



The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial data. This includes not only sales and purchases but also expenses and income. The document provides a detailed list of items that should be tracked, such as inventory levels, accounts payable, and accounts receivable. It also outlines the procedures for recording these transactions, including the use of double-entry bookkeeping to ensure that the books balance.

The second part of the document focuses on the analysis of the recorded data. It explains how to calculate key financial ratios and metrics, such as the gross profit margin, net profit margin, and return on investment. These calculations are essential for understanding the overall performance of the business and identifying areas for improvement. The document also discusses the importance of comparing the current period's performance against historical data and industry benchmarks to provide context for the results.

The final part of the document addresses the reporting requirements for the financial data. It outlines the format and content of the financial statements, including the balance sheet, income statement, and cash flow statement. It also discusses the importance of providing clear and concise explanations for any significant changes or trends in the data. The document concludes by emphasizing the need for transparency and accountability in financial reporting, and the role of the accounting department in ensuring that all information is accurate and reliable.

# TUBERCULOSIS CONTROL AND MEDICAL SCHOOLS

**Report of a WHO workshop  
Rome, Italy 29–31 October 1997**

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# FOREWORD

by Sir John Crofton

The successful National Tuberculosis Control Programmes (NTCPs) in several countries in Africa, pioneered by the International Union against Tuberculosis and Lung Disease in association with their governments, led the World Bank to investigate the cost effectiveness of the programmes. This in turn led the World Bank to support the launch of WHO's Global Tuberculosis Programme designed to help other high prevalence countries to initiate similar programmes. A steadily increasing number have done so. Because of the exploding pandemic of HIV, which will greatly increase the incidence of tuberculosis, and the threat of multidrug resistance (MDR), WHO has declared the tuberculosis problem a Global Emergency. In consequence the establishment of effective NTCPs must be given a particularly high priority.

To be effective a National Programme must have the enthusiastic support of a well-informed medical profession. This will require giving a high priority to both undergraduate and postgraduate education. Because of the novel aspect of the new successful programmes, involving diagnosis by direct smear microscopy, standardised treatment by short term chemotherapy, each dose directly supervised at least in the intensive phase, and enhanced administrative support, medical education needs to be updated to cover these new concepts. Every doctor should know the outlines of his national programme and be committed to treat his patients by proved and standardised regimens. He must be made aware that only by using proved regimens can the spread of multidrug resistance be prevented. Moreover he must be convinced that only by cooperative effort can tuberculosis be controlled. Obstinate individualism is the enemy of success.

To achieve all these there must be adjustments to the traditional curriculum. WHO is to be congratulated on initiating this Workshop on Medical Education, involving experts from many countries. Its report should prove of great value in helping countries and their

medical schools to develop up-to-date and comprehensive undergraduate education on tuberculosis. It will also help in evolving national measures for regular postgraduate updating for practising doctors. The Workshop has produced a clear and succinct outline for action. I hope it will be very widely used.

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## ABSTRACT

The Global Tuberculosis Programme of WHO responded to the World Health Assembly's resolution (WHA 48.8) for change in medical education and medical practice by setting up a workshop on "Tuberculosis Control and Medical Schools". The workshop, held between 29 and 31 October 1997 in Rome, was attended by 25 participants from 16 countries of the 6 WHO Regions, and whose disciplines covered microbiology, clinical chest medicine, infectious disease, radiology, public health and medical education. Most of the participants currently hold or have held leading positions in medical schools and/or in National Tuberculosis programmes.

Considering the large spectrum of responsibilities that future doctors should assume, and in line with the evolution of health systems worldwide, discussion was held on what the doctor's position should be in tuberculosis control.

A list of required knowledge, skills and attitudes essential for a doctor to manage tuberculosis was agreed. Various options in educational strategy were considered, the first choice being a comprehensive module integrating all aspects of tuberculosis and tuberculosis control. Taking also into account the accommodation of learning needs relative to other important public health concerns, participants stressed the importance of proper evaluation of practical skills and attitudes before graduation.

