

## Harmonization of Tuberculosis Control in the WHO European Region: The History of the Wolfheze Workshops

Veen J\*¶, Migliori GB†, Raviglione MC‡, Rieder HL§, Dara M\*, Falzon D□ ‡, Kuyvenhoven JV\*, Schwoebel V□ \*\*, ‡, Zaleskis R††.

\* KNCV Tuberculosis Foundation, Netherlands; ¶ freelance TB Control Advisor, Netherlands; † WHO Collaborating Centre for TB and Lung Diseases, Fondazione S. Maugeri, Care and Research Institute, Tradate, Italy; ‡ Stop TB Department (STB), World Health Organization, Switzerland; § International Union Against Tuberculosis and Lung Disease, France; □ EuroTB/InVS - Saint-Maurice France, \*\*Institut de Veille Sanitaire, France, ††World Health Organization, Regional Office for Europe, Copenhagen, Denmark.

Corresponding author: Dr J Veen [j.veen10@hetnet.nl](mailto:j.veen10@hetnet.nl)

**Word count: 4537**

**Word count abstract: 109**

### **Acknowledgement:**

The authors thank Dr Malgosia Grzemska (WHO-STB Geneva) for her valuable input to the second period described in the manuscript.

## **Abstract**

In 1990 a workshop was organized in the Netherlands in the village of Wolfheze near Arnhem, where experts discussed the critical interventions that would foster elimination of tuberculosis in Europe. This event was followed by several more over the following two decades to become known as the "Wolfheze Workshops". This paper gives a brief overview of the history and the impact the Wolfheze Workshops had on the commitment of European governments to standardize definitions, recording and reporting systems and thus permitted comparison of interventions and improving tuberculosis control across borders. The Wolfheze Workshops have been and still are an essential platform for this exchange of experiences, promoting common approaches.

Keywords: interventions, harmonization, surveillance, tuberculosis control, Wolfheze Workshops,

## **Introduction**

During the 1980's, inspired by the declining trends of tuberculosis in the previous decades since the 1950s, experts from low incidence countries of Europe started to debate the likelihood of elimination of tuberculosis. In the spring of 1990 a workshop was organized in the Netherlands in the village of Wolfheze near Arnhem, where experts discussed the critical interventions that would foster elimination of tuberculosis in Europe. \* This first historical event was followed by many more over the following two decades and, even if not always taking place in the original setting, they have become known as the "Wolfheze Workshops". Aiming originally at low tuberculosis incidence countries in Europe, but also elsewhere, their focus changed after the collapse of the former Soviet Union (FSU). The new independent countries in Eastern Europe were high tuberculosis incidence countries and it became soon apparent that tuberculosis elimination in Western Europe was intrinsically linked to the epidemic in Eastern Europe. Twenty years later it is time to assess the contributions of the Wolfheze Workshops to improved tuberculosis control in Europe. Did they significantly change the roadmap towards elimination in Europe and did they achieve concrete results? This paper presents, from an historical perspective, what the "Wolfheze Workshops" and their outcomes have been, as well as their legacy for future generations to realize the power and the effectiveness of coordinated multi-national approaches to global health problems.

## **Approach and aims**

Generally speaking, the Workshops can be divided into three periods, depending on the focus and the needs arising during them: Period 1 (1990-1995), new strategies for low incidence

---

\* The then president of the Europe region of the International Union against Tuberculosis and Lung Disease (now referred to as "The Union"), Professor Eero Tala from Finland and the Director of the (then) Royal Netherlands Tuberculosis Association (KNCV) Dr Jaap F Broekmans, took the initiative to convene this meeting of experts.

countries; Period 2 (1996-2005), multifaceted strategies for low, medium and high incidence countries; Period 3 (2006 - ), separate tracks for low and high incidence countries. Originally the Workshops were attended by experts in the various fields of tuberculosis (clinical, epidemiology, public health, laboratory) representing 15 European and 4 non-European low incidence countries, to contribute to debates on those themes identified by the organizers as crucial for elimination. This can be described as the first period. It led to the establishment of EuroTB as a European surveillance centre at the start of Period 2. Putting the focus on tuberculosis control and elimination in Europe, the platform changed and thus sought the participation of senior officials of national tuberculosis programmes and laboratories in the second period. The different pace of development in low and high incidence countries of Europe made it necessary to divide the Workshops into two different tracks for the two groups of countries, still including national programme managers, laboratory specialists, and a variety of additional experts of the World Health Organization (WHO), the International Union Against Tuberculosis and Lung Diseases (the UNION) and linked institutions. In the third period the newly established European Centre of Disease Control (ECDC) has become involved. The public health answers given by the Wolfheze Workshops to specific problems relevant for tuberculosis control and elimination have been analyzed, described and summarized in table format for each period.

## **Results**

### **Period 1: 1990-1995, new strategies for low incidence countries**

The conveners of the first Wolfheze meeting and those who agreed to participate in that workshop held in March 1990 may have held diverse views on what should come out of the workshop, reflected in the wide range of topics that were presented. They seemed to agree,

however, that the major conclusions from the deliberations should be summarized in a report to serve as a basis for the future direction any possible follow-up workshop would have to take.

The heading of this first report obviously suggests the major points that the workshop participants and those charged with writing it up had to make.[1] First, addressing tuberculosis was a government responsibility and non-governmental organizations had to play a major role in keeping governments on the toes as the problem was seemingly diminishing. Second, the publication of a tuberculosis elimination plan for the United States [2] clearly left its imprint on European low incidence countries. Third, Europe was to present its own identity in how it would go about to control tuberculosis. Indeed, the resulting report made three points. First, it delineated the responsibilities of the governments. Second, it specifically called for strengthening surveillance, and third, it emphasized the need for highly qualified personnel to tackle the problem, calling on rebuilding or strengthening centers of excellence and expertise. The report introduced a common terminology with operational definitions to facilitate the speaking of a common language.

A follow-up workshop, held in Wolfheze in 1994, established a task force to address the problem of tuberculosis associated with international migration in Europe. This task force comprised representatives from over 30 countries in Europe. Its report took an inventory of activities then carried out in different countries to address the recognized high relative risk of tuberculosis among immigrants. [3] Most responding countries used active case-finding with radiography, some supplementing it with tuberculin testing. In some countries, screening was indiscriminate for any foreigner, others reported more targeted activities. It appeared from the survey that the criterion was by and large “foreign citizen” rather than selection of groups known to have a high prevalence amongst these. The reliance on radiography alone also indicated the preference given to identify currently prevalent cases without additionally

considering prevention of future incident cases through identification of those already infected with *Mycobacterium tuberculosis* that might be benefiting from preventive therapy. The report called for targeted screening of foreigners, taking into consideration differences in the epidemiology of tuberculosis in the countries of origin. To refine such knowledge, a call was made for better surveillance and evaluation of the yield resulting from screening policies. In an accompanying editorial, the ethical obligations intrinsically linked to screening populations, and segments of the foreign-born population in particular were highlighted. [4]

Surveillance, the critical foundation of any effective tuberculosis control activity was seriously deficient in many European countries, [5,6] while in North America, and the United States in particular, [7] it was taken as the yard stick against which to measure what could and should be achieved in industrialized countries. At the time the second Wolfheze workshop took place, the AIDS epidemic had risen rapidly, impacting tangibly on tuberculosis morbidity in the United States since 1985.[8] The co-epidemic of multidrug-resistant tuberculosis in New York City [9] had made the front page of newspapers and drawn attention of politicians again on tuberculosis. This US experience was widely presented to the participants in the second Wolfheze workshop. The European AIDS surveillance system, which had achieved a unique collaboration between most European countries on a common data collection, was presented as well. Surveillance was comprehensively addressed and was the key issue of the third publication of the working group established after the second Wolfheze Workshop. [10] The recommendations addressed several key issues that needed to be taken into consideration for an effective surveillance system for tuberculosis. First, it was essential that a clear and unambiguous case definition based on bacteriological findings had to be adopted by all countries. Second, a minimum set of essential variables was more likely to provide relevant information than a vast number of variables that were unlikely to be furnished to a reasonable degree of completeness. Third, experience shows that physicians

mandated to report were often not adhering to such legal requirements.[11] It was thus critical to mandate, in addition to practicing physicians, laboratories to report each bacteriologically confirmed case of tuberculosis. The European Centre for the Epidemiological Monitoring of AIDS (CESES) was the institution of choice to implement the proposed surveillance system recommended by the working group which had obtained consent from 37 countries of the European Region of the World Health Organization. Technical support to the Centre was to be provided by KNCV<sup>†</sup> Tuberculosis Foundation; an agreement for financial support by the European Union (DG SANCO<sup>‡</sup>) was found quickly. Implementation was swift with a first feasibility report published as early as 1997. [12] Wolfheze workshops leaders and selected participants were those who constituted the scientific advisory committee of the newly established EuroTB surveillance project based at CESES. Undoubtedly, the Wolfheze "incubator" was behind the major achievement of previously non-existent common standards for surveillance in Europe. (Table 1)

## **Period 2: 1996-2005, multifaceted strategies for low, medium and high incidence countries**

### **a. Standardized case definitions and harmonized data collection for unified European tuberculosis surveillance**

As a response to the threats posed by tuberculosis and other serious communicable diseases, the European Parliament acted to strengthen surveillance in the European Union (EU). [13,14] Its decisions bound member countries to share information on diseases to establish an early warning system. It also provided for a better understanding of the global situation through the pooling of data from a wider knowledge base. Later, in an effort to standardize reporting, the European Commission (EC) published standard case definitions for surveillance in 2002. [15]

---

<sup>†</sup> Royal Netherlands Tuberculosis Association

<sup>‡</sup> Directorate General for Health and Consumers

The establishment of a legal framework for unified surveillance by the EC was however preceded in time by the Wolfheze Workshops and their consensus documents with recommendations on surveillance [10], treatment outcome monitoring [16], drug resistance surveillance [17] and tuberculosis control and elimination [18,19]. As a result, the standard definition for tuberculosis bore distinct differences from those of other communicable conditions. A decision to treat patients was a criterion for defining a case, while patients were to be classified by features important to public health – previous treatment history and site of disease.

The use of case-based (individual) data at national level was encouraged. Completeness of reporting was important: information on 60% or less of tuberculosis patients was considered likely to be non-representative of the entire tuberculosis caseload. The number of countries reporting case-based data for European supranational surveillance increased steadily until 2005 (Figure 1). Nevertheless, with the exception of the Baltic States, no FSU country participated up until 2005 although a number of these had national, countrywide datasets and provided aggregate data.

In a context where migration from countries with high tuberculosis incidence to countries with low incidence was expected to continue, it was recommended that European countries strengthen case notification (from clinicians and laboratories), screen for tuberculosis among persons of foreign origin, provide appropriate curative and preventive services, and evaluate efficiency and effectiveness of screening procedures. [3] The availability of data did improve over the years and allowed more in-depth ascertainment of both the absolute and relative increase of tuberculosis cases of foreign origin in many Western European countries up until at least 2005. [20]

## **b. Tuberculosis control programmes: a revival in the WHO European region**



In the attempt to stimulate high-incidence European countries to adopt its new strategy launched in 1994 and branded as DOTS [21] the year after, WHO held a first meeting of European national tuberculosis programme (NTP) managers in June 1994 in Warsaw, Poland. This event was attended by representatives of 25 countries of central and Eastern Europe. It was a difficult time for those FSU countries in which the public health system had collapsed resulting in frequent stock-outs of medications. At the meeting, participants requested WHO to assist in the implementation of the DOTS strategy<sup>§</sup>. The involvement of WHO and other partners in tuberculosis control activities in Eastern Europe accelerated subsequent to this landmark meeting. Thereafter, in view of the growing demand for technical support in many countries, WHO decided to hold tuberculosis managers meetings every two years. Subsequent events were held in Poland (1996), Kyrgyzstan (1998), Finland (2000), the Netherlands (2002), and Romania (2004).

Converging priorities between the 1996 WHO meeting in Poland and the third Wolfheze Workshop held a few weeks earlier in Noordwijk, The Netherlands, were reflected in an overlapping agenda. At the Poland meeting, participants of Eastern Europe voiced the same concern and demands for technical cooperation. It was therefore decided to combine the Wolfheze Workshops every other year with the NTP managers meetings of WHO. During the fifth NTP meeting in 2002, the expansion of the WHO-recommended DOTS strategy in the region was discussed [22]. The strategy aimed to achieve the World Health Assembly targets [23]. In 2005, the WHO European Region Technical Advisory Group (TAG) recommended that more efforts were needed to reach these targets [24]. By 2006, 35 of 53 countries in the

---

<sup>§</sup> The 5-point policy for tuberculosis control (known as the DOTS Strategy): government commitment; case detection through direct sputum smear examination of suspects; standardized short-course chemotherapy for at least all smear-positive tuberculosis cases under; regular uninterrupted supply of all essential anti-tuberculosis drugs; a monitoring system for programme supervision and evaluation.

European Region (Figure 2) reported that over 95% of their populations could access DOTS while many of the remaining countries were implementing some components of the strategy (e.g., monitoring system). Programme performance, however, remained unsatisfactory, with 52% of estimated new sputum smear-positive cases detected in countries implementing the DOTS Strategy, achieving only 71% treatment success among these, the lowest performance among any WHO region in the world.

The effectiveness of treatment programmes in curing tuberculosis patients - especially the most infectious ones - was an early concern of the European movement. A Wolfheze Task Force recommended that all laboratory-confirmed pulmonary cases notified were, as a minimum, to be assigned to six mutually exclusive treatment outcome categories [16]. New and retreated cases reported during one calendar year would be analyzed as two separate 'cohorts'. As outcome information would be collected subsequent to the initial case notification, this was expected to require the voluntary engagement of the attending doctors in countries. Only Norway had mandatory treatment outcome monitoring in place by 1997 while a few other countries had started to collect these data through their tuberculosis control services. In the following years, treatment outcome reporting to the supranational level increased dramatically even if adoption of the recommended methodology and reporting practices differed between countries [25]. Many countries assigned outcomes using case-based data on the entire national datasets, thus providing additional data which were of use for certain analysis (e.g., association between risk of death and age) and also outcome information on non-pulmonary tuberculosis patients. Forty-four countries reported outcomes for about 119,000 cases notified in 2005. Of those 38 countries reported outcomes based on exhaustive, nationwide cohorts. The overall reported treatment success in new pulmonary cases in these countries did not reach the 85% target, but varied by location (mean: 79% in the EU and West, 74% in the non-Baltic countries of the FSU and 89% in the Balkans). Major

obstacles to achieving the targets were loss to follow-up, which was high throughout the region, high deaths especially in the EU and other Western European countries and, partly as a result of a high drug resistant tuberculosis burden, frequent failures and loss to follow up in the FSU.

### **c. A drive towards elimination and its obstacles in low incidence countries**

The resurgence of tuberculosis in many industrialized European countries, due to varying degrees of migration, HIV, impoverishment and other socio-economic factors, made the prospect of its elimination more distant. While substantial progress has been registered in tuberculosis control across Europe, no country has come close to the threshold of one case of active tuberculosis per million population as proposed in the framework document. If tuberculosis incidence continues to decline at current trends, countries may still be several decades away from elimination.

The 1990 Wolfheze workshop had concluded, amongst others, that elimination could only be reached if governments maintained a central role in tuberculosis care and control, if specialized health personnel were available and if surveillance and monitoring were strengthened. [1] By the end of the 1990s, most western European countries had reduced tuberculosis rates among their native populations to very low levels indeed. In contrast, the higher tuberculosis rates among certain risk groups in these countries, particularly individuals originating from high incidence countries, became more prominent. In 2002, a Working Group published a framework for tuberculosis control and elimination in low incidence countries. [18] This document expanded upon the principles in the original 1994 WHO framework document, but focusing on low incidence European countries. [26] It stressed rapid case detection and treatment to reduce avoidable death and the incidence and prevalence of latent infection with *M. tuberculosis*. The 'Framework document' of 2002, put the DOTS

Strategy as the back bone of tuberculosis control in low incidence countries. Risk group management, outbreak management and infection control are additional key-interventions for countries with a low incidence of tuberculosis. The organizers of the Wolfheze Workshops felt that further elaboration of this policy package would favour tuberculosis control and elimination in low and intermediate incidence countries and should be part of the future agenda.

### ***Drug resistance***

A WHO report published in 1997 revealed for the first time a major problem related to drug resistance in several Eastern European countries. [27] Concerns about the inadequacy of first-line regimens in the face of drug-resistant tuberculosis, and especially multidrug-resistant (MDR) tuberculosis, were therefore discussed at the NTP meeting in 2000 in Finland. It was recommended to introduce programmatic management of cases with MDR tuberculosis only where tuberculosis control programmes were functioning well. The need to avert the further emergence of drug-resistant tuberculosis was emphasized. That same year specific recommendations for the standardization of tuberculosis drug resistance surveillance in Europe were published as a result of another Wolfheze Task Force established at the fourth workshop. [17] Laboratories were to use standardized methods for drug susceptibility testing with a quality assurance programme. In 1998, 22 of 47 national reference laboratories participated in an international proficiency testing programme, but only 11 had proficiency testing schemes for their own laboratories. By 2005, 35 of 45 countries providing drug susceptibility testing (DST) data reported that they participated in international proficiency for DST within the previous four years and 19 countries with two or more laboratories performing DST had national proficiency schemes (Figure 3). Resistance to isoniazid and rifampicin (ie, MDR) at the start of treatment - calculated separately for patients previously treated with combined antituberculosis drugs and for those who had never been treated - was

considered one of the main indicators. Analyses by year of report, age, sex, country of birth, site of disease and sputum smear results were recommended. Countries in which routine surveillance was not possible were to undertake periodic representative surveys or initiate sentinel systems. By 2006, 30 countries were reporting countrywide representative data, of which 22 were providing DST results for isoniazid and rifampicin on a case based level and four others reported data from surveys done within the previous 5 years. Through these improvements in reporting it was possible to describe in detail the main characteristics of drug-resistant cases and the main determinants for MDR among pooled cases from several European countries. [28]

### ***Migration***

One of the reasons for the stagnation in decline in western European countries has been immigration from countries with a higher prevalence of tuberculosis. Both the number and the proportion of tuberculosis cases of foreign origin increased over the years in Western Europe. [20] By 2005, thirty percent of the cases reported in the 25 countries of the European Union were of foreign origin. Moreover, drug-resistant tuberculosis among cases of foreign origin, especially among those from the FSU countries, is commonly higher than among native cases.

### ***Incarceration***

Correctional facilities have often been cited as reservoirs for tuberculosis, presenting a potential threat to the general population. Among 22 European countries responding to a survey, the median tuberculosis notification rate among inmates was 232 per 100,000 in 2002 [29]. The overall rate among prisoners was 15 times higher than in the civilian populations of these countries, but was much higher in some. Screening practices and coverage varied

markedly between countries. These results highlighted the vulnerability of prisoners to tuberculosis.

### ***HIV co-morbidity***

The overall contribution of HIV to tuberculosis epidemiology in Europe remained relatively small, although HIV may be important among groups such as injection drug users and immigrants from high HIV prevalence countries. With Eastern Europe having the fastest growing HIV epidemic in the world, HIV could become an important impediment to achieving elimination. After an in-depth discussion at the Wolfheze Workshops in 2001 and 2002, WHO developed a framework to decrease the tuberculosis/HIV burden [30], focusing primarily on six countries considered a high priority for both tuberculosis and HIV (the Baltic States, Belarus, the Russian Federation and Ukraine). All of these countries reported having a national policy to screen HIV positive individuals for tuberculosis in 2006 (except Lithuania) and the three non-Baltic countries were offering isoniazid preventive therapy to HIV positives by 2007. (Table 2)

### **Period 3: 2006 onwards, separate tracks for high and low/medium incidence countries**

The preparation and launch of the new Stop TB Strategy (2006) [31,32] with a more comprehensive control package than ‘DOTS’, and the situation of a rising incidence of tuberculosis and especially drug-resistant tuberculosis in Eastern European and Central Asian (EECA) countries since the mid-nineties, urged the organizing committee to focus more intensely on high priority countries and on interventions that could strengthen tuberculosis control in EECA-countries. It was therefore decided to create two interlinked tracks within the Wolfheze Workshops from 2006 onward: one directed towards the high priority countries and one directed towards low and medium incidence countries in addition to joint sessions.

In 2006 in Vilnius, Lithuania a joint Wolfheze Workshop and WHO National Tuberculosis Programme (NTP) Managers discussed the new STOP TB Strategy [31], the International Standards for Tuberculosis Care [33] and the Patient's Charter [34]. Separate tracks for high and low/medium tuberculosis burden countries followed. The NTP managers meeting discussed a draft Plan to Stop TB in 18 High-priority Countries\*\* in the WHO European Region, 2007-2015. [35] The Wolfheze Workshop dealt with: (i) contact tracing/outbreak management, leading to creating a writing group for a consensus document on contract tracing [36], (ii) IGRA††, resulting into a consensus statement about the use of these assays published in Eurosurveillance [37], (iii) exploration on the role of nation wide DNA fingerprinting of tuberculosis strains and (iv) draft guidelines for tuberculosis infection control in high MDR tuberculosis settings. Pending the publication of international tuberculosis infection control guidelines, these draft guidelines helped countries (Russia, Belarus, Romania) to finalize their own national infection control guidelines.

In order to increase political commitment the meeting in 2006 also discussed the planning of a European Ministerial Forum and its Declaration. As a result a WHO European Ministerial Forum took place in Berlin in October 2007. The ministerial delegations present committed to adopt the Stop TB Strategy and endeavored to secure sustainable financing for tuberculosis control in all its aspects. [38]

The joint Wolfheze workshop and the NTP Managers meeting in 2008 followed up on 1) The Berlin Declaration on Tuberculosis on how to enhance its use as an advocacy tool [39]; 2) implementation of the Plan to Stop TB in 18 high-priority countries in the WHO European

---

\*\* Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Republic of Moldova, Romania, Russian Federation, Tajikistan, Turkey, Turkmenistan, Ukraine and Uzbekistan.

†† Interferon Gamma Release Assay

region, 2007-2015, 3) the Framework Action plan to fight tuberculosis in the European Union, and its recommendations for implementation and monitoring [40]; and 4) the review of the most updated and controversial interventions for tuberculosis control and elimination in low tuberculosis incidence settings, including (i) a consensus paper on tuberculosis contact tracing, (ii) tuberculosis control in migrants [41,42], (iii) the role of rapid detection techniques for the identification of drug resistant tuberculosis [43], (iv) how country reviews can contribute to the performance of tuberculosis control in a country. To monitor tuberculosis in internal and external migrants, both in western and eastern European countries, ECDC commissioned a literature review, conducted by KNCV, to study the effectiveness of different screening interventions. Three main screening strategies were identified (screening at the port of entry, just after arrival in shelters or later after arrival in the community) that showed no differences in effectiveness. Undocumented migrants are among the most vulnerable groups with limited access to diagnosis and treatment. Recommendations were presented, including to defer deportation until completion of treatment, that were endorsed in November 2008 in an Official Statement of The Union. (Table 3)

## **Conclusion**

The spirit of the first Wolfheze Workshop, based on an exchange of opinions originating from personal expertise and stimulated by the informal ambiance of the Wolfheze rural surroundings, has been kept over the years, despite the growing number of participants, the necessary change of venues, the ensuing new challenges that European tuberculosis control had to face, and the complexities of global health in recent years. This spirit and the willingness of European tuberculosis experts and leaders to work jointly against the common enemy, despite coming from different professional backgrounds and cultures, overcoming longstanding controversies, stimulated the commitment of European governments to



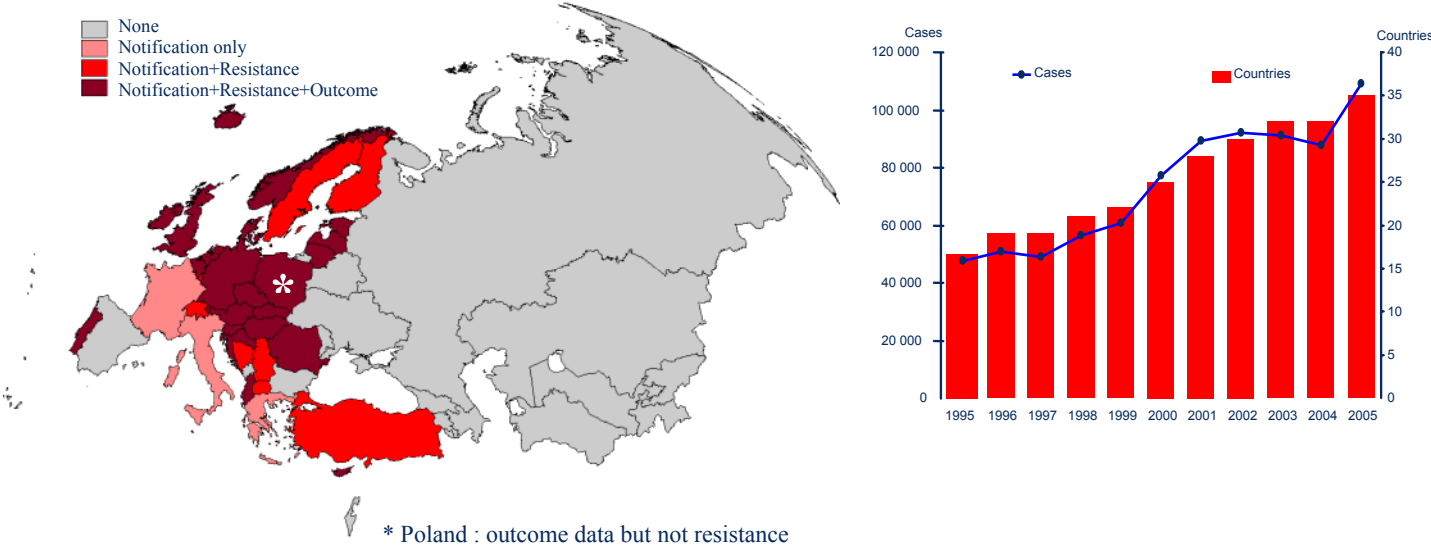
standardize their definitions, their recording and reporting systems, and their provision of either aggregated data or individual data to the common European database, initially at EuroTB and now at ECDC. It allowed for a comparison of harmonized interventions and helped to improve tuberculosis control across borders, taking advantage of lessons learned. The Wolfheze Workshops have been and still are an essential platform for this exchange of experiences, promoting common approaches. The informal and friendly atmosphere of the meetings facilitated sharing experiences and in-depth discussions on common challenges.

The Wolfheze Workshops will continue with two separate, yet interlinked tracks. The Wolfheze programme committee will be expanded to ensure better representation of both high tuberculosis priority and low/middle incidence countries.

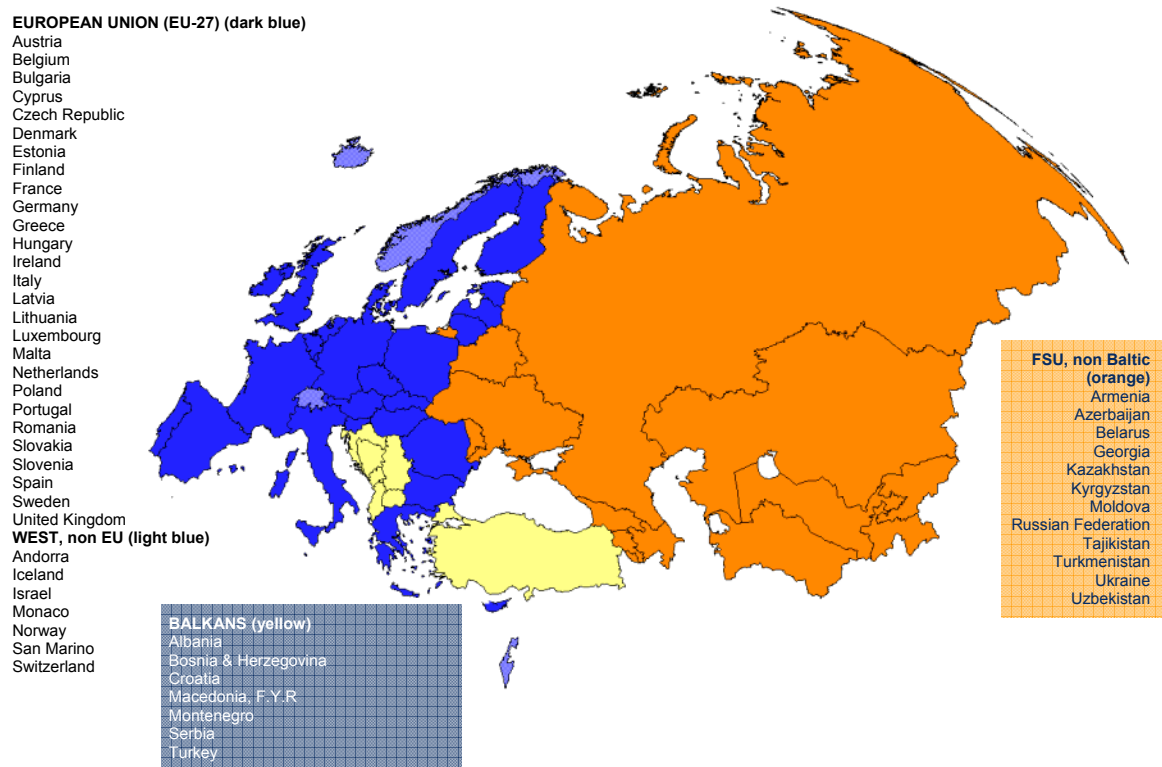
The steering committee of the WHO European Ministerial Forum “All Against Tuberculosis” under auspices of the WHO Regional Office for Europe can create a potential link to the Wolfheze workshops thus using the movement to reiterate the countries commitments to the Berlin declaration. In order to avoid an overlap between the Wolfheze workshops and The Union’s European congresses and capitalize on available resources, the pan-European Wolfheze Workshops will be organized every other year from 2008 onward. When feasible these workshops will be conducted back-to-back with the WHO NTP managers’ meeting and the ECDC Focal Points meeting. The movement will serve as a “think tank” to discuss modern policies and practices of tuberculosis control in Europe. The year 2010 marks the twentieth anniversary of the first Workshop, and we look back with respect to the people who inspired this fundamental initiative and to those who contributed often with passion and intensity to the debates. The outcomes are in front of our eyes and we can claim today that European efforts are coordinated and harmonized like never before in the history of tuberculosis control. This is the best recipe for further progress towards elimination, a word that was the key to reunite all those who cared about tuberculosis control in 1990 and that

remains the key for the future generations of those who will continue the global fight until the last case of tuberculosis is cured.

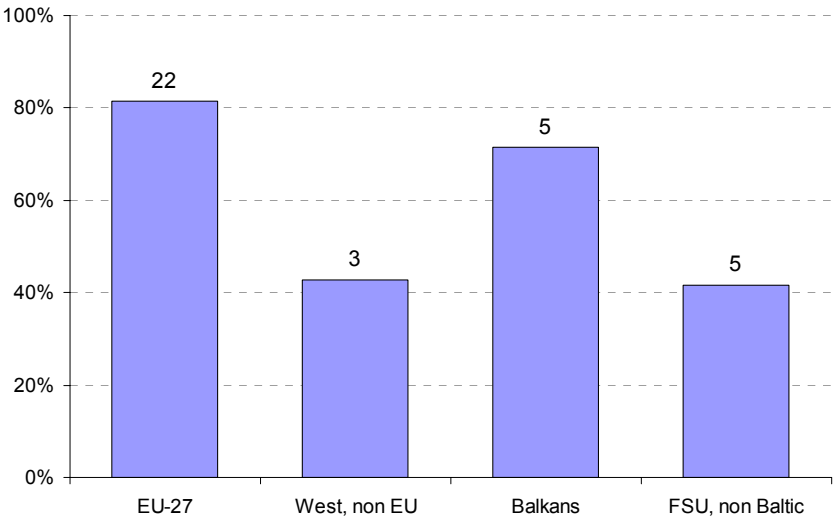
**Figure 1.** Countries providing case-based data for European surveillance until 2005 by level of data completeness (map), and case-based reporting by number of countries and tuberculosis cases notified, 1995 to 2005.



**Figure 2.** The WHO European Region, the main country groupings, 2007



**Figure 3.** Country participation in international quality assurance schemes for drug susceptibility testing (isoniazid and rifampicin), by 2005, European Region (number of countries shown on top of bars).



**Table 1**

Wolfheze Workshops (WW); priorities identified and public health answers given in period 1 (1990-1995) and publications referenced (Ref)

<b>WW</b>	<b>Public Health Problem</b>	<b>Public Health Response</b>	<b>Ref</b>
I 1990	<b>Elimination:</b> Control and elimination of tuberculosis in low incidence countries	National Plan for tuberculosis elimination, based on government responsibility, maintenance of adequate surveillance and availability of expertise	[1]
II 1994	<b>Migrants:</b> High incidence of tuberculosis in migrants, coming to low incidence countries	Targeted screening, based on mandatory laboratory and physician reports to identify population segments with excess incidence that can benefit from curative and preventive interventions.	[3]
	<b>Migrants:</b> All members of any society should have equal rights to health and equal access to health services.	It is ethically justified to target foreign-born persons from a high incidence country for tuberculosis control in order to offer treatment, relieve human suffering, avoiding premature death and preventing the spread of infection.	[4]
	<b>Surveillance:</b> Different definitions and data sets hinders comparison of tuberculosis surveillance in Europe	A uniform case definition and a minimum set of variables for reporting on each case will allow comparison of the epidemiology of tuberculosis in different European countries. Reporting on cases is better if information requested is kept to a minimum. Timely reporting is essential for appropriate public health action.	[10]

**Table 2**

Wolfheze Workshops (WW); priorities identified and public health answers given in period 2 (1996-2005) and publications referenced (Ref)

<b>WW</b>	<b>Public Health Problem</b>	<b>Public Health Response</b>	<b>Ref</b>
III 1996	<b>Monitoring of treatment outcome:</b> Little information on effectiveness of interventions of tuberculosis control in European countries is available	Emphasis is placed on cohort analysis of definite cases of pulmonary TB, using a minimal set of six mutually exclusive categories of treatment outcome: cure, treatment completed, failure, death, treatment interrupted, and transfer out.	[16]
IV 1998	<b>Drug resistance surveillance:</b> Countries use their own definitions and methods to determine anti-tuberculosis drug resistance	Methods to test susceptibility for anti-tuberculosis drugs must be internationally standardized and quality assured. Patients never been treated before and those that had previous treatment should be analyzed separately.	[17]
V 1999	<b>Framework for TB control in low incidence countries:</b> In the elimination phase of tuberculosis, specific problems and challenges emerge (importation of TB and latent TB infection; emergence of risk groups).	An overall control strategy aiming at reducing tuberculosis infection and an elimination strategy aiming at reducing the prevalence of tuberculosis infection by using risk group and outbreak management oriented interventions	[18]
	<b>Framework for tuberculosis</b>	Each European country must scrutinize	[19]

	<p><b>control in low incidence countries:</b></p> <p>The steady decline of tuberculosis for 150 years in many Western European countries, leads to complacency and neglect of all aspects of disease control.</p>	<p>the framework document carefully to find out how best to apply the principles outlined and draft country specific guidelines.</p>	
	<p><b>TB control in prisons:</b> Correctional facilities have often been cited as reservoirs for tuberculosis, presenting a potential threat to the general population</p>	<p>Prisoners have 15 times more risk of tuberculosis than civilians (up to 84 in one country). This highlights the vulnerability of prisoners to TB and emphasizes the need for containment strategies.</p>	[29]
	<p><b>Public Health Nurse (PHN):</b></p> <p>Patient compliance and contact investigations need close follow-up.</p>	<p>The PHN is key in patient and risk group management. A PHN network in Europe is advocated.</p>	
	<p><b>Clinical specialist in tuberculosis</b></p> <p>In low incidence settings expertise to detect and treat tuberculosis is difficult to maintain.</p>	<p>Good TB control in situations with MDRTB and TB/HIV needs close cooperation and exchange of information between various clinical specialists and public health TB specialists.</p>	
VI 2000	<p><b>Management of MDR tuberculosis:</b> Countries have difficulties in priority setting</p>	<p>Drug resistance surveillance, clinical management with access to Essential Drugs and full treatment compliance, and prevention of transmission are all</p>	



		important in tuberculosis control.	
	<b>Transmission in Health Care Workers (HCW):</b> No information on risk of tuberculosis infection in HCW is generally available.	Working groups discussed risk assessment and how to develop an Infection Control Plan	
VII 2001	<b>Migration:</b> Migrants move freely across borders, screening points are not always accessible; magnitude of contribution to transmission is unknown.	Options are screening for TB at every visit to a health facility and treatment of latent infections. Monitoring of transmission (DNA tests) can help in the development of a screening policy and practice.	
	<b>TB surveillance in Europe:</b> The global rate of increase of TB is predicted to be 3% per year on average, but is much higher in eastern Europe (8%)	Expand the DOTS strategy. DOTS is among the most cost-effective of all health care interventions available to low and middle-income countries.	[21]
VIII 2002	<b>TB/HIV:</b> HIV/AIDS is increasing dramatically in eastern Europe. TB/HIV related morbidity and mortality are expected to accelerate significantly in the future.	A framework sets out the rationale for effective collaboration between HIV/AIDS and TB national programmes.	[30]
IX 2003	<b>Metropolitan TB:</b> Infectious diseases are more prevalent in marginalised population groups that are difficult to reach for health care	Set up a service oriented organisation for treatment delivery; strengthen outcome monitoring and other local surveillance needs and intensify contact tracing and	

	workers. Case finding and treatment adherence is difficult. Data are often unreliable.	screening of risk groups.	
	<b>Patient treatment adherence:</b> Patients interrupt or decline from treatment for various reasons. Ignorance and stigma are important contributing factors	Patient education and information are effective. Proper communication (IEC) is done best by the Public Health Nurse.	
X 2004	<b>Laboratory Harmonization:</b> TB laboratories can be governmental, or private profit or non-profit based.	Harmonization of procedures and establishing a network of national and supranational reference laboratories for quality assurance will contribute to strengthening laboratory organisation.	
	<b>Treatment outcome monitoring:</b> There are unsolved issues in outcome monitoring in Europe.	Include all definite pulmonary cases, apply the standard period of observation and revised categories, and preferably report individual data.	[25]
XI 2005	<b>Infection control:</b> RFLP testing shows that many MDRTB cases are caused by re-infection in an institutional setting	NTP plans must include Infection Control (IC) development plans; Laboratory managers must produce guidelines for cost-effective Infection Control in Laboratories; NTP nurses should be responsible for Quality Assurance of IC	
	<b>Human Resource Development</b>	HRD wants to 'ensure that the right	

	<p><b>(HRD):</b> For many years HRD has been used as a synonym for training and organising courses. Training has become a routine activity in NTP's with output measured in numbers and not in quality improvement.</p>	<p>number of personnel with the appropriate competences is available at the right place at the right time'. HR capacity strengthening should be part of a 5 year Development Plan.</p>	
--	---	--	--

**Table 3**

Wolfheze Workshops (WW); priorities identified and public health answers given in period 3: (2006- ) and publications referenced (Ref)

XII 2006	<b>Interferon gamma release assays (IGRA):</b> Tuberculin skin tests (TST) have many shortcomings.	IGRA offer an alternative to TSTs for the diagnosis of tuberculosis (TB) and latent infection (LTBI) or as an additional diagnostic method for active TB.	[37]
	<b>Contact tracing:</b> Policies and practices differ between and in countries. Scientific evidence is lacking.	Best practice strategies are outlined. Suggestions for better monitoring and evaluation of outcome of contact tracing given.	[36]
XIII 2008	<b>European Framework :</b> Epidemiological patterns are diverse between countries, and control efforts are challenged by problems such as MDRTB, XDRTB, TB/HIV co-infection and the concentration of cases within vulnerable groups.	ECDC has developed a Framework Action Plan to fight TB in the EU. It is in line with and complementary to the United Nations' Millennium Development Goals and the WHO Stop TB Strategy.	[40]
	<b>TB control in HPC:</b> 85% of the European TB burden is situated in 18 High Priority Countries	WHO Regional Office for Europe has developed a Plan to Stop TB 2007-2015. The Plan describes the main challenges, strategies and activities to	[35]

		control TB in the 18 HPC.	
	<p><b>Migration:</b> Little information exists on internal and external migration in countries of Eastern Europe. Access to health care for undocumented migrants is not always assured.</p>	<p>Internal or external migrants need to be monitored. In an Official Statement of the Union recommendations for the most vulnerable (undocumented) migrants were endorsed in November 2008</p>	[41,42]

## References

---

1. Clancy L, Rieder HL, Enarson DA, Spinaci S. Tuberculosis elimination in the countries of Europe and other industrialized countries. Based on a workshop held at Wolfheze, Netherlands, 4-9 March 1990, under the joint auspices of the IUATLD (Europe region) and WHO. *Eur Respir J* 1991; 4: 1288-95.
2. Centers for Disease Control. A strategic plan for the elimination of tuberculosis in the United States. *Morb Mortal Wkly Rep* 1989; 38(suppl S-3): 1-23.
3. Rieder HL, Zellweger J-P, Raviglione MC, Keizer ST, Migliori GB. Tuberculosis control in Europe and international migration. Report of a European Task Force. *Eur Respir J* 1994; 7: 1545-53.
4. Tala E. Tuberculosis care in foreigners: ethical considerations. (Editorial). *Eur Respir J* 1994; 7: 1395-6.
5. Raviglione MC, Sudre P, Rieder HL, Spinaci S, Kochi A. Secular trends of tuberculosis in Western Europe. *Bull World Health Organ* 1993; 71: 297-306.
6. Raviglione MC, Rieder HL, Styblo K, Khomenko AG, Esteves K, Kochi A. Tuberculosis trends in Eastern Europe and the former USSR. *Tuber Lung Dis* 1994; 75: 400-16.
7. Rieder HL, Cauthen GM, Comstock GW, Snider DE, Jr. Epidemiology of tuberculosis in the United States. *Epidemiol Rev* 1989; 11: 79-98.

- 
8. Centers for Disease Control. Tuberculosis - United States, first 39 weeks, 1985. *Morb Mortal Wkly Rep* 1985; 34: 625-8.
9. Sepkowitz KA, Telzak EE, Recalde S, Armstrong D. Trends in the susceptibility of tuberculosis in New York City, 1987-1991. *Clin Infect Dis* 1994; 18: 755-9.
10. Rieder HL, Watson JM, Raviglione MC, Forssbohm M, Migliori GB, Schwoebel V, Leitch AG, Zellweger J-P. Surveillance of tuberculosis in Europe. Recommendations of a Working Group of the World Health Organization (WHO) and the European Region of the International Union Against Tuberculosis and Lung Disease (IUATLD) for uniform reporting on tuberculosis cases. *Eur Respir J* 1996; 9: 1097-104.
11. Brown JS, Wells F, Duckworth G, Paul EA, Barnes NC. Improving notification rates for tuberculosis. *BMJ* 1995; 310: 974.
12. EuroTB (CESES/KNCV) and the national coordinators for tuberculosis surveillance in the WHO European Region. Surveillance of tuberculosis in Europe. Report on the feasibility study (1996-1997). Tuberculosis cases notified in 1995. *EuroTB* 1997; 1-63.
13. European Parliament and the Council of the European Union. Decision No 2119/98/EC of the European Parliament and of the Council of 24 September 1998 setting up a network for the epidemiological surveillance and control of communicable diseases in the Community. *Official Journal of the European Communities* 1998; 268: 1-6.

- 
14. The Commission of the European Communities. Commission Decision of 22 December 1999 on the communicable diseases to be progressively covered by the Community network under Decision No 2119/98/EC of the European Parliament and of the Council (2000/96/EC). *Official Journal of the European Communities* 2000; 28: 50-53
15. The Commission of the European Communities. Commission Decision of 19 March 2002 laying down case definitions for reporting communicable diseases to the Community network under Decision No 2119/98/EC of the European Parliament and of the Council (2002/253/EC). *Official Journal of the European Communities* 2002; 86: 44-62
16. Veen J, Raviglione MC, Rieder HL, Migliori GB, Graf P, Grzemska M, Zaleski R. Standardized tuberculosis treatment outcome monitoring in Europe: recommendations of a Working Group of the World Health Organization (WHO) and the Europe Region of the International Union against Tuberculosis and Lung Disease (IUATLD) for uniform reporting by cohort analysis of treatment outcome in tuberculosis patients. *Eur Respir J* 1998; 12: 505–10.
17. Schwoebel V, Lambregts-van Weezenbeek CSB, Moro ML, Drobniowski F, Hoffner SE, Raviglione MC, Rieder HL. Standardization of anti-tuberculosis drug resistance surveillance in Europe: recommendations of a WHO and IUATLD Working Group. *Eur Respir J* 2000; 16: 364–71.
18. Broekmans JF, Migliori GB, Rieder HL, Lees J, Ruutu P, Loddenkemper R, Raviglione MC. European framework for tuberculosis control and elimination in countries with a low incidence. Recommendations of the World Health Organization (WHO), International Union



---

against Tuberculosis and Lung Disease (IUATLD) and Royal Netherlands Tuberculosis Association (KNCV) Working Group. *Eur Respir J* 2002; 19: 765-775.

19. Davies PDO. A European Framework for effective tuberculosis control. Editorial. *Eur Respir J* 2002; 19: 590-2

20. EuroTB and the national coordinators for tuberculosis surveillance in the WHO European Region. Surveillance of tuberculosis in Europe. Report on tuberculosis cases notified in 2006, Institut de veille sanitaire, Saint-Maurice, France. March 2008

21. World Health Organization. Global Tuberculosis Programme. Framework for effective tuberculosis control. Geneva, Switzerland, 1994. (Document WHO/TB/94.179.)

22. National Tuberculosis Programme Managers' Meeting. Report on the fifth meeting. Wolfheze, Netherlands. 7–9 June 2002. EUR/02/5037612.

23. DOTS expansion plan to Stop TB in the WHO European Region 2002-2006. Copenhagen, Denmark, 2002. E77477

24. Report of the WHO European Region Technical Advisory Group (TAG) – first meeting on tuberculosis. Sinaia, Romania. 28–19 September 2004. EUR/05/5049255.

25. Falzon D, Scholten J, Infuso A. Tuberculosis outcome monitoring—is it time to update European recommendations? *Euro Surveill* 2006; 11:20–5.

- 
26. Tuberculosis Programme framework for effective tuberculosis control. World Health Organization, Geneva, 1994. WHO/TB/ 94.179.
27. Pablos-Méndez A, Raviglione MC, Laszlo A, Binkin N, Rieder HL, Bustreo F, Cohn DL, Lambregts-van Weezembeek C, Kim SJ, Chaulet P, Nunn P, for the WHO/IUATLD Working Group on Anti-tuberculosis Drug Resistance Surveillance. Global surveillance for antituberculosis-drug resistance: 1994-1997. *N Engl J Med* 1998; 338: 1641-9.
28. Falzon D, Infuso A, Aït-Belghiti F. In the European Union, TB patients from former Soviet countries have a high risk of multidrug resistance. *Int J Tuberc Lung Dis* 2006; 10: 954–8
29. Aerts A, Hauer B, Wanlin M, Veen J. Tuberculosis and tuberculosis control in European prisons. *Int J Tuberc Lung Dis* 2006; 10(11): 1215-23
30. de Colombani P, Banatvala N, Zaleskis R, Maher D. European framework to decrease the burden of TB/HIV *Eur Respir J* 2004; 24: 493–501.
31. Raviglione MC, Uplekar MW. WHO's new Stop TB Strategy. *Lancet* 2006; 367: 952-5.
32. The Stop TB Strategy. WHO/HTM/TB/2006.368
33. Tuberculosis Coalition for Technical Assistance. *International Standards for Tuberculosis Care (ISTC)*. The Hague: TBCTA 2006.

---

34. Patient's Charter for Tuberculosis Care. 2006 World Care Council.

[www.worldcarecouncil.org/](http://www.worldcarecouncil.org/) last accessed January 2010.

35. Plan to Stop TB in 18 High-priority Countries in the WHO European Region, 2007–2015 (in English and Russian). Copenhagen, WHO Regional Office for Europe, 2007.

36. Erkens C, Kamphorst M, Abubakar I, Bothamley G, Chemtob D, Haas W, Migliori GB, Rieder HL, Zellweger J-P, Lange C. Tuberculosis contact investigation in low prevalence countries: a European consensus. (submitted for publication)

37. Drobniewski F, Cobelens FG, Zellweger J-P. Use of Gamma-interferon assays in low- and medium-prevalence countries in Europe: a consensus statement of a Wolfheze workshop organized by KNCV/EuroTB, Vilnius Sept. 2006. *Eurosurveillance* 2007; 12: 7

38. The Berlin Declaration on Tuberculosis (in English, French, Spanish and Russian). Berlin. WHO European Ministerial Forum. 2007

39. The Report of WHO European Ministerial Forum. Copenhagen, WHO Regional Office for Europe, 2007.

40. Framework Action Plan to fight tuberculosis in the European Union. Stockholm, European Centre for Disease Prevention and Control, 2008

41. Klinkenberg E, Manissero D, Semenza JC, Verver S. Migrant tuberculosis screening in the EU/EEA: yield, coverage and limitations. *Eur Resp J* 2009; 34: 1180-9.

---

42. Haldal E, Kuyvenhoven V, Wares F, Migliori GB, Ditiu L, Fernandez de la Hoz K, Garcia D. Diagnosis and treatment of tuberculosis in undocumented migrants in countries with low or intermediate incidence. *Int J Tuberc Lung Dis* 2008; 12: 878-88.

43. Use of Liquid TB Culture and Drug Susceptibility Testing (DST) in Low and Medium Income Settings, Summary report of the Expert Group Meeting on the use of liquid culture media. World Health Organization, Geneva, 26 March 2007