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Evaluation of the impact of guidelines on tuberculosis control in Italy

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ABSTRACT: *Evaluation of the impact of guidelines on tuberculosis control in Italy. G.B. Migliori, L. Casali, S. Nardini, A. Spanevello, G. Besozzi, B. Faravelli and the National AIPO "Tuberculosis" Study Group.*

This study was performed in Italy, where a central tuberculosis (TB) unit and national guidelines on TB control are lacking. The objectives of the study were: 1) to design comprehensive guidelines on TB control; 2) to discuss them within the scientific community and to present them to administrators and politicians; and 3) to evaluate their impact from a public health perspective. The ultimate goal was to improve TB control nationwide through a consensus-based initiative.

The steps taken in planning were as follows: 1) an assessment of control activities operating in the country was made by means of three surveys; 2) guidelines on TB control were designed, presented, discussed and approved during three Consensus Conferences involving representatives of organizations operating in TB control and services; and 3) their impact was evaluated by means of objectively verifiable indicators (availability of TB case definition, regional control programmes, surveillance reports, guidelines on treatment, staff training).

Regional TB control programmes were implemented in three major regions (30% of the national population), and are in advanced process in other four regions (29% of the national population).

The protocol approved during the three Consensus Conferences benefited from the co-ordinated action of governmental and nongovernmental organizations. Its impact on tuberculosis control was positive, particularly at the regional level.

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Keywords: Consensus, guidelines, prevention, rehabilitation, tuberculosis.

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The World Health Organization (WHO), recognizing that the tuberculosis (TB) epidemic is out of control in many parts of the world, declared TB a global emergency in April 1993 [1]. In some industrialized countries, a slowing or a reversal in the decline of case rates of TB has been reported in the past few years; the reasons for these changes being mainly increased immigration, poverty, homelessness, intravenous drug abuse and immunodeficiency virus infection [2, 3]. According to WHO, public policy neglect has allowed TB control systems to deteriorate or even disappear, and poorly managed and incorrectly conceptualized TB control programmes have contributed to the increase in the burden of disease as well as to the emergence of multi-drug resistant TB [1]. It was suggested that each country should maintain a central (national) TB programme unit, whose responsibilities would include surveillance, development and revision of the national TB control programme, monitoring of programme effectiveness, and training and provision of an adequate number of personnel with specialized TB expertise [4].

Tuberculosis control in Italy

Since 1934, infectious pulmonary and selected extrapulmonary TB cases have been compulsorily notified in Italy. Since 1990 (Ministry of Health Act on Communicable Disease Surveillance No. 36), TB notifications have become compulsory for all cases (infectious or not) within class III, *i.e.* communicable diseases for which additional data are required. The physician is required to notify the case (demographic characteristics, diagnostic data, date of onset) to the local health authority (Public Health Unit). From this unit, a form is mailed to the regional level (Regional Epidemiological Office) and another to the national level (Istituto Superiore di Sanità, Min-istry of Health and National Institute of Statistics). Since 1978, when the pre-existing vertical system of TB dispensaries covering the whole national population (with clinical and epidemiological tasks) was abolished, inconsistency of data [5] and underreporting are recognized problems [3, 6]. Whilst 4.185 TB cases were officially reported in 1990 [3] (corresponding to 7.3 cases per 100,000 population), it was estimated that approximately 20,000 (*i.e.* up to 35 cases per 100,000 population) may have occurred annually around the same year [7].

Due to the lack of a central unit and of national guidelines on TB case-finding, treatment and case holding [8], the National TB Study Group of the Associazione Italiana Pneumologi Ospedalieri (AIPO) organized a 5 year project with the following objectives: 1) to design comprehensive guidelines on TB

control suitable for the Italian situation; 2) to discuss them within the scientific community and to present them to administrators and politicians; and 3) to evaluate their impact from a public health perspective.

Once the possible weak points of the health system presently in operation have been identified, the ultimate goal is to improve TB control nationwide through a consensus-based initiative.

Steps in planning

Survey of control activities and design of the guidelines on control

Three surveys were organized and published by AIPO from 1992 to 1994, before designing the guidelines on TB control. A survey on the services available for diagnosis, treatment and prevention of TB in Italy was performed in 1992. A questionnaire was sent to the 381 Local Health Units operating nationwide, investigating their characteristics and location, availability of beds and outpatient services, activity in terms of prevention and case-finding [9]. A second study on the quality of TB chemotherapy was performed in 1994, based on a questionnaire sent to a sample of respiratory and anti-TB health units. The physicians' behaviour in terms of regimen and dosage prescribed, as well as management of treatment failure and side-effects, was investigated [10]. A third survey was performed to estimate coverage and validity of data collected by the national surveillance system and the incidence of TB in a Northern province [11].

Comprehensive guidelines on TB control were designed from 1990 to 1994, consisting of three main areas: 1) data collection, prevention, case-finding and case holding; 2) organization of health services within a TB control programme; and 3) treatment.

Definitions and concepts derived from recently published WHO and International Union Against Tuberculosis and Lung Disease (IUATLD) documents were included in the proposed guidelines [1, 4, 12–14].

Presentation and discussion of the guidelines on TB control

The main topics were presented and discussed within three Consensus Conferences organized by AIPO, involving representatives of WHO, IUATLD, Istituto Superiore di Sanità, Rome, Italy (technical branch of the Ministry of Health), different Italian regions and the Italian nongovernmental organizations and institutions involved in TB control (Federazione Italiana contro la Tubercolosi e le malattie polmonari sociali) GISTA, Gruppo Italiano Studio Tubercolosi e AIDS and scientific societies). The approved guidelines on

Table 1. – Objectively verifiable indicators and means of verification selected to evaluate the impact of the AIPO guidelines on tuberculosis control at regional and national level

Narrative summary	Objectively verifiable indicators	Means of verification	Assumptions
Purpose: regional level			
To implement effective regional TB control programmes	Case definition	Case definition published in regional documents	Commitment of regional government
	Regional control programmes based on the AIPO protocol	Nomination of regional commissions Regional guidelines on TB control	Acceptance of AIPO (WHO/ IUATLD) strategy
To use regional pilot projects to stimulate similar reforms in other regions	Surveillance reports from model regional control programmes	Regional reports on surveillance	Sufficient financial/ manpower resources
	Guidelines on treatment standardization from model regional control programmes	Regional guidelines on standardized treatment	
	Training of staff motivated in TB control	Organization of regional courses on TB control	Qualified staff sent to training courses
Goal: national level			
To implement a standardized TB control programme in Italy	Case definition in national documents	Case definition published in national documents	Commitment of national government
	Surveillance system with precise data on cases reported and treatment evaluation by cohort analysis	Surveillance data sent to the national level	Commitment of regional governments
	Organizational structure of the programme	Implementation of a national co-ordinating unit (national commission)	
	Adoption of standardized chemotherapy	National guidelines on standardized chemotherapy	

AIPO: Associazione Italiana Pneumologi Ospedalieri; TB: tuberculosis; WHO: World Health Organization; IUATLD: International Union Against Tuberculosis and Lung Disease.

Table 2. – Results of the AIPO survey on the services available for diagnosis, treatment and prevention of tuberculosis, Italy, 1991 [9]

Local Health Units n	381
Regions represented n	19/19
Population covered n	33,276,492
Beds for: chest diseases n	5,161
TB n	815
Mean inhab./bed for: chest diseases n	5,049
TB n	37,023
TB control activities performed in:	
Public Health Units %	18
Chest Disease Units %	12
Other Health Units %	9
Medical examinations done for TB/chest diseases (mean ratio)	0.2

Inhab./bed: number of inhabitants per bed reserved for TB patients. (For further definitions see legend to table 1.)

TB control were aimed at exploiting existing resources and collaboration among organizations involved in TB control and services.

Evaluation of the impact of the guidelines on TB control

To evaluate the impact of the guidelines the WHO approach based on indicators was used. The objectively verifiable indicators that were selected and their means of verification to evaluate the impact of the proposed guidelines are summarized in table 1. Briefly, the general strategy is presented separately for the regional and national level (narrative summary), followed by the objectively verifiable indicators and their means of verification (*e.g.* indicator = TB case definition; means of verification = TB case definition published in official regional documents). The important assumptions necessary to implement the whole process are finally presented in the same table.

The objectively verifiable indicators are presented as absolute numbers and as percentage of the national population covered by each indicator (numerator = population of the regions covered; denominator = national population). Census data were derived from 1995 national statistics [15].

Table 3. – Results of the AIPO survey on antituberculosis chemotherapy in Italy [10]

	National	North %	Centre %	South %
Questionnaires analysed	n=182	53	14	33
Regions represented	19/19			
Drugs used %				
Isoniazid	99	100	96	98
Rifampicin	99	99	100	98
Ethambutol	85	87	73	87
Streptomycin	41	32	50	50
Pyrazinamide	31	40	19	22
Use of fixed regimens %	71	80	62	70
Length of treatment (new cases) %				
6 months	49	34	11	22
9 months	20	13	8	10
>9 months	31	53	81	68

AIPO: Associazione Italiana Pneumologi Ospedalieri.

Table 4. – Results of the study to evaluate coverage (%) and validity of data (% of data missing) collected by the national surveillance system (NSS) and the incidence of tuberculosis per 100,000 population in a Northern province, Italy, 1992 [11]

	Overall	Native Italians	Immigrants
Population surveyed (Varese Province) n	807,345	778,345	29,000
Incidence n:			
All cases	15.0	14.4	31.0
Pulmonary	10.9	10.3	27.6
Extrapulmonary	4.1	4.1	3.4
Smear positive	7.4	7.1	17.2
Culture positive	5.4	4.9	20.7
Coverage of NSS %	63 (45/121 not notified)		
Definite (culture+) cases %	36 (44/121)		
Data missing from NSS forms %	20 (200/988)		

Outcomes of the process

Survey on control activities and design of the guidelines on TB control

A summary of the results of the three previously published surveys are presented in tables 2–4 and the guidelines on TB control are summarized in table 5.

Table 5. – Summary of the AIPO protocol for tuberculosis control in Italy [15]

Section I: Epidemiology and control
Epidemiology and control strategies
Section II: Surveillance
Surveillance and epidemiological evaluation
Monitoring of the prevalence of TB infection
Section III: Prevention
Chemoprophylaxis
Vaccination
Operative proposal for preventative activities
Section IV: Case finding and case holding
Management of diagnosis, treatment and follow-up cases
Section V: Treatment
Rationale
Operative proposal for standardized treatment
Intermittent treatment
Treatment monitoring
When treatment should be started and concluded
Side-effects
Treatment during pregnancy, puerpery and childhood
Treatment of resistant cases
Treatment of HIV+ patients
Section VI: Specific issues
Risk groups
Organization of laboratories
Proposals for training

AIPO: Associazione Italiana Pneumologi Ospedalieri; TB: tuberculosis; HIV+: human immunodeficiency virus seropositive.

Presentation and discussion of the proposed guidelines

The guidelines on TB control, after approval, were published in the official journal of the society (Rassegna di Patologia dell'Apparato Respiratorio) and distributed to members of the scientific community, administrators and politicians [16].

Evaluation of the impact of the guidelines on TB control

The results are summarized in table 6. The locations of the different Italian regions are presented in figure 1.

For instance, Lombardia Region, through its Regional Commission; established a TB control programme based on the guidelines in 1993 [17]; published guidelines for prevention of TB among health staff in 1993 [18]; selected TB units and regional referral centres and laboratories in 1995 [19]; produced the annual report on TB in 1993 and 1994 (including a protocol to evaluate the quality of notifications); and is publishing the guidelines on TB diagnosis and treatment [20, 21]. According to the regional reports on surveillance, the incidence of notified TB cases per 100,000 population (all forms) in 1993 was 15.2 in Lombardia and 10.8 in Piemonte, and in 1994 was 15.4 in Lombardia and 9 in Toscana [20, 21].

Table 6. – Impact of the AIPO protocol on TB control in Italy (56,778,031 inhabitants)

Objectively verifiable indicators	Proportion of national population covered %
Regional commissions nominated = 5 (Lombardia, Piemonte, Emilia-Romagna, Toscana, Liguria)	39
Case definition published in regional documents = 3 (Lombardia, Piemonte, Emilia-Romagna, Liguria)	33
Regional guidelines on TB control approved =3 (Lombardia, Piemonte, Emilia-Romagna, Liguria)	33
Regional guiedlines on TB control in advanced process = 4 (Toscana, Sicilia, Sardegna, Veneto)	26
Regional reports on surveillance = 4 (Lombardia, Piemonte, Emilia-Romagna, Toscana)	36
Regional guidelines on standardized treatment =1 (Lombardia)	16
Organization of regional courses on TB control = 8 (Lombardia, Piemonte, Emilia-Romagna)	
Organization of national courses on TB control = 1 (AIPO course)	

The results are summarized, taking into account the objectively verifiable indicators and the means of verification presented in table 1, columns 2 and 3. For definitions see legend to table 5.

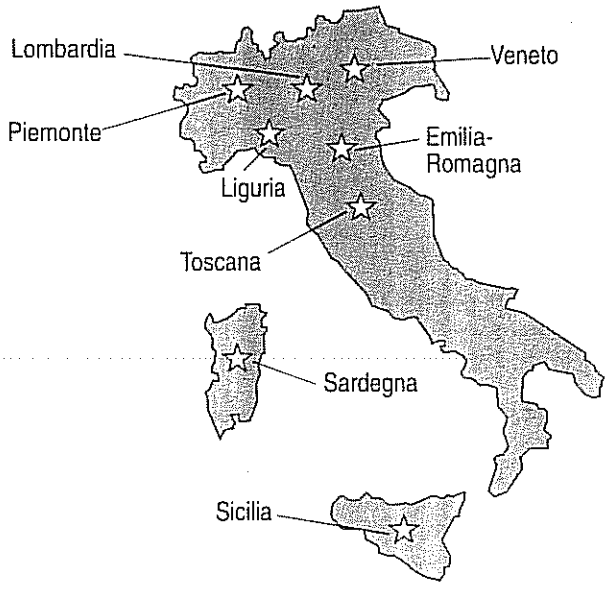

Fig. 1. – Map of Italy with location of the different Italian regions where regional programmes are implemented.

Discussion

The aims of the present initiative were to design comprehensive guidelines on TB control suitable for the Italian situation, to discuss them within the scientific community, to present them to administrators and politicians, and, finally, to evaluate their impact on TB control from a public health perspective. As a result of the AIPO initiative, guidelines on TB control were designed, discussed, approved and published. According to the methods proposed to evaluate the impact of the guidelines, the following comments can be made: 1) the objectively verifiable indicators concerning the regional level were met; 2) some of the main regions (Lombardia, Piemonte, Emilia-Romagna, Toscana, Liguria) are at present covered by the indicators, representing about one third of the national population; 3) from a public health perspective, the availability of standardized TB case definition, guidelines on TB control, and reports on surveillance at regional level represent a significant improvement towards national TB control; 4) the objectively verifiable indicators concerning the national level have still not been met and should be re-evaluated in a few years; and 5) the upward trend in compliance of local governments to the proposed strategy will hopefully lead to a complete national coverage in the near future.

Based on the results of this initiative, further remarks can be made: 1) in spite of the absence of national guidelines, TB services are available in Italy in terms both of prevention and treatment, although no standard was established [9, 10]; 2) health units involved in TB control are heterogeneous within as well as among regions [9, 10]; 3) TB treatment is not standardized [10]; 4) TB notification rates range 10–16 cases per 100,000 population [20, 21]; 5) coverage of the national surveillance system is not complete [11]; and 6) information missing from notification forms is potentially relevant [11].

Our findings are consistent with those of other studies performed in Italy. In a survey carried out in a northern region, ACOCELLA *et al.* [22] found

unsatisfactory reports on microbiological examinations and deviations between established therapeutic regimens and those applied in the study area, in terms of treatment selection, duration and dosage. A study performed by Istituto Superiore di Sanità in 1993 on 320 out of 639 Local Health Units countrywide described large coverage of TB surveillance and control activities, relevant variability in their frequency and management, and low adherence to official notification procedures [23].

In spite of the relative inconsistency of surveillance data available at national level and of the non-standardized approach to TB control, TB incidence in Northern Italy [11] and TB notification rates produced by regional programmes [20, 21] are similar to those of several Northern European countries [3].

We believe that national control programmes should be standardized to allow comparability of data both within and among countries. The AIPO guidelines were designed on the basis of WHO and IUATLD documents on TB control [1, 4, 12–14], which were adapted to fit the Italian situation, taking into account how TB control activities are carried out at present. The notification form currently used by the national surveillance system, was modified; 1) to include the minimum set of essential variables suggested by WHO and IUATLD [14] (date of starting treatment, place of residence, date of birth, country of origin and disease-specific variables, including site of disease, bacteriological status (microscopy and culture), and history of previous antituberculosis chemotherapy); and 2) to allow monitoring of treatment outcome. The form was proposed to administrators and politicians, suggesting the following [11]: 1) bacteriological and clinical data should be collected at the lowest possible level (Local Health Unit); 2) smear-positive cases should be notified immediately to public health officers; 3) public health officers should co-operate with physicians to collect all additional information (clinical data) as soon as diagnostic procedures are completed; 4) cases should be classified as definite (culture positives) or other than definite; 5) a surveillance unit should be implemented at regional and national level.

To evaluate how the proposed form works in practice, a study (presently in progress) was planned by the Study Group in the period 1994–1997 on a significant sample of TB units nationwide, within the research project co-ordinated by Istituto Superiore di Sanità. The study includes the evaluation of treatment results by cohort analysis. The protocol approved during the three Consensus Conferences benefited from the co-ordinated action and critical suggestions of officers from Istituto Superiore di Sanità and other groups and societies involved in TB control and services.

According to our analysis, the impact of the proposed guidelines on TB control was positive at regional level, whilst its impact at national level will be re-evaluated in the years to come. The availability of the protocol in the period when public concern on the resurgence of TB has motivated administrators and politicians to take action made it possible to speed up the implementation of regional programmes of TB control. The process of transferring a technical protocol into a governmental operational guideline was made possible by the strict co-operation of AIPO members and public health officers within regional commissions, under the supervision of Istituto Superiore di Sanità. The protocol was generally well-accepted by regional administrators because it was aimed at rationalizing interventions and reducing the cost of TB control.

The main discussion arose on the necessity to implement directly observed therapy (DOT) on a large scale. At present, all regional guidelines support DOT during the initial intensive phase, and suggest its implementation during the continuation phase of treatment. The availability of preliminary data on cure rates without DOT (mid 1996) will hopefully motivate regional governments to invest resources in comprehensive DOT programmes.

The future tasks of the AIPO Study Group will be directed to co-operation with regional programmes, maintaining strict contact with Istituto Superiore di Sanità. The priorities at regional level are the following: 1) regions at present without operational regional commissions: implementation of a commission and production of guidelines on TB control; and 2) regions where the TB control programme is established: a) evaluation of surveillance data; b) standardization of treatment; c) monitoring of treatment results; and d) evaluation of specific activities for prevention and control.

As a result of the effort co-ordinated by Istituto Superiore di Sanità, involving the AIPO TB Study Group and other groups and societies, a protocol designed to improve surveillance data was implemented at the national level and a clear TB case definition was approved (*M. tuberculosis* identified by culture) [14]. Furthermore, a national commission was recently nominated by the Ministry of Health. The experience of several regions should help the national commission in producing official national guidelines and co-ordinating the promising activities of TB control performed at regional level. The implementation of a national TB unit is considered a priority.

In Italy, some of the problems discussed above arose during the transition from the pre-existing vertical TB control programme to the present integrated one. Since, according to WHO [1], TB control programmes have deteriorated in several industrialized countries, we propose our consensus-based initiative as a possible strategy to reorientate the existing control services.

As poor treatment of tuberculosis cases engenders chronic cases, resulting in increased cost of cure and rehabilitation for the national health system, improvement of tuberculosis control in Italy is a public health priority. Each co-ordinated initiative taken by nongovernmental organizations, where expertise in tuberculosis control exists, to support efforts by central and regional governments will speed up the effective implementation of a standardized tuberculosis control programme at the national level.

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