To initiate, achieve and sustain the required changes in the medical curriculum and in medical practice, the workshop recommended that a "task force for tuberculosis" be set up in each medical school. The remit of this task force should extend eventually into medical practice and post-graduate training in close association with the Ministry of Health, the National Tuberculosis Programme, medical professional organizations and other national bodies, organizations and/or institutions in the community.

At all stages, the task force should recognise the importance of partnership in the process of change in health care delivery, medical practice and medical education and should seek to create appropriate partnerships.

It was recommended that WHO should be a catalyst and a resource for developing task forces at regional and country levels.

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**Note of authors:**

It is hoped that this report as well as proposed references will be useful to workshop organizers and participants at regional, national or institutional level and that adaptation can be made to suit the particular conditions of the context in which they work.

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# 1. INTRODUCTION

## 1.1 Rationale

A WHO Workshop on Tuberculosis Control and Medical Schools was organized in the Congress Centre of the Università Cattolica del Sacro Cuore, Rome (Italy) from 29 to 31 October 1997, following the recommendations of the World Health Assembly in 1995 and of the Coordination Advisory and Review Group of the Global Tuberculosis Programme in 1996.

- Resolution 48.8 (1995) of the World Health Assembly on *"Reorientation of medical education and medical practice"* stated that medical practitioners can play a pivotal role in improving the relevance, quality, and cost-effectiveness of health care delivery and urged Member States to define the desired profile of future medical practitioners. The WHO Strategy to implement the resolution, articulated in the document *"Doctors for Health"*, encourages coordinated reforms in health care, medical practice and medical education to optimally take up the challenge of *"Health for all"*.

- Considering that the WHO tuberculosis policy package (known as the *"DOTS strategy"*) is the best tool available to control tuberculosis, the Coordination Advisory and Review Group (CARG) of the Global Tuberculosis Programme (GTB), at its 6th meeting, on 6 November 1996, recommended: *"GTB should develop partnerships with the academic and scientific communities and other units of WHO to ensure that relevant training materials, including the medical school curriculum and nursing school teaching materials, incorporate tuberculosis control and the DOTS strategy."*

This WHO workshop on *"Tuberculosis Control and Medical Schools"* was prepared by two divisions of WHO Headquarters, Geneva: Global Tuberculosis Programme (GTB) and Human Resources Development and Capacity Building (HRB), with the support of the Istituto di Microbiologia, Università Cattolica del Sacro Cuore, Rome. Twenty-five experts in medical education and/or tuberculosis control from

16 different countries in the six WHO Regions came to share experience and to make pertinent recommendations.

## **1.2 Objectives**

The objectives of the workshop were:

- To define the desired curriculum content and learning process to enable future medical practitioners to contribute effectively to the management of tuberculosis control programmes and,
- To suggest ways for enhancing collaboration between medical schools and other interested bodies in the implementation of national tuberculosis control strategies.

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## 2. BACKGROUND

### 2.1 Tuberculosis is a global public health concern.

- In 1993 tuberculosis was declared by WHO to be a global emergency. About one third of the world's population is infected by *Mycobacterium tuberculosis* and in 1996 there were approximately eight million new cases of tuberculosis, with three million deaths. Worldwide, tuberculosis is the leading cause of death due to a single infectious agent.

95% of tuberculosis cases and 98% of tuberculosis deaths are in developing countries. Deaths from tuberculosis comprise 25% of all avoidable deaths in the developing world. 75% of tuberculosis cases occur in the age group 20-49, which represents men and women in their most productive years.

In the future it is expected that tuberculosis will remain one of the 10 leading causes of mortality and morbidity in the world. Although the rates of tuberculosis will decrease in many countries, the total number of tuberculosis patients will increase to ten million new cases in 2020.

- The main reasons for the increasing global tuberculosis burden are the following
  - poverty in various populations, not only in developing countries but also in inner city populations in developed countries
  - changing demographics, with increasing world population and changing age structure
  - insufficient and inadequate health coverage of the population, especially in poor countries, and of the vulnerable groups of the population in all countries
  - neglect and underfunding of tuberculosis control programmes, with inadequate case detection, inadequate case management and poor cure rates

- in several countries, mainly in Africa and in Asia, the impact of HIV epidemics.

- Despite the above problem, global tuberculosis control is possible. The WHO tuberculosis control policy package, called the "DOTS strategy", represents an organizational framework for effective utilisation of the existing tools for diagnosis (sputum smear microscopy) and treatment (short-course chemotherapy). The World Bank (1993 Report) recognised this policy as one of the most cost-effective of all health interventions, and recommended that effective short-course chemotherapy for smear positive patients should form part of the essential clinical services package available in primary health care.

The five main components of the WHO tuberculosis control policy are: governmental commitment; case detection by passive case finding and microscopy smear examination; directly observed treatment with short course chemotherapy regimens administered to at least all smear positive cases of tuberculosis; regular drug supply; and a monitoring system for supervision and evaluation.

- In countries applying the WHO tuberculosis control policy there has been a trend towards improvement in the detection of infectious cases (smear positive) and towards achieving cure/success rates of between 80 and 90% of detected cases.

In 1996 only 30% of the global population had access to the "DOTS strategy". The year 2000 targets are beginning to look unachievable: the global case detection rate is 38%, in contrast to the 2000 target of 70%. The global success rate of treatment is only 58%, in contrast to the 2000 target of 85%.

There is obviously a need to implement "DOTS strategy" more widely if there is to be any chance of achieving the global targets set for 2000 between 2010 and 2020.

## **2.2 Pivotal role of doctors in tuberculosis control**

Although the principles of management of tuberculosis were established 30 to 40 years ago, and the efficacy of short-course chemotherapy has been known for some 20 years, tuberculosis is still not diagnosed and treated properly in many parts of the world. Shortage of resources, lack of government commitment and poor administration of national tuberculosis control programmes are not the only reasons for the world's failure to respond to the increase in

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tuberculosis. In many instances, doctors are to blame for poor diagnosis, e.g. inappropriate use of radiology, inadequate use of sputum microscopy and for poor treatment, e.g. providing regimens that are neither standard nor generally accepted, using incorrect doses of anti-tuberculosis drugs and treating for an inadequate period, failing to monitor the patient during treatment, failing to inform the patient and relatives about tuberculosis, failing to trace household contacts of smear positive pulmonary tuberculosis. These mistakes occur in the private sector as well as in the public sector.

Consequently, not only are resources wasted on misdiagnosed patients, but in those patients who have tuberculosis the inadequate use of anti-tuberculosis drugs has led to the problem of increasing drug-resistance in many countries and, worse yet, the emergence and rise of multi-drug resistance.

Thus it is now vital to improve the knowledge of doctors about tuberculosis and to train them in the skills necessary for the proper diagnosis and treatment of tuberculosis in an individual patient and in the community. The DOTS strategy will not succeed unless doctors can be trained to manage tuberculosis properly. Obviously the active participation of doctors in tuberculosis control will have a "cascade" effect on other health care providers whose involvement will be more easily obtained.

### **2.3 The case of tuberculosis control as an example of medical schools' adaptation to priority health concerns**

With the growing desire to obtain better value for the increasing investment in health care, stakeholders in the health sector are being asked to demonstrate how they will contribute to improving the health care and health status of society. The introduction of quality control and total quality management are expressions of this trend towards demanding better returns from investment in the health sector.

Medical schools, too, must adapt: they cannot remain indifferent to the important health reforms that society expects. They may decide to respond to the changes that they think will take place, or preferably, they may use their potential to contribute proactively to shaping the future health system.

They must accept a certain degree of accountability for society's health if they wish to continue to be forces for social progress and consequently to merit taxpayers' support. To fully respond to the

needs of society, medical schools must accept responsibility for the outcome of their training: Is there evidence that graduates perform effectively and as expected? Do research results have a positive impact on the way health care services are delivered and/or address health care priorities? Do delivered health services serve as models and optimally respond to needs?<sup>1</sup>

This is not solely the responsibility of medical schools; however, medical schools can actively support health policy set by the government and by health departments. By introducing changes in medical education, research and delivery of care for tuberculosis control, medical schools have the unique opportunity to demonstrate their social accountability.

Tuberculosis is a major public health and social concern: medical schools should respond to this priority.

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<sup>1</sup> Boelen C., Heck J.E. Defining and Measuring the Social Accountability of Medical Schools. Document WHO/HRH/95.7

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## 3. TRAINING DOCTORS IN TUBERCULOSIS

### 3.1 Doctors of the future

To fill the pivotal role described above it is felt that a doctor of excellence is needed, a doctor of "5 Star" quality who would possess the following five aptitudes:<sup>1,2</sup>

- 
- ★ **Care provider**, who considers the patient holistically, as an individual and as part of a family and a community, and who provides high quality continuing care within a doctor-patient relationship based on mutual respect and trust.
  - ★ **Decision maker**, who chooses which technologies to apply in enhancing care in an ethical and cost-effective fashion.
  - ★ **Communicator**, who is able to promote healthy life-styles by effective explanation and advocacy appropriate to the cultural and economic context, thereby empowering individuals and groups to improve and protect their health.
  - ★ **Community leader**, who having gained local respect and trust, can reconcile individual and community health requirements and initiate action on behalf of the community.
  - ★ **Manager**, who can work efficiently and harmoniously with individuals and organizations inside and outside the health care system to meet the needs of patients and communities.
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Such a "5 Star" doctor not only serves the patients and the community but also gains their respect.

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<sup>1</sup> Doctors for Health: A WHO global strategy for changing medical education and medical practice for health for all. Document WHO/HRH/96.1

<sup>2</sup> Boelen C., Frontline doctors of tomorrow, 1994, World Health, 5, Sept-Oct, 4-5.

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### **3.2 Preparation and production of a "5 Star" doctor**

Although the definition of a "5 Star" doctor (or the ideal doctor) should be the result of wide consultation within the health system and society at large, it is the primary task of medical schools to train them.

Tuberculosis has become a global epidemic: preparation and production of doctors capable of "5 Star" performance in tuberculosis control is required. Such practitioners will not be the only means of reducing the rise in tuberculosis and reducing the individual and socio-economic damage caused by tuberculosis, but they will play a vital part. Other health care providers will also play an important role as they may also possess to a certain extent the range of aptitudes described in the "5 Star" doctor's profile, but their efficacy (regardless of the quality of their own training) depends in part upon the quality of the doctors with whom they work. The statistics describing the epidemic clearly indicate the urgency of the situation and the challenge facing the medical schools of the world, especially medical schools in countries of high prevalence of tuberculosis. The perception that there is a need to improve the curriculum for tuberculosis in many medical schools was reinforced by presentations to the workshop from developing and developed countries (Annex 1).

The medical school should provide every graduate with the knowledge, skills and attitudes essential to the management of tuberculosis in the patient and in the community as a whole. The medical school should have an effective educational strategy to provide such ability. The results of the educational process should be adequately assessed and evaluated before the medical student is allowed to graduate as a doctor.

### **3.3 Essential knowledge, skills and attitudes needed by future doctors**

A list of the items of essential knowledge is shown in Table 1. The newly qualified doctor should be aware of the global, national and regional tuberculosis burden and of the National Tuberculosis Programme in his/her country. The doctor should know the fundamental medico-scientific facts about tuberculosis and should be able to manage tuberculosis, diagnosing it promptly and accurately and treating the patient properly, within the context of the community and in accordance with the National Tuberculosis

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Programme. If no such programme exists, management should conform to that recommended by WHO and the International Union Against Tuberculosis and Lung Disease (IUATLD).

The practical skills and attitudes essential for the translation of knowledge into practice are defined in Table 2. In countries where there is a comprehensive network of good microbiological laboratories to provide prompt and accurate results individual practitioners are less likely to need to perform microscopy themselves, but they should nevertheless have been taught how to while at medical school.

**Table 1**

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**WHAT THE FUTURE DOCTOR NEