV infection is high and increasing in North-West Russia, above the Russian average, while the level in Arkhangelsk is much lower (Figure 9). The number of new cases with tuberculosis and HIV co-infection in the North-West Federal District (NWFD) in Russia is growing every year. Within five years the morbidity rate per 100,000 population has increased by 1.7 times, from 6.2 in 2008 to 10.3 in 2012 in the NWFD, and from 5.2 to 8.6 in Russia. In the Arkhangelsk region this figure remains below the nationwide rate and average rate in NWFD, but it is growing. Similarly, the proportion of TB cases with HIV infection has increased in Northwest-Russia and The Russian Federation, but is still at a low level in Arkhangelsk (Figure.10).

Figure 9: HIV prevalence per 100 000 population (including prison system)

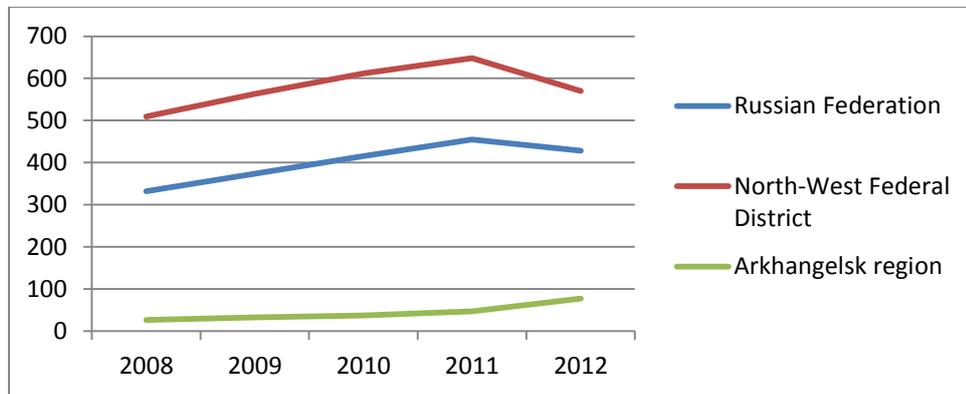
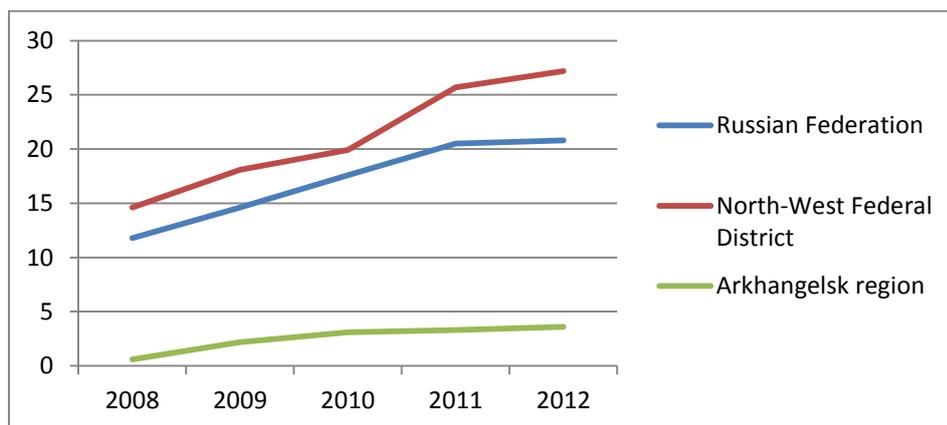


Figure 10: Percentage of TB patients with HIV infection (including prison system)



Against the background of the decreasing TB mortality rate, the proportion of TB patients with HIV among new TB cases is annually increasing in the North-West Federal District and Russia, changing the social, demographic and clinical profile of patients with tuberculosis. This requires a strong relationship between Arkhangelsk Regional AIDS Centre, Arkhangelsk

Clinical TB Dispensary and the prison system. Interagency cooperation is carried out as a part of the routine work and in some particular projects aimed at solving specific problems.

In Arkhangelsk region as well as in many other areas of the North-West, more than half of all patients with tuberculosis and HIV co-infection are detected in the medical institutions of the Federal Penal Service- 73.1% in 2011, 57, 9% in 2012.

In 2012 the HIV incidence in the institutions of DFPS of Russia in Arkhangelsk region increased by 4 times due to a strong inflow of patients from other parts of Russia, 70% of which were HIV-positive. In addition to HIV infection, risk factors for tuberculosis in prisons of Arkhangelsk region are contact with TB patients, overcrowding (especially in winter), a weakened immune system and stress.

In 2013 in the civil sector of Arkhangelsk region 12 cases of TB/HIV co-infection were registered (3% of newly diagnosed patients with tuberculosis). Of these, the combined TB/HIV infection was reported in 8 new cases, in 3 patients who came from other areas and in one relapse of tuberculosis.

In 2013 LHL International supported the proposal of the Northern State Medical University, Federal Penal Service of Russia in Arkhangelsk region and Charity Fund "Easy Breathing" to implement activities for prevention of tuberculosis in HIV-infected prisoners. At the beginning of the project (June 2013) in the prisons of Arkhangelsk region there were 415 HIV-positive inmates. All of them received antiretroviral therapy. In accordance with the internal orders of the FPS of Russia and Guidelines for intensified tuberculosis case-finding and isoniazid preventive therapy for people living with HIV in resource-constrained settings (WHO guidelines 2011) they should also be provided with preventive therapy with isoniazid during 6 months, regardless of antiretroviral therapy and the results of tuberculin skin test.

In the frame of the project 320 HIV-infected patients from 12 colonies of Arkhangelsk region agreed to receive preventive TB therapy. In determining social indicators it was found that the average age of persons suffering from HIV infection was 29 years, 98% of the prisoners used injected drugs, 63% had previously served a sentence in prison, 77% were unemployed.

All patients were divided into two groups: control group (140 people, 4 colonies in the region) and cases (180 people, 8 colonies in Arkhangelsk region). All patients received preventive TB treatment for 6 months - from July to December 2013. Cases received in addition a food parcel (cost of 300 rubles) once every two weeks on condition that they are regularly, without interruption took anti-TB drugs. Patients in the control group did not receive additional food

support. 222 patients (69.4%) completed treatment. 35 cases (19.4%) interrupted treatment, while in the control group - 63 people (45%) interrupted. 145 cases (80.6%) and 77 (55%) controls successfully completed treatment.

On December 2-5, 2013 in Arkhangelsk was held a Scientific and Practical Conference "Improving the awareness of specialists in TB facilities and AIDS Centers of the North-West Federal District of Russia in the prevention and treatment of TB / HIV", that was dedicated to the World AIDS Day. In the conference there were announced the preliminary results of this project: the promotion of food sets to the patients significantly increased adherence to preventive therapy. TB experts suggested Mr. Odintsov V.E., the senior TB specialist of FPS of Russia, to consider the introduction in the algorithms of TB care for inmates the encouragement of patients with food packages or in other way (additional family visits, phone calls, and parcels) during the preventive TB treatment.

In 2013 activities for the prevention of tuberculosis in HIV-infected persons in the civilian sector were started. Among the 13 HIV-infected patients who were contacts of TB patients, positive "Diaskin test" and the presence of residual radiological changes caused by earlier tuberculosis, 8 people received chemoprophylaxis with isoniazid and moxifloxacin for 6-8 months.

Since 2014 Charitable Foundation "Easy Breathing " has been working with the Arkhangelsk regional AIDS Centre within the training of specialists in health communication. In 2014-2015 it is planned to develop up-dated information materials for the community affected by HIV (patients and their families).

### **Training of health personnel and technical assistance to other regions**

Northern State Medical University regularly conducts intensive training for health care workers from other areas to new approaches to TB control, including individual courses on the basics of TB control program (DOTS), diagnostic methods, the system of recording and reporting, supervision, health communication. Charitable Foundation "Easy Breathing" provides organizational and financial support in carrying out the scientific conferences.

A team of specialists from ARTD conducts training and provides counseling services to TB programs in 15 regions of Russia, including the North-West, Central, Southern, Siberia and Far Eastern Federal Districts and the Asian countries of the former Soviet Union. In three areas the training was organized from the local budgets without the involvement of the international experts (Republic of Karelia, Nenets and Khanty-Mansi Autonomous Districts).

TB specialists of Arkhangelsk region have provided technical support to Murmansk Region and the Komi Republic (in 2009-2011 Komi Republic was a part of some projects funded by the Health Program of the Barents region).

From 2001 to 2012 doctors Arkhangelsk region were consultants of TB programs funded and implemented by the International Federation of Red Cross and Red Crescent, headed by Yuri Kokotov and Tatyana Toichkina in Pskov, Belgorod, Kostroma, Kaluga region, Khabarovsk Krai, the Jewish Autonomous Region, Republic of Khakassia, Adygea, Buryatia. TB department of NSMU held visiting postgraduate courses in the above mentioned regions of the Russian Federation.

Mr. Kokotkov Yu.Ya., Honoured Doctor of RF, leader of TB programs of International Federations of Red Cross from 2001 to 2012, recalls:

The fact that people from Arkhangelsk Clinical TB Dispensary work in the research institutes and international organizations, that different parts of Russia seek advice from currently operating Arkhangelsk TB specialists, and that people from other countries often address their questions to Andrey Maryandyshev, confirms the importance of their contribution to the common fight against tuberculosis, and not only to the local program. Although I cannot assess the contribution of Oksana Myronyuk and Elena Nikishova to the Arkhangelsk program, I have to give special thanks for their help in the development of international programs in Russia. Their training and working visits always aroused great interest and respect from specialists in all areas where they were held. And, of course, special thanks to Nina Ivanovna and Dmitry Perkhin for agreeing to release from their posts in the Arkhangelsk TB Dispensary not only of Oksana and Elena, but also, at the time, Tatiana Toichkina and Anastasia Samoylova, in spite of their workload in the implementation of the program in Arkhangelsk! All your employees have had their own special contribution to the program and it's very valuable!

Since 2009 the employees of the ARTD have actively participated in the preparation of the Federal guidelines for the diagnosis and treatment of MDR-TB. In 2013 the recommendations were accepted by the All-Russian Society of tuberculosis and recommended for use by the Ministry of Health of the Russian Federation. Since 2010 Maryandyshev A.O. has been the chair of the WHO "Green Light Committee" for the European region – the experts in management of multidrug-resistant tuberculosis, and the

doctors of Arkhangelsk region continue to share their experience gained in cooperation with LHL association in the Central Asian countries of the former Soviet Union. In 2014 Maryandyshev A.O. as a WHO expert was a reviewer of the textbook "Phthiology" for the students of the Republic of Kazakhstan.

### Scientific support of the TB program in Arkhangelsk region.

Joint research began in 1995, two years before the signing agreement with LHL. In 1996 Professor at the University of Oslo Gunnar Bjune and the head of the Laboratory of the National Institute of Public Health, Oslo, Dominique Caugant started training Russian specialists to conduct international scientific research. In 1.5 years the research works were closely linked to the practical activities of the Russian-Norwegian TB program of Arkhangelsk region, and then in the Barents Region.



*On the photo: Training of the first researcher (from left to right – Olga Tungusova, Andrey Mariandyshev, Gunnar Bjune).*

During the years of collaboration 3 MDs were prepared in the TB department of NSMU : Nikishova Elena Ilyinichna, Markelov Yuri Mikhailovich, Olga Sergeevna Toungousova, and 6 candidates of medical sciences: Eliseev Platon Ivanovich, Andreeva Oksana Aleksandrovna, Baranov Anton Alekseevich, Nikishova Elena Ilyinichna, Samoilova Anastasia Gennadievna, Toungousova Olga Sergeevna. Starting in the master program at the University of Oslo, both Toungousova O.S. and Baranov A.A. Toungousova O.S. went on to defended Ph.D. thesis, and currently Kuznetsov Vladimir Nikolaevich is preparing to

defend his Ph.D. thesis. Regular operational research resulted in the publication of 156 scientific papers and among them 18 articles in international journals and 35 articles in Russian journals (see below):

1. Toungousova O.S., Nizovtseva N.I., Maryandyshev A.O, Caugant D.A., Sandven P., Bjune G. A. /Drug resistance of Mycobacterium tuberculosis strains isolated from patients with pulmonary tuberculosis in the Arkhangelsk, Russia //International Journal of Tuberculosis and Lung Disease, - 2002, №6 (5). P.405-414. Impact factor 2.47
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3. Toungousova O.S., Nizovtseva N.I., Maryandyshev A.O, Caugant D.A., Sandven P., Bjune G. A./ Molecular epidemiology and drug resistance of Mycobacterium tuberculosis isolate in the Arkhangelsk Prison, Russia predominance of the BW-Beijing clone family// Clinical Infectious disease.-2003.-№37.-P. 665-672. Impact factor - 8.195
4. Gupta R., Espinal M., Beggs A., Laing R., Preger J., Karataev O.N., Drobniewski F., Farmer P., Hiatt H., Kim J., Mukherjee J., Murray M., Repina E., Pechiorina I., Squire S.B., Coker R., Lee D.-H., Park S.-K., Salfinger M., Mariandyshev A. et al./A prioritized research agenda for DOTS-PLUS for multidrug-resistant tuberculosis (MDR-TB)// International Journal of Tuberculosis and Lung Disease. 2003. T. 7. № 5. C. 410-414. Impact factor 2.73
5. Toungousova O.S., Nizovtseva N.I., Maryandyshev A.O, Caugant D.A., Sandven P., Bjune G. A./Impact of drug-resistant mycobacterium tuberculosis on treatment outcome of culture-positive cases of tuberculosis in the Archangel oblast, Russia, in 1999// Eur.J.Clin.Microbiol.Infect.Dis. (2004)23:174-179. Impact factor 6,357
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9. J. R. Glynn; K. Kremer, M. W. Borgdorff , M. P Rodriguez , Dick van Soolingen et al./ European Concerted Action on New Generation Genetic Markers and Techniques for the Epidemiology and Control of Tuberculosis. Beijing/W genotype Mycobacterium tuberculosis and drug resistance// Emerg Infect Dis [serial on the Internet]. 2006 May [date cited]. Available from <http://www.cdc.gov/ncidod/EID/vol12no05/05-0400.htm> Impact factor 5.993
10. Baranov A.A., Presnova S.E., Nizovtseva N.I., Trekin I.A., Gvozdovskaja L.I., Yendaurova L.B., Maryandyshev A.O., G.Bjune, E.Heldal, T. Mannsaker/ Comparison of quality of drug susceptibility testing of Mycobacterium tuberculosis by absolute concentration method and BACTEC 460// Clinical Microbiology and Infection, Volume 13, on-line supplement no.1, International Journal of Antimicrobial Agents, March 2007, Volume 29, on-line supplement 2. Impact factor 4.415
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### Additional factors contributing the improvement of epidemiological situation on TB in Arkhangelsk region.

Socio-economic changes have influenced the trends of tuberculosis incidence both in Russia as a whole and in Arkhangelsk region in particular.

The socio-economic situation in Russia is being stabilized. Financing according to leftover principle, which has long hung over the health care system, begins to lose ground. During the period of 2008-2012 the federal budget spent on health care has increased two times: from 202.8 billion rubles to 413 billion rubles. The share of gross domestic product for health care, has grown over these years from 3.1 percent to 3.7 percent.

In recent years, due to fertility increase and mortality decline the rate of natural population decline significantly decreased in the region. The population decline continues mainly due to emigration. In relation to the level of 2011 the total mortality decreased by 2.1 percent, mainly due to the reduction in mortality from respiratory diseases (achieved among other factors by active immunization of the population) as well as due to reduction in diseases of the nervous and urogenital systems and congenital anomalies.

Over the past five years, the birth rate in the region increased by 6.8 percent: 10.9 people per 1,000 of population in 2006, 12.8 people per 1,000 of population in 2012. In 2013 a slight decrease in the birth rate was noted - 12.6 people per 1,000 of population, for four months in 2014 it was 12.2 per 1,000. There is a tendency for decrease of mortality rate: in 2006 the mortality rate was 15.8 people per 1,000 of population, in 2013 13.4 people per 1,000 of population. The overall mortality rate of population in 2014 has a convincing tendency to decrease. During the beginning of the year, this figure (13.4 people per 100,000 of population) decreased by 8.8 percent – almost less than 550 people died in comparison with the same period in 2013. At the same time the life expectancy of Arkhangelsk region is increasing every year: today it is 64 years in men, 76 years in women. It is therefore a clear trend that the population is getting older.

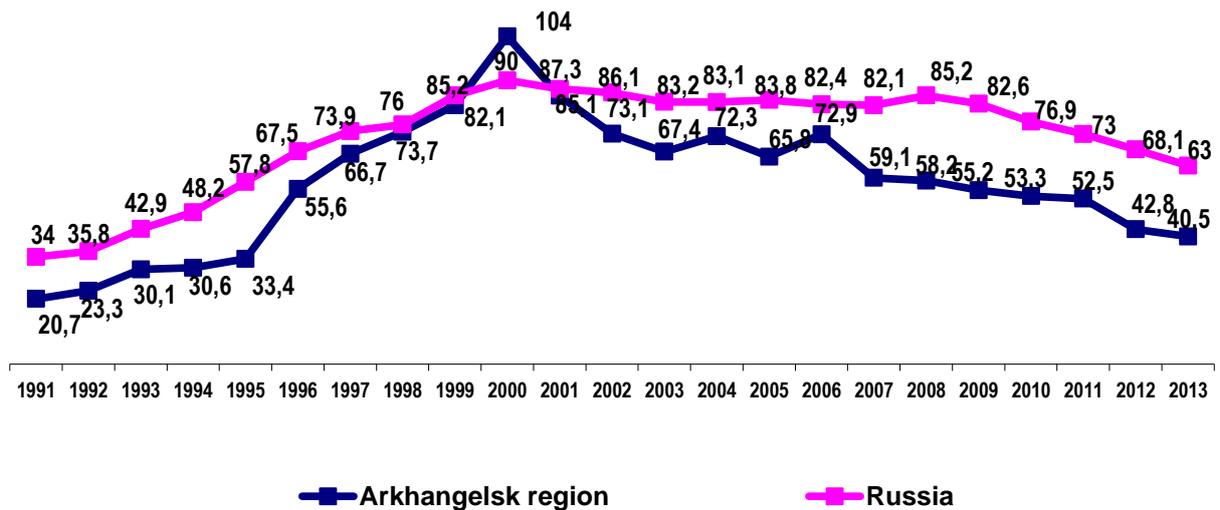
The average salary in the region increased from 19 046 rubles in 2007 up to 40,845 rubles in 2013 for men and from 11 065 up to 25 498 rubles for women, so it was almost doubled. The

level of the population with incomes below the poverty level decreased from 33.5% in 2000 to 14.1% in 2013.

The data shows that the demographic and economic situation in Russia as a whole and in the Arkhangelsk region is stabilizing, but there is a problem with the increasing stratification of society into "very rich" and "very poor" (similar to the rest of Europe with the increasing difference between the incomes of the population). The middle class in Russia and in the Arkhangelsk region is still in its stage of formation.

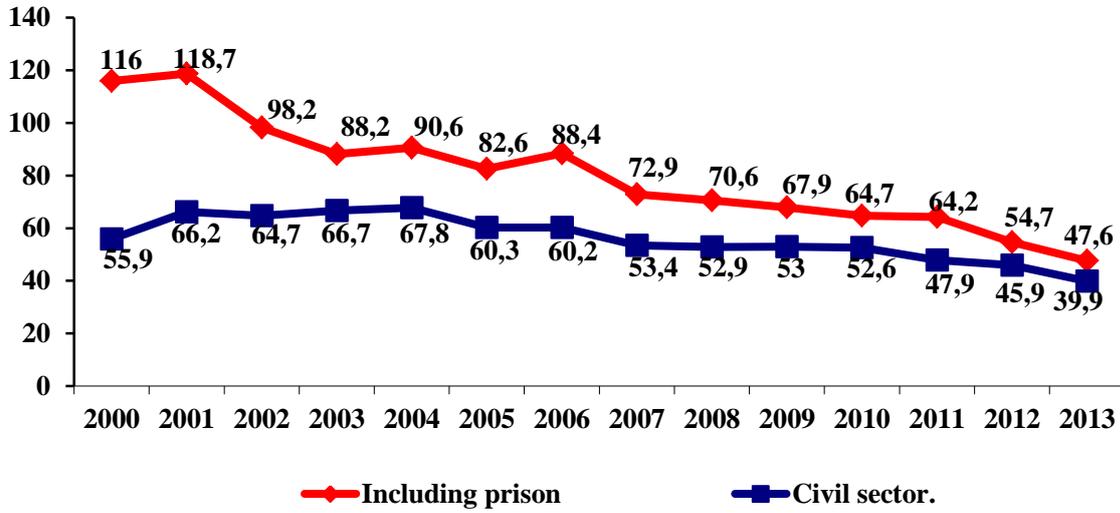
### The main epidemiological trends of TB in Arkhangelsk region

Figure 11. TB Incidence (new cases, including penitentiary system) in Russia and in Arkhangelsk region, 1991 – 2013 (per 100 000 population).



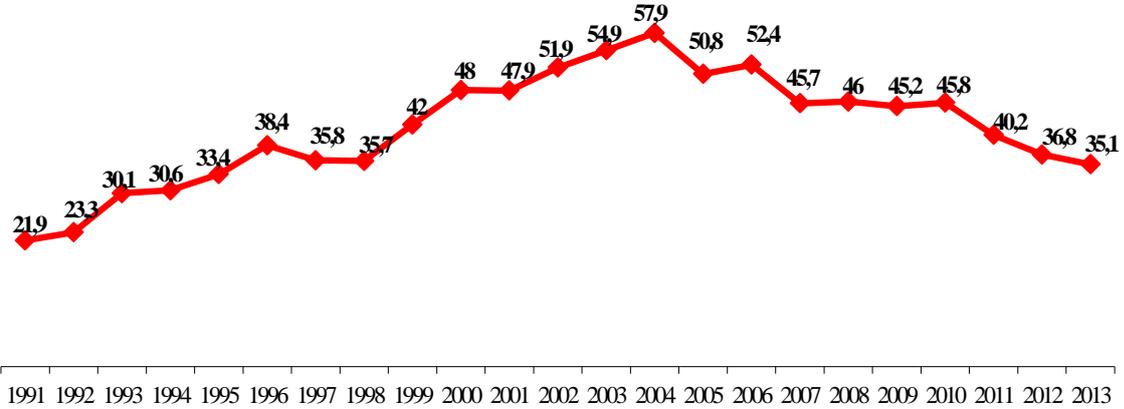
TB incidence in Arkhangelsk region in the period of implementation of the Russian-Norwegian program has considerably reduced and in 2013 it was 1.5 times lower than TB incidence in Russia.

Figure 12. TB Incidence (new cases and relapses) in Arkhangelsk region 2000 – 2013. (per 100 000 population).



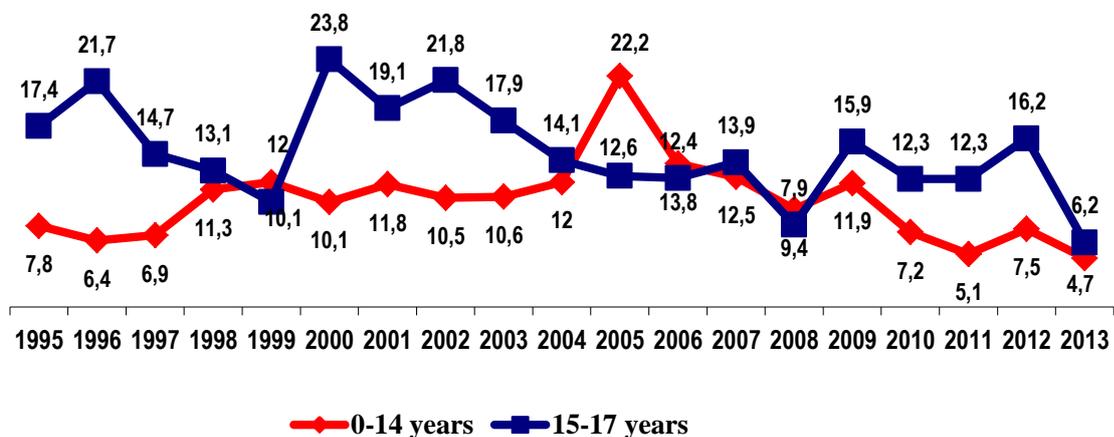
During 13 years TB incidence reduced more than twice.

Figure 13. TB incidence (new cases and relapses) of Arkhangelsk region, 1991 – 2013. (per 100 000 population).



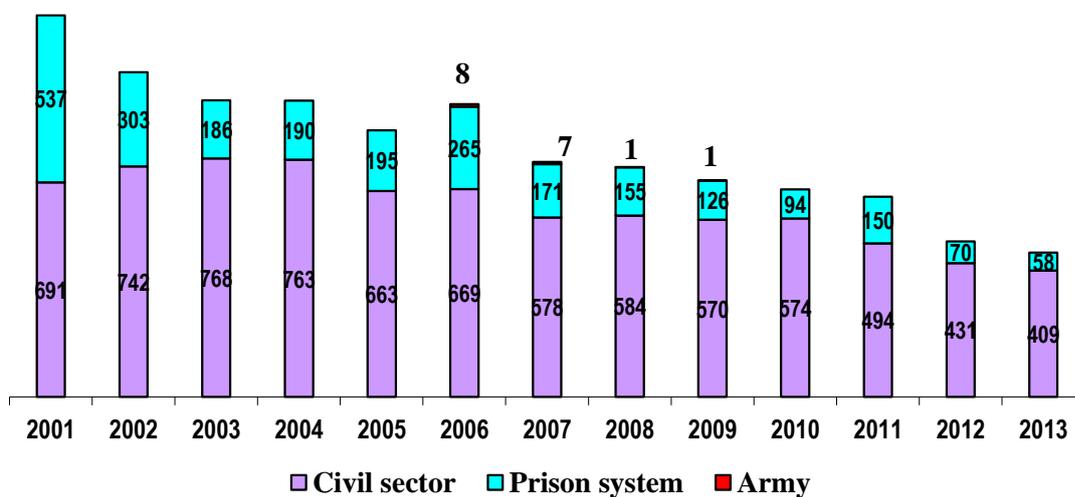
TB incidence in the civil sector of Arkhangelsk region will achieve the best level of 1991 during 5 – 6 next years if the positive epidemiological trend continues.

Figure 14. TB incidence among children in Arkhangelsk region, 1995 – 2013. (per 100 000 population)



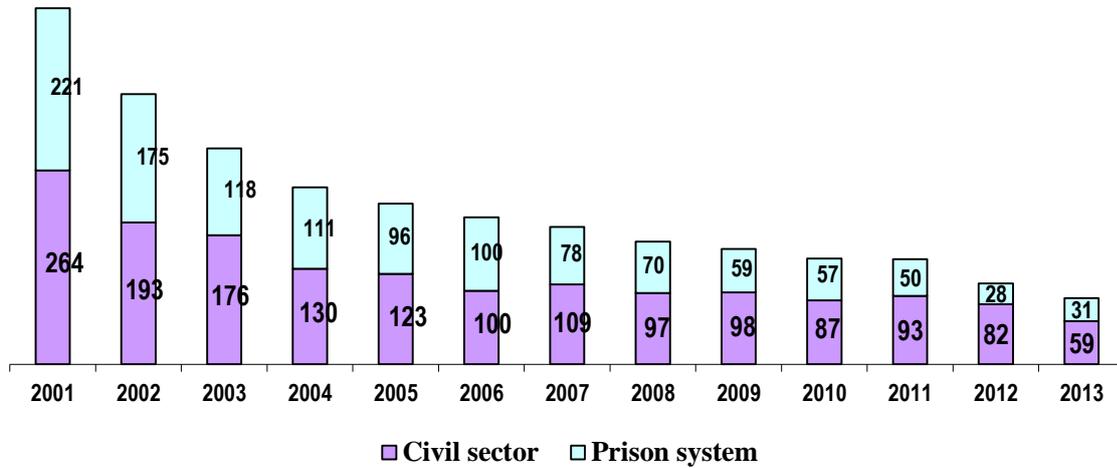
The number of children with tuberculosis reflects directly the prevalence of TB patients in Arkhangelsk region. In 2013 TB incidence among children reached the best level since 1995.

Figure 15. New cases of TB, 2001 – 2013 (absolute numbers).



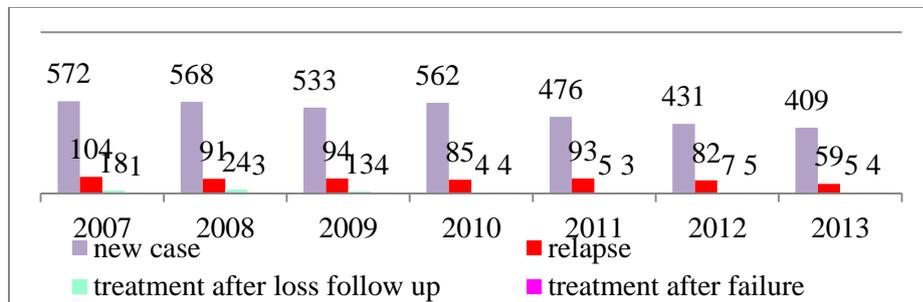
In 2013 the number of new cases of tuberculosis in Arkhangelsk region reduced 2.6 times compared to 2001.

Figure 16. Relapses of TB, 2001 – 2013 (absolute numbers).



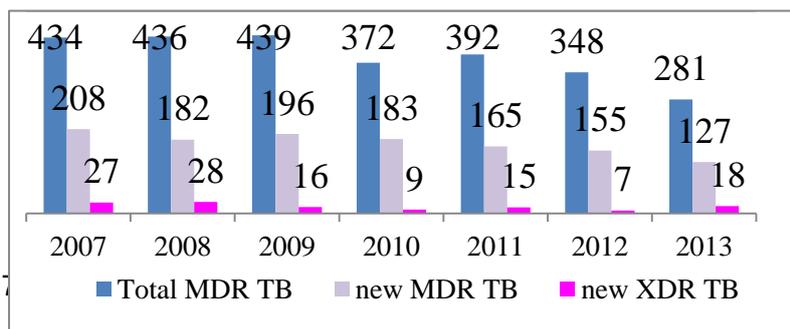
The number of patients with relapse of tuberculosis reflects the quality of organization of TB treatment and infection control measures in TB Dispensary. In 2013 the number of patients with relapse of the disease reduced 5.5 times compared to 2001.

Figure 17. Registration of TB in the civil sector of Arkhangelsk region, 2007 – 2013.



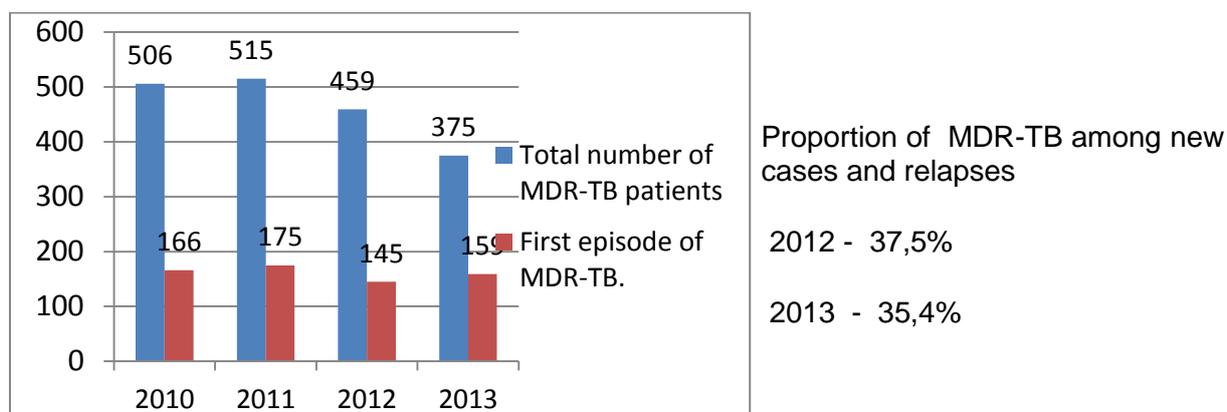
409 new cases, 59 relapses, 5 cases of defaulted treatment and 4 failures were registered in 2013. Totally 477 patients with tuberculosis needed treatment were diagnosed and registered in the civil sector of Arkhangelsk region in 2013.

Figure 18. Registration of MDR/XDR TB in the civil sector of Arkhangelsk region, 2007 – 2013.



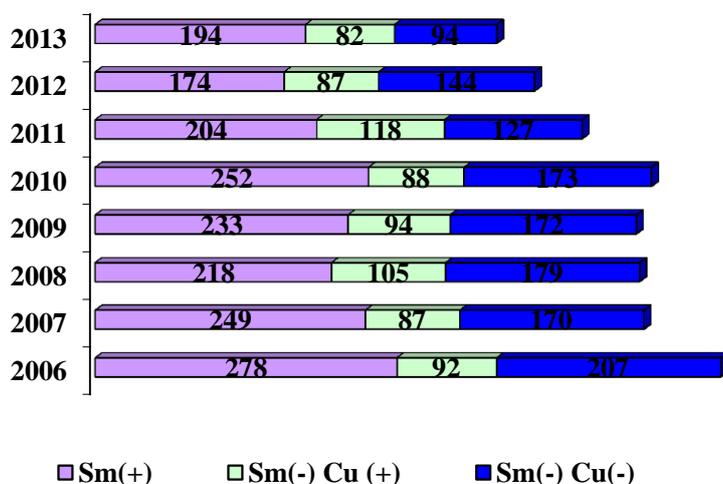
127 new cases of MDR-TB and including new 18 cases of XDR-TB were registered in the civil sector of Arkhangelsk region in 2013 and 281 patients were under observation in ARTD on December 31<sup>st</sup>, 2013:193 MDR-TB patients were on treatment (104 on the intensive phase, 92 on the continuation phase), and 88 patents had stopped treatment: 5 patients refused treatment, 14 – failures, 48 patients were lost to follow up, 18 XDR-TB patients, 3 patients with place of residence unknown (among 88 MDR-TB patients 18 smear positive patients were not isolated in ARTD) according to reports of Central Medical Commission.

Figure 19. Total number of MDR-TB and the number of patients with the first episode of MDR-TB, including prison system, 2010 – 2013 (absolute numbers)



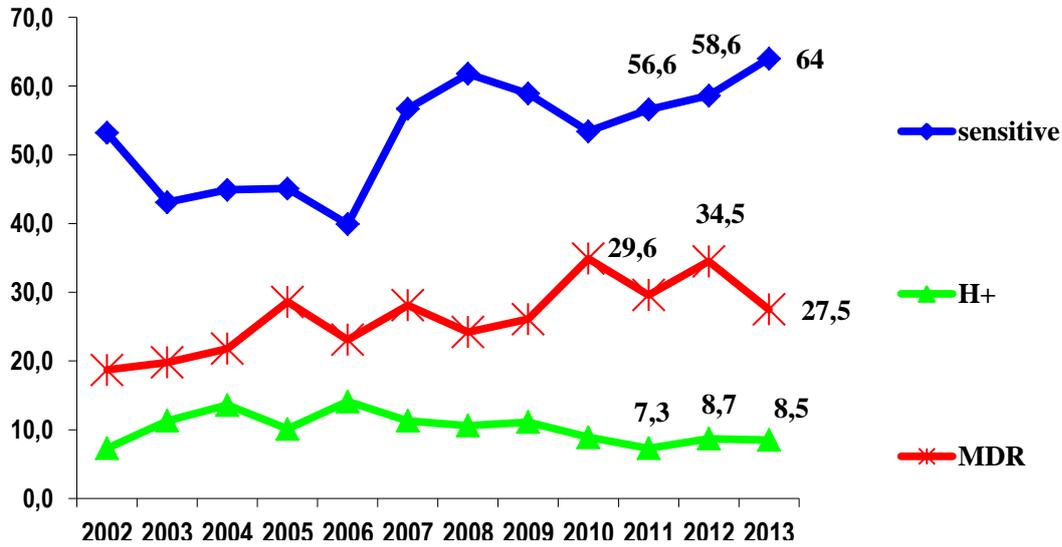
There was a clear decline in the total number of registered MDR-TB cases over the years, while the number of patients registered with MDR for the first time is slowly declining (Figure 19). The same trend was seen both in civil and prison sectors.

Figure 20. New cases of Sm+ and Sm- pulmonary TB, 2006 – 2013 (absolute numbers)



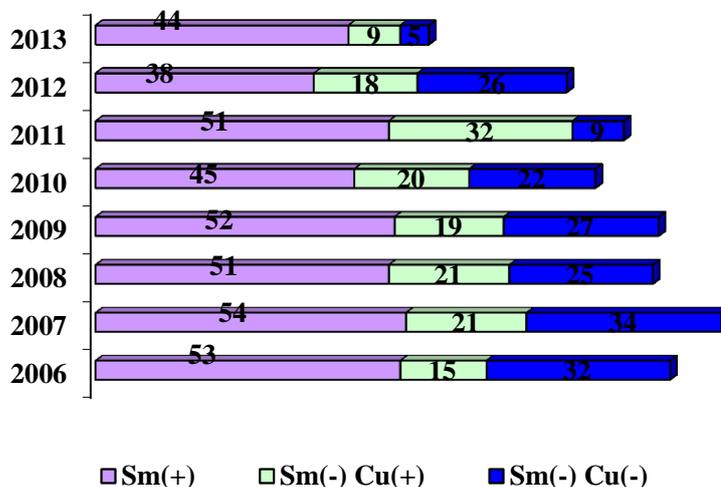
In 2013 74,6% of patients with new cases of tuberculosis had bacteriological confirmaton of the diagnosis. Considerable improvement of the level of bacteriological confirmation of diagnosis allows to detect drug resistance and prescribe adequate chemotherapy regimen before treatment start

Figure 21. Drug resistance among new cases of pulmonary TB, 2002 – 2013 (%%).



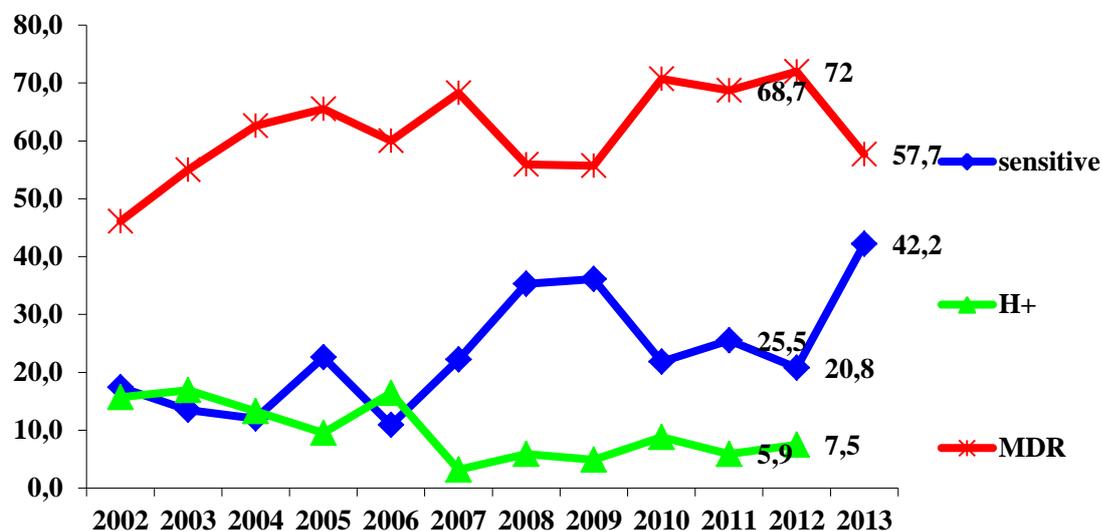
Improved bacteriological diagnostics and molecular-genetic methods led to continuous increase of the proportion of MDR-TB patients. Before 2007 many MDR-TB patients were not treated, leading to high level of transmission of MDR-TB. The number of TB cases has been reduced, but a higher proportion have risk factors for MDR-TB, such as previous imprisonment, alcohol abuse, unemployment or homelessness. During recent years there is a tendency for reduce of the proportion of MDR-TB and increase of the proportion of patients sensitive to the first-line drugs.

Figure 22. Relapses of TB with Sm+ and Sm-, 2006 – 2013, (absolute numbers).



85,6% of patients with relapses of tuberculosis have bacteriological confirmation of their diagnosis.

Figure 23. Drug resistance among patients with relapse of TB, 2002 – 2013 (%%).



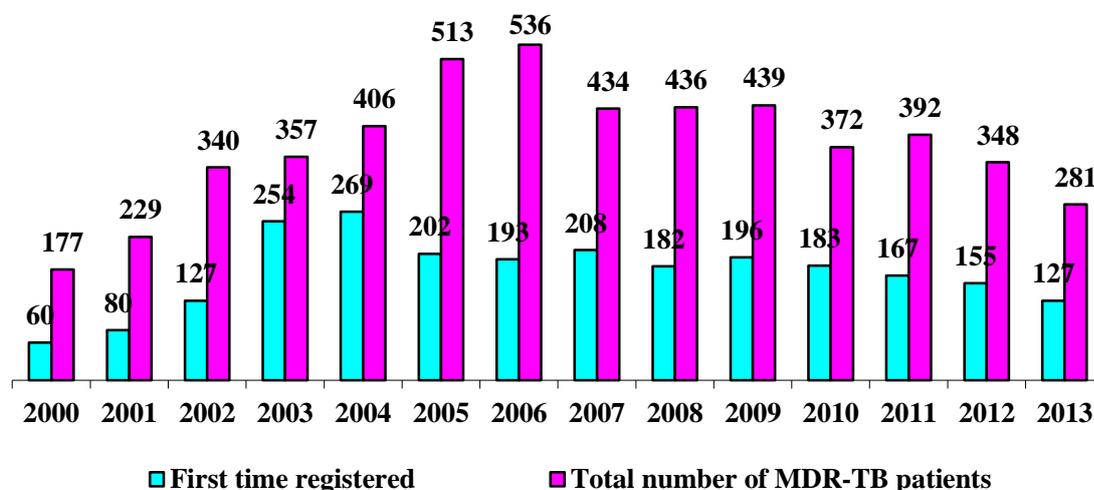
In 2013 there was a reduce in number of MDR-TB patients among relapse cases and no cases with resistance to Isoniazide were registered.

Table 2. DST results of patients with pulmonary TB (2013).

	New cases	Relapses
Patients examined	258 (276-93%)	45 (57-79%)
Sensitive	165 (64,0%)	19 (42,2%)
H	22 (8,5%)	
R	3 (1,2%)	
H R	47 (18,2%)	18 (40,0%)
H R Km/Cm/Am	13 (5,0%)	5 (11,1%)
H R Fq	4 (1,6%)	1 (2,2%)
H R Km/Cm/Am Fq	4 (1,6%)	2 (4,4%)

In 2013 93% of cases with bacteriological confirmed tuberculosis and 79% of relapses had DST results before treatment start. 6 cases of XDR-TB were diagnosed before treatment start: 4 patients among new cases and 2 among relapses.

Figure 24. Total number of MDR-TB patients and patients with the first episode of MDR-TB in the civil sector of Arkhangelsk region, 2000 – 2013 (absolute numbers).



Since 2006 the number of MDR-TB patients and patients with MDR on treatment has been reducing.

Table 3. Registration of MDR-TB, 2006 – 2013 (civil sector).

Category of patient	2006	2007	2008	2009	2010	2011	2012	2013
MDR from new cases	103	124	113	131	132	111	112	96
MDR from relapses	70	70	51	54	45	50	38	28
MDR from default	6	13	13	5	3	5		1
MDR from failure	2	1	5	6	3	1	5	2
Subtotal: First time registered MDR TB	181	208	182	196	183	167	155	127
Relapses MDR	3	0	5	3	8	5	9	4
Default MDR	1	28	19	21	16	5	4	11
Failure MDR	0	9	3	4	6	5	6	8
Other MDR cases						2		1
Subtotal: Previously treated for MDR-TB	4	37	27	28	30	17	19	24
Total new and previously treated for MDR-TB	185	245	209	224	213	184	174	151
Among them, with XDR	2	26	28	16	9	15	7	18

The number of patients with first-time registered MDR-TB and with defaulted MDR-TB decreases every year. The number of patients with failures and relapses of MDR-TB remains unchanged.

Table 4. Registration XDR-TB 2009-2013.(civil sector)

Previous registration group	2009	2010	2011	2012	2013
New MDR case	4	1	9	4	6
MDR from relapse	3	2	1		1
MDR from interrupted treatment	1				
Subtotal: MDR for first time	8	3	10	4	7
MDR TB relapse			1		
Interrupted MDR treatment	5	4		1	3
Failure MDR treatment	3	2	4	1	5
Subtotal previously treated for MDR-TB	8	6	5	2	8
Transfer in				1	3
Total	16	9	15	7	18

There are no significant changes in the number of registered XDR-TB patients despite the fact that there is no opportunity to organize treatment of this category of patients because of the absence of drugs.

Table 5. Treatment outcomes of patients with sensitive TB.

	Registered	Cured	Failure	Died from TB	Died not from TB	Defaulted treatment	Refused from treatment	Transferred out	TB not confirmed	MDR-TB developed
2007	195	66,7		9,7	1,5	16,4		1,5		4,1
2008	216	72,7	1,4	7,4	3,7	5,6		3,7		5,6
2009	208	74,5	1,4	8,2	1,9	6,3		2,4		5,3
2010	183	84,7	1,6	4,4	4,4	2,7		0,5		1,6
2011	209	86,1	0,5	6,2	1,9	3,3			0,5	1,4
2012	168	81,5	1,8	7,1	3,6	4,8		0,6		0,6

Treatment success rate of patients with sensitive tuberculosis is high and reaches the indicator recommended by the World Health Organization.

Table 6. MDR-TB treatment outcomes.

	Registered	Started treatment	Cured	Failure	Died from TB	Died not from TB	Loss to follow up	Refused from treatment	Transferred out	TB not confirmed	XDR-TB developed
2007	157	155	42,7	3,2	21,7	8,3	20,4	1,3	1,3	0,0	1,3
2008	146	143	47,3	3,4	13,0	6,8	23,3	2,1	2,1	0,0	2,1
2009	143	141	50,3	2,8	11,9	7,7	22,4	1,4	3,5	0,0	0,0
2010	171	167	57,9	3,5	11,7	6,4	12,9	2,3	2,3	0,0	2,9
2011	158	155	60,6	3,2	10,8	5,1	13,9	1,9	1,3	0,0	2,5
2012	154	148	64,3	5,2	5,2	10,4	8,4	3,9	3,9		0,6

Treatment outcomes of patients with MDR-TB improve every year and in 2012 64,3% of patients were cured, but still the percentage of patients who die or who are lost to follow-up is high (15,6% and 8,4% correspondently).

Table 7. Treatment outcomes of Sm (-) patients.

	Registered	Effective treatment	Failure	Died from TB	Died not from TB	Defaulted treatment	Refused from treatment	Transferred out	TB not confirmed	MDR/XDR
2007	236	78,8		4,7	4,2	4,2		2,1	3,4	2,5
2008	208	85,6		7,2	1,9	2,9		0,5	1,9	
2009	204	87,3		2,9	4,4	2,5		1,0	1,0	1,0
2010	202	84,7		1,0	2,5	2,5		3,5	4,5	1,5
2011	143	88,1		0,7	2,1	4,2		0,7	3,5	0,7
2012	135	85,6	2,2	1,5	2,2	6,5		1,5	1,5	

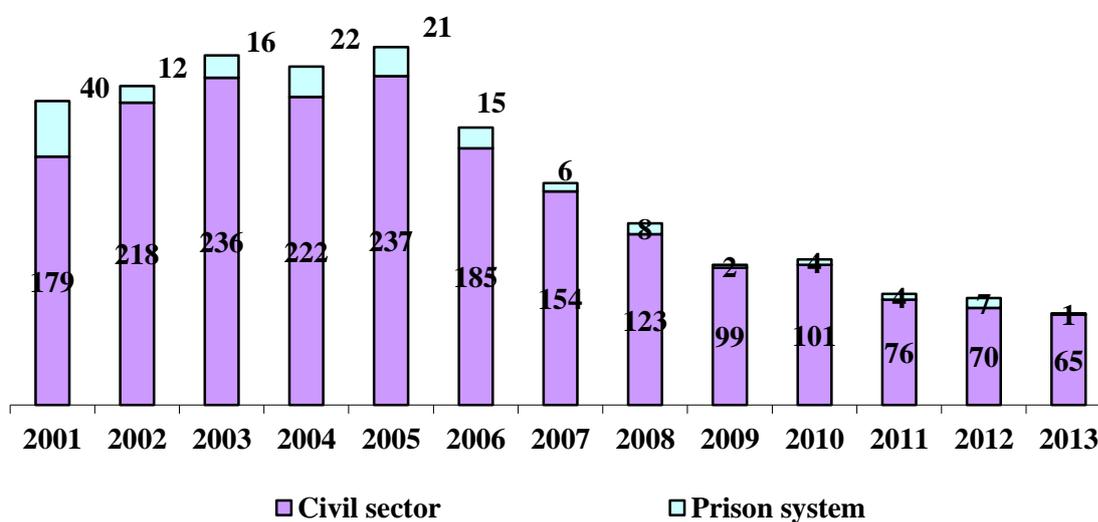
Since 2008 cure rate of patients with no bacteriological confirmation of their diagnosis is higher than 85%.

Table 8. Treatment outcomes of SM (+) patients with no DST data.

	Registered	Effective treatment	Failure	Died from TB	Died not from TB	Defaulted treatment	Refused from treatment	Transferred out	TB not confirmed	MDR/XDR
2007	44	45,5		25,0	6,8	4,5		2,3		15,9
2008	43	37,2		34,9	7,0	4,5		2,3	2,3	11,6
2009	43	60,5		25,6	4,7	4,7	2,3	2,3	2,3	
2010	29	44,8		24,1	13,8	6,9			6,9	3,4
2011	9	77,8						11,1		11,1
2012	20	45,0		35,0	10,0			5,0		5,0

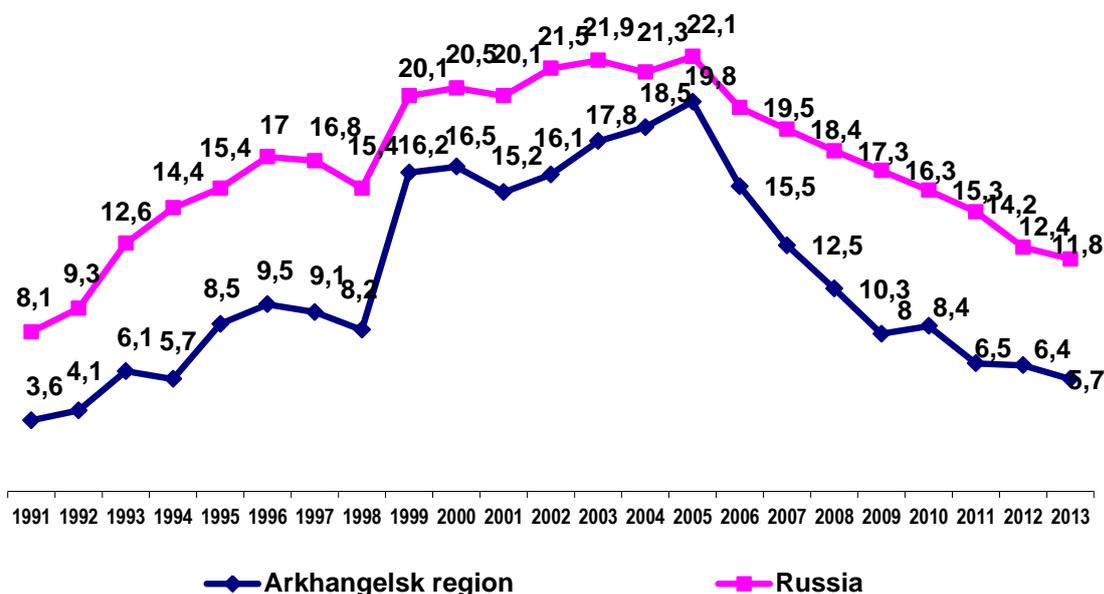
Treatment of patients with no DST done are much lower than for patients with drug susceptibility results available.

Figure 24. TB death cases in Arkhangelsk region. 2001 – 2013 (absolute numbers).



TB death rate has decreased in 3.3. times since 2001.

Figure 25. TB Mortality in Russia and in Arkhangelsk region, including prison, 1991 – 2013. (per 100 000 population).



TB death rate in Arkhangelskr region is 2 times lower than the same rate in the Russian Federation.

## TB policies and epidemiological trends in Norway 1995-2014

### TB policies

In Norway TB prevention and control has changed in several ways in recent years, partly in line with international recommendations:

- In 1996 the TB Act from 1900 was replaced by the Communicable Disease Act, with a new TB regulation and TB manual. Treatment outcome monitoring was introduced.
- A group of TB experts (including the Chest physicians' association) appointed by The Ministry of Health developed a "White book" on "Elimination of TB? Strategy for future TB control" in 1998, recommending continuation of BCG vaccination to all school leavers (age 12-14 years) and increased use of treatment of latent TB infection, especially in immigrants.
- In 2001 4-5 (later 4) regional health authorities were established with hospitals organized in trusts, now reduced to 27. The intention was to make the health services more efficient, by introducing business-like models. From 2001 municipalities are obliged to ensure that the whole population are registered with a family doctor ("fastlege"). In 2002

the National Health Screening Service (which included the TB Registry) was integrated into the new Norwegian Institute of Public Health (NIPH), including surveillance.

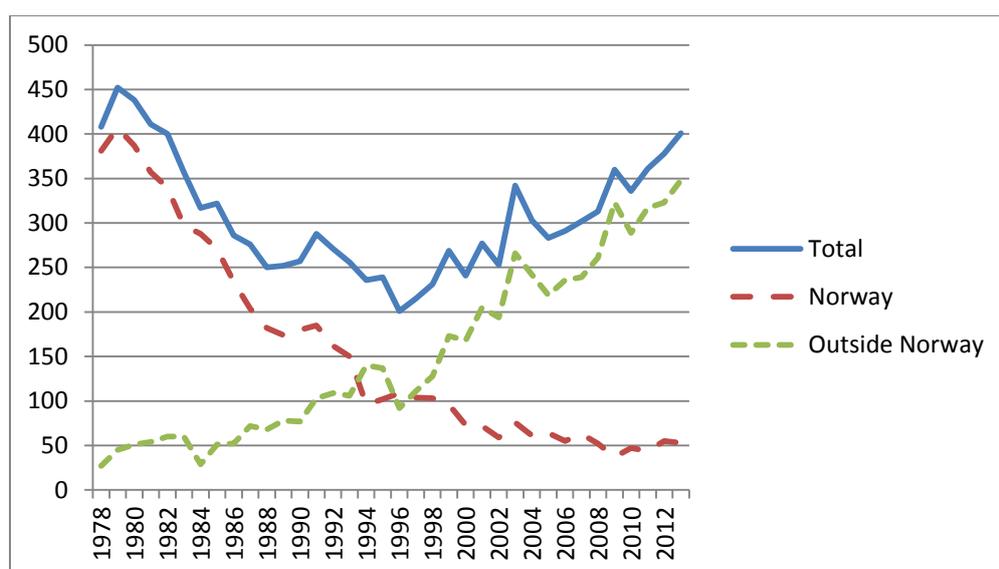
- In 2003 a new TB regulation (based on the “White book”) and TB guideline, with key participation of the TB Committee of the Chest Physicians’ Association. All regional health authorities appoint TB coordinators to ensure that the TB control program is functioning. This has been a major strengthening of TB control, with at least a part time person responsible at county level, ensuring that patients after discharge from hospital are followed up in the primary care system. Treatment should be given under direct observation by health staff, at least the first two months. Obligatory TB screening was limited to immigrants and to staff in health and education sectors who have been more than three months in a country with high prevalence of TB. Treatment of latent TB should be increased.
- NIPH appointed a new advisory National TB committee which meets twice per year, and a Technical MDR-TB group which meets once per year and discusses MDR cases by email and phone between the meetings. The MDR committee has representatives from each of the 4 health regions (where one hospital has been designated for MDR treatment), surgeon, paediatrician, TB coordinator, as well as Reference laboratory and surveillance unit in NIPH.
- BCG vaccination to all school leavers was omitted in 2009, because the transmission in Norway was found to be so low that too many would have to be vaccinated to prevent one case. The effectiveness of the vaccine has been high in Norway (as in England, around 80% the first 5 years, 60% the first 10 years). The vaccine is still given to newborns with immigrant parents. In 2014 the time of vaccine was postponed until 6 weeks after birth to prevent vaccinating children with congenital immunodeficiencies.
- According to the Migration Act (“Utlendingsforskriften” 2010 § 17-14) foreign nationals who are undergoing assessment or treatment for tuberculosis shall not be deported until suspicion of tuberculosis has been dispelled or the treatment has been completed.” This policy had already been practiced a number of years, in order to attract to the health services undocumented migrants with TB symptoms who may otherwise be hiding, often in congested housing with high risk of transmission, also affecting officials from migration and police. NGOs are running health centers for undocumented migrants.
- WHO/ECDC review 2011 concluded very positively. Recommendations included HIV-status in the notification form (permitted since 2013), peripheral data entry in the notification system (not yet), link with vital registration system, follow-up of screening, use of molecular tests and IGRA.

## Notification of TB cases

Both clinicians who diagnose a case and the laboratory have an obligation to report TB cases to NIPH. In addition hospital pharmacies send lists of patients who have been prescribed Rifampicin and Isoniazid to NIPH to be compared with reported cases.

The total number of TB cases registered in Norway declined steadily for several decades until the mid 1990s, with 201 cases in 1996, but has since then gradually increased to the double in 2013: 401 cases (figure 26). The rate per 100 000 increased from 4,6 in 1996 (4,4 million population) to 7,9 in 2013 (5,1 mill). The explanation is the increase in the foreign-born population from 5% of the total population in 1995 to 12% in 2013. While half of the migrants came from high-income countries (mainly labour migrants), others came from low income countries with high levels of TB, many refugees and asylum seekers. The percentage of TB cases who are foreign-born increased from 46% in 1996 to 87% in 2013. A similar trend is seen in many Western-European countries.

Figure 26: Number of TB cases in Norway 1979-2013, by country of birth



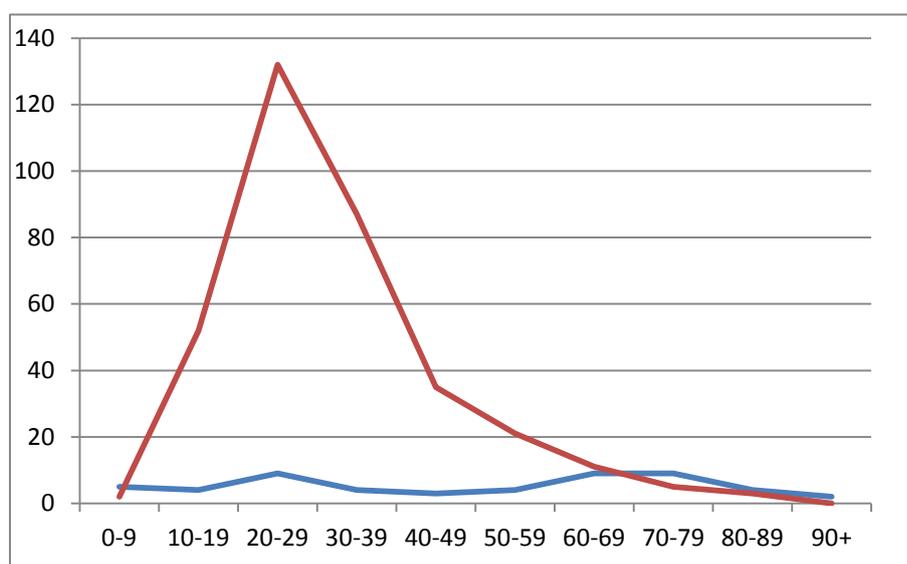
The rate of TB reflects the TB level in the country of birth, from 1,2 per 100 000 in the Norwegian-born population, to 251 in persons born in African countries, with Asia (72) and Europe outside Norway (8) in between (table 10).

Table 10. Number of TB patients reported in 2013 by continent of birth and notification rate per 100 000 (population data from Statistics Norway)

Place of birth	Number of TB patients	Population in Norway by place of birth	Notification rate
Norway	53	Ca 4 400 000	1,2
Europe outside Norway	29	356 722	8,1
Africa	177	70 577	251
Asia	135	187 930	72
South- and Central-America	4	24 632	16
Foreign-born total	345	663 870	52
Total	401	5 051 275	7,9

Foreign-born TB patients are young adults, while Norwegian born have a median age of 70 years, since almost all have reactivated disease from infection many decades ago (figure 26). In foreign-born male and female patients were almost the same (male/female ratio 1,1) while in Norwegian-born the majority are males (ratio 1,5).

Figure 27. Number of TB cases 2013 by country of birth and age (10-year groups) (top curve: foreign-born, lower curve: Norwegian-born)



Comparing the 20 counties in Norway, the rate of TB in 2013 was highest in the capital Oslo, because the foreign-born population is larger. There is no clear difference between other counties, with cases ranging from 6 to 90, and not higher in the north.

Pulmonary TB was found in 62% of the TB cases, 23% in lymph nodes, 5% in pleura, and the rest in other extrapulmonary organs (5 or less in each organ). Extrapulmonary TB was more frequent in foreign-born (40%) than in Norwegian-born patients (22%).

## TB diagnosis

Most TB patients (66% in 2013) were detected because they went to the health services with symptoms, 21% were detected by entry screening and 3% by contact tracing. Mass x-ray screening for TB of the general population started in the late 1940s, was limited to persons with increased risk from the early 1970s and stopped in the 1990s. However, since the 1970s TB entry screening is obligatory in migrants from countries with high levels of TB, with tuberculin skin test or Quantiferon for all and chest x-ray for persons above 14 years of age. Almost half of the foreign-born patients were registered with TB less than one year after arrival, suggesting that the entry screening is effective.

County laboratories do smear microscopy as well as PCR for TB diagnosis, while regional laboratories do culture and rapid tests for Rifampicin resistance (in 3 of 4 regions). All positive cultures are sent to NIPH for susceptibility testing and genotyping (from 1994 RFLP, later MIRU-VNTR). Only around 20% of patients have strains that are part of a cluster. In many cases epidemiological link cannot be found, and it is doubtful if clustering means recent transmission. The large majority of TB cases are therefore considered to be reactivation of infection before arrival in Norway.

## Drug resistance

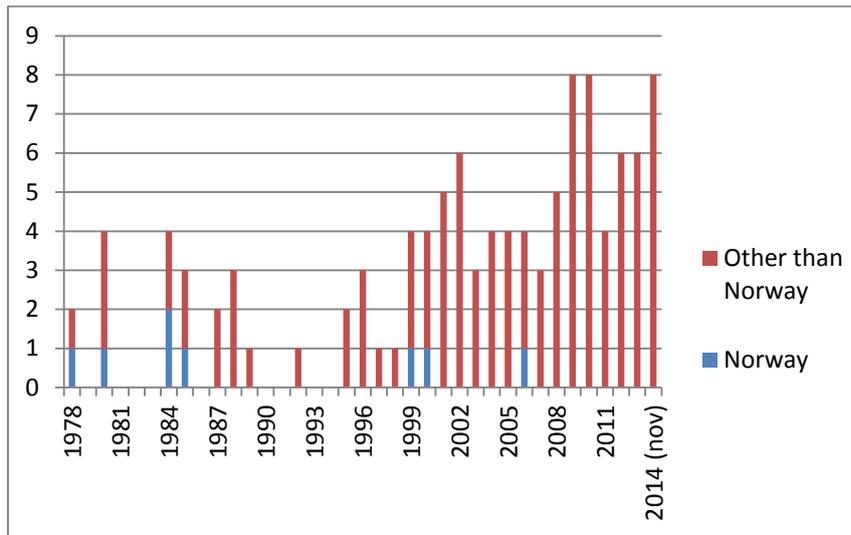
All resistance tests are confirmed at the National reference laboratory at National Institute of Public Health, which takes part in the WHO network of external quality assurance. Rapid tests are used (Gene Xpert and Line Probe Assays) and confirmed with MGIT. Among the 318 culture confirmed TB cases in 2013, 10% had resistance to Isoniazid and 2,2% to Rifampicin (table 11).

Table 11. Resistance to first line drugs (phenotypic) in 318 culture confirmed TB cases 2013

	Resistant	Lowgrade resistant	Susceptible	Total	% resistant
Isoniazid	21	10	287	318	10 %
Rifampicin	7	-	311	318	2,2 %
Ethambutol	3	-	314	317	0,9 %
Streptomycin	34	9	274	318	14 %
Pyrazinamid	14	-	303	317	4,4 %

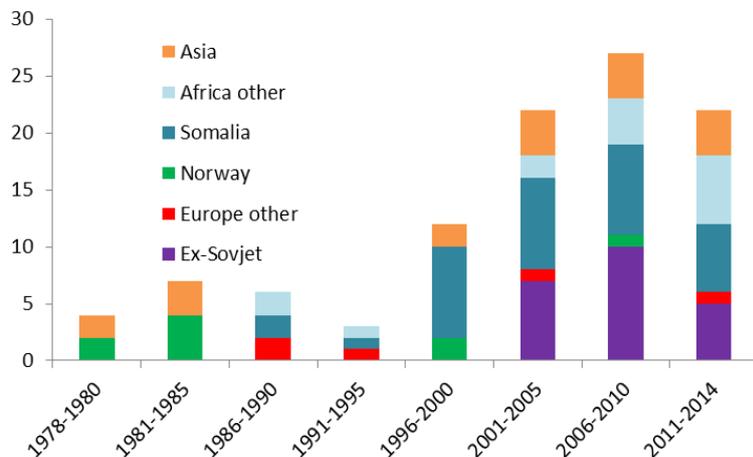
The number of MDR-TB cases has gradually increased over the years but is still less than 10 cases per year (figure 27). The first years there were a few Norwegian-born cases who had received inadequate treatment in the past, but no Norwegian born cases have developed MDR-TB on treatment since 2002. The large majority of foreign-born cases have been infected before arrival to Norway.

Figure 28: MDR TB in Norway 1978- Nov 2014 by origin



Most MDR cases are born in Africa, since most TB cases are born there, but the proportion with MDR is low. Patients from former Soviet Union countries is another important group, which is not so numerous in TB cases but the percentage with MDR is much higher (figure 29).

Figure 29: MDR and XDR TB cases in Norway 1978 – Aug 2014 by origin



Among 784 cases registered 2012-Nov 2014 with susceptibility results, 19 MDR-TB cases (2,4%) were diagnosed. Considerably higher levels were found in patients born in Former Soviet Union countries and formerly treated patients, representing around half of the MDR-TB cases (table 12). The patients from former Soviet Union came from Baltic countries (13 patients, 2 with MDR-TB), Russia (5, one with MDR), Ukraine (two, one with MDR) and one from Caucasus (no MDR).

Table 12: Rifampicin (R) and Isoniazid (H) susceptibility testing in TB patients notified in Norway 2012-2014 (October) by continent of birth

Continent	With susceptibility result to:		Resistant to:		% MDR in patients with susceptibility results for R and H
	R	R and H	R	R and H	
Africa	384	379	12	10	2,6 %
Asia	242	239	5	4	1,7 %
Norway	85	85	0	0	0 %
Europa outside Norway	67	66	5	5	7,6%
South/Central-America	7	7	0	0	0,0 %
Unknown	9	8	0	0	0,0 %
Total	794	784	22	19	2,4 %
Former Sovjet Union	21	21	4	4	19%
Previously treated (except former Sovjet)	31	30	5	4	13%

The level of resistance to quinolones and 2.line injectible drugs is increasing. Among 18 MDR patients 2012-14 with test results, 4 had resistance to Moxifloxacin (two from Baltics), and 3 to a 2.line injectible (two from Baltics), one with resistance to both groups.

### **Treatment outcome**

Data were collected since 1995 when 76% of culture confirmed pulmonary cases were successfully treated, with 14% deaths and 9% lost to follow up. In later years the success rate of all cases has generally been quite high, over 80%, while deaths, patients leaving the country (with unknown final outcome), and missing outcomes being the main challenges (table 13).

Table 13: Treatment of all TB cases notified 1999-2012

År	Total TB cases reported	Total with outcome	Success %	Deaths %	Lost follow-up %	to Left country	Outcome missing
1999	269	271	83 %	9 %	4 %	4 %	-1 %
2000	241	237	80 %	7 %	6 %	5 %	2 %
2001	277	276	86 %	7 %	2 %	5 %	0 %
2002	253	253	84 %	7 %	4 %	4 %	0 %
2003	342	342	87 %	7 %	3 %	2 %	0 %
2004	303	303	87 %	6 %	4 %	2 %	0 %
2005	283	281	90 %	5 %	2 %	1 %	1 %
2006	291	289	86 %	4 %	2 %	3 %	0 %
2007	302	288	80 %	6 %	4 %	2 %	5 %
2008	313	278	76 %	5 %	1 %	4 %	11 %
2009	360	362	89 %	5 %	1 %	4 %	-1 %
2010	336	335	91 %	4 %	1 %	1 %	0 %
2011	358	349	90 %	4 %	1 %	3 %	3 %
2012	375	345	82 %	4 %	1 %	4 %	8 %

Treatment success of MDR-TB cases was lower, the first years because of loss to follow-up, but in later years mainly because patients leave the country or outcome is unknown (table 14).

Table 14: Treatment outcome of MDR-TB

	Complete	Died	Lost to follow-up	Stopped because of adverse	Left the country	Failure	Unknown	Still on treatment	Total	Success %
1978-2006	36	2	12				1		51	71 %
2008- 2009	8	1	2	1					12	75 %
2010-2012	10	1	1	1	3			2	18	61 %
2013-okt 2014					1	1			14	

### Treatment of latent TB

Start of treatment for latent TB is notifiable to NIPH. The number of persons started on treatment has increased from below 40 in 2001 to around 750 in 2013, twice the number of patient started on TB treatment. The increase speeded up especially when IGRA tests became available from around 2007. The increase is seen mainly in foreign-born persons,

mainly detected on entry screening. while others are detected in contact tracing, because of HIV infection, or because they start immunosuppressive treatment.

## Conclusion

The number and rates of TB is still at a low level, around 8 per 100 000, but have increased gradually since the mid 1990s. The increase is explained by the increasing number of foreign-born persons from countries with high levels of TB. Entry screening detect a number of cases, and very little transmission seems to occur in Norway. Treatment success has been over 80%. The level of MDR-TB remain low, reflecting the level in countries of origin. Current challenges in TB control include how to make health services easily accessible to ensure early diagnosis of TB especially in all migrants, reduce duration of hospitalization, and how to better target screening and treatment of LTBI.

## The importance of the cooperation for Norway

1. The joint Russian-Norwegian program has been useful for the Norwegian clinicians to get to know the epidemiological situation on tuberculosis in our neighbor Russia, and to increase their competence how to diagnose, treat and manage patients with TB, especially MDR-TB, in Norway. It has been important to see not only clinical but also programmatic management of TB and MDR-TB, since similar changes have also taken place in Norway during the same period.
2. LHL was founded in 1943 by five TB patients and is today the largest organization for Heart and Lung Patients in Norway. The collaboration with Arkhangelsk has been of great importance for members of LHL that have followed the development and strengthening of TB program in Arkhangelsk closely. The Arkhangelsk region in Russia became one of the territories-partners of LHL, where all components of the WHO strategy "Stop TB" were implemented and where LHL has been engaged as a long term partner. LHL has been able to develop jointly the new methods of health communication, patient friendly information materials and measures to empower TB patients to better cope with their disease. It has been especially fruitful to work this out together with the partners in Arkhangelsk and within the framework of a supporting all medical and social components of a TB program not only as separate projects.
3. To strengthen the control with infectious diseases is a global issue and a joint responsibility. From a Norwegian perspective, sharing borders with Russia it is our common responsibility to engage in the fight against TB when being invited to

collaborate with Arkhangelsk. LHL has made use of its experience from global TB control in the collaboration with Arkhangelsk and not so much the Norwegian experience. But since a vast majority (87% in 2013) of the notified TB cases in Norway are foreign born we need to establish and maintain good professional networks with our neighbors concerning global health issues and especially tuberculosis. It is in our own interest too.

## Lessons learned from Russian-Norwegian collaboration in TB control in Arkhangelsk

Below we will highlight some of the most valuable experiences and lessons learnt that have derived from the collaboration so far. We have summarized the main points as we see them, all containing approaches and types of activities that in one way or another have contributed to the improvement in TB control in Arkhangelsk.

### **1. Sharing of knowledge is key. Support collegial technical cooperation.**

The collaboration between Russia and Norway has emphasized collegial technical cooperation and mutual sharing of knowledge, although some financial assistance has been part of the picture. The most important contribution from the Norwegian side has been to provide knowledge of, and insight into, global TB control, including sharing of the Norwegian experience with TB and TB control. On the other side, the long term collaboration has contributed to building Norwegian competence on important global health issues, such as challenges and opportunities of health system development and the management of MDR-TB.

### **2. Long term perspective is needed, together with a holistic approach to TB control**

Due to the long term perspective of the collaboration it has been possible to support the development of the whole TB program rather than a few isolated projects covering only smaller components of TB control. The partnership has emphasized and learnt from having a holistic approach to TB control . In order to have an impact, all key components within TB control must be implemented. This implies both a medical and a social perspective on TB.

**3. Promote collaboration and form partnerships with a variety of actors relevant for TB control.**

The collaboration has promoted partnership in TB control within the framework of the TB program. The program acknowledges the fact that all stakeholders and partners who are involved in TB control need to work together. Each stakeholder or partner have a specific competence/expertise that is relevant for TB control and they also have a specific dedicated role to play fighting TB. It is important to work together to control Tb and reduce the burden on society. This partnership approach has secured ownership and dedication, and a variety of important contributions from all key partners such as the Ministry of Health, DFPS, NSMU, ARTD and NGOs, in particular the Charity Foundation "Easy Breathing".

**4. Ownership is imperative. Implementing part should always be Russian.**

The collaboration has supported the Russian colleagues in Arkhangelsk region to revise and update both TB plans and practical management of TB. Systematic visits have been carried out and concrete recommendations have been discussed, implemented and proven helpful. The implementation of all TB control activities has been carried out by the Russian health services. The Norwegian presence has been limited to 1-2 week visits twice per year focused on discussions and recommendations for further development and strengthening of TB control.

**5. Be flexible, change according to needs and learning**

The flexibility of the, collaboration, the ability to change according to needs identified over time, and the implementation of a variety of different activities of TB control in the Arkhangelsk region has had a strong impact. Based on analysis of data recorded in the program such as high loss to follow-up, level of MDR etc has systematically influenced the planning.

**6. The most vulnerable and marginalized groups in society must be actively addressed in TB control.**

As briefly mentioned above when talking about having a holistic approach to TB control, the collaboration has included and addressed both social (i.e. non-medical) and medical aspects of TB control. TB control is dependent on such an approach. Many people who contract TB belong to so called "marginalized groups" or risk groups. These groups include people in challenging situations such as people having problems with alcohol or drug abuse, people with other types of diseases that weakens the immune system, people struggling to find employment and/or are homeless, people that are imprisoned/convicted or that have

previously been in prison. The cooperation has specifically targeted many of these people and for instance provided support for food packets and travel cost. A patient centered individual approach is necessary to find the best way to support such patients through the course of treatment. Such an approach has been developed by the program and its collaborating partners through outreach activities, home based care, and health communication. The general improvement of living conditions (socioeconomic situation) in Arkhangelsk over the years has helped this process, although the income distribution in the region is unequal and those with low income will continue to face a higher risk of contracting TB.

**7. Peer support (former TB patients helping TB patients) and the use of TB patient organization is helpful in achieving higher treatment success rates**

The cooperation has supported the development and involvement of patient networks, such as study groups, TB schools and peer groups. These are fora where TB patients can exchange experiences and meet others in similar situation as themselves. This approach is based on a positive Norwegian experience where the use of peer groups and patient organizations have shown to have a great impact on treatment success; i.e such groups and peers help TB patients through treatment and assist patients morally in coping with the disease while in treatment. Role models are of great significance for people in difficult situations. To meet healthy former TB patients are of great value for those who are ill in that it brings hope.

**8. Electronic recording and reporting system.**

In retrospect, a Norwegian IT expert put it like this: "The solution was to find a local expert, not to assist in the development of a new system". An IT expert was found, and he developed the computer based electronic system for recording and reporting.

**9. Address and improve Infection control**

Biosafety measures was introduced and safety cabinets were built.. This impacted greatly on infection control. Guidelines must be followed.

**10. Align and agree on treatment regimens**

All stakeholders agreed on a joint regimen, this helped align the system of TB control, and centralized drug management.

**11. Continuous training of health personnel and supportive supervision to the districts**

Such follow-up is important both to secure high standards of diagnostics and treatment, but also to sustain health workers motivation. The introduction of health communication trainings has proven positive both to health workers and to patients.

**12. Diagnostic tools of high quality. Invest in the laboratories.**

The introduction of rapid tests reduced the days of hospitalization for patients. A variety of diagnostic tools are available. The program put less emphasis on x-Ray, and more on microscopy, culture, Gene Expert etc.

**13. Home based care is a good option for following up patients,**

Home based care throughout the treatment process reduces the level of stress for patients. The ability to offer home based care also reduced the number of days at hospital.

**14. Continuous spread of information about TB is needed among the public and in prisons is needed**

The current joint five-year program “Stop TB in North-west Russia in our lifetime” is a strong basis to continue the collaboration.

**Recommendations for continual improvement of TB control activities in the Arkhangelsk region.**

	Challenge/Task	Recommendation
1.	The TB mortality rate (deaths per 100 000 population) has declined markedly, but the TB lethality or fatality rate (deaths as percentage of TB patients) remains high in the Arkhangelsk region (15 % in 2013)	To conduct delay studies: identify factors associated with patients delay in going to the doctor and doctors delay in diagnosing and starting treatment
2.	High rate of lost to follow-up	To explore opportunities and different types of

	of treatment	<p>measures and individually tailored approaches to motivate patients to stay on treatment and strengthen their skills and resources to cope with the disease. Find new ways of social and motivational support for patients in need</p> <p>To negotiate with the Arkhangelsk region Healthcare Ministry concerning the introducing into the regional budget a range of measures aimed at social and motivational support for TB patients</p> <p>To continue active cooperation with public organizations that provide social and psychological, material, anti substance abuse, legal and other assistance to citizens in difficult life situation</p>
3.	Incomplete data in electronic database (no data before 2007)	To consider the opportunity to introduce the data from treatment cards and registers of the previous years (since 2000, when the treatment of MDR-TB started), if necessary - to hire additional staff to perform this task
4.	Insufficient number of healthcare workers in TB service	<p>To conduct active information work in higher and secondary educational institutions of Arkhangelsk (NSMU, NArFU, medical colleges)</p> <p>Participate in the Open Days, career guidance activities, job fairs</p>
5.	The increase of HIV-infected people requires special attention to prevention of TB (especially in prisons)	To continue activities aimed at prevention of TB in HIV-infected people in the Arkhangelsk region, including infection control and treatment for latent tuberculosis
6.	To continue education in "health communication"	To integrate the elements of health communication training in the curricula of higher and secondary educational medical institutions

7.	To continue competence improvement in specialists from general health care institutions, TB service, the prison system concerning diagnosis and treatment of TB	To conduct regular conferences at the regional and national levels with the presentation of the best practices in TB control, including conferences for penitentiary sector  Collaboration with the NSMU in regard to medical education
8.	To continue the supervision system in the territory of the Arkhangelsk region	To increase the number and strengthen the content of supervisory visits to the districts of the Arkhangelsk region  To seek additional funding for the organization and conduction of visits, involving Russian and international donor organizations

## Conclusion

The report documents that, and shows how, the collaboration between Russia and Norway has been successful in reducing TB and MDR-TB in Arkhangelsk, that the partners has gained experiences in TB control and that the ties between our countries has been strengthened.

We hope that colleagues also from other areas of the Russian Federation will find information in the report that may be useful in their work.

## Annex 1.

### **InFiL congratulates the Tuberculosis program in Arkhangelsk with its 15 years celebration .**

Fighting multi-resistant tuberculosis is one of the most important international medical challenges today. The problem being great in Russia, does to a significant extent concern Norway as a neighbouring country. Infections do not respect national borders.

Norway and North-West Russia has had a close and fruitful cooperation in the Barents region program during the past 23 years, covering many areas of civil life. One of the most fruitful fields of this cooperation has been within medicine, covering a wide range of both clinical and scientific aspects. Both our countries have benefitted greatly from the close contacts established through these multitudes of projects over all these years. Great and lasting friendships have been established. The cooperation has first and foremost been between hospitals in Northern Norway and Arkhangelsk, but a wide range of medical institutions all over Norway have had important roles.

We are impressed by the results achieved by the tuberculosis program in Arkhangelsk over these 15 years, results that have had impact on the treatment of tuberculosis in the whole of Russia. We are proud that the Norwegian foundation InFiL, who's purpose is to support financially health projects worldwide, has had the opportunity to take a part in this program. Our participation has given us the chance to see the high level of medical standard in the Tuberculosis Hospital in Arkhangelsk, the impressive organisation of tuberculosis treatment in the region and the concern taken to treat also prisoners with multi-resistant tuberculosis.

In our troubled world medicine is a bridge over which peaceful cooperation can move freely between countries preventing conflicts and wars. The lessons learned from the cooperation in the Barents region should be extended to other areas in the world where conflicts are evident or threatening.

Mons Lie

Board member of InFiL  
October 2014

Oslo 2.

## Annex 2.

Dear Conference participants,

A collaboration between TB experts in Arkhangelsk and at the Norwegian Institute of Public Health was established in 1994, and until 2008 the Norwegian Reference Laboratory for Mycobacteria had the pleasure of supporting the Arkhangelsk TB Dispensary in reconstructing the TB Laboratory, upgrading the diagnostic procedures, including quality assurance activities, and establishing molecular epidemiological methods.

Together we were involved in supporting actions to establish TB diagnostic activities in the Arkhangelsk prison.

During these years the Norwegian Reference Laboratory for Mycobacteria conducted a number of support visits in Arkhangelsk in collaboration with the Norwegian Heart and Lung Association. These are remembered always as very pleasant experiences.

In 2008 the laboratory diagnosis of TB in Arkhangelsk had reached a level of documented high quality diagnostics, using up-to-date methods and following international standards. From then on, diagnostic procedures have been further developed by local expertise.

The personnel in Arkhangelsk deserves great honor for their work in securing TB patients of Arkhangelsk Oblast excellent diagnostic services. The staff of the Norwegian Reference Laboratory for Mycobacteria also gained much important knowledge through the cooperation with the Arkhangelsk TB Dispensary.

We are also very grateful for the personal relationships with the staff in Arkhangelsk, headed by Prof. Andrey Maryandyshev and Dr. Nina Nizovtseva.

Wishing you a successful conference, and that the experience gained in Arkhangelsk is also useful for other regions.

Dominique Caugant

Turid Mannsåker

Per Sandven

Norwegian Reference Laboratory for Mycobacteria

Norwegian Institute of Public Health



**LHL** International

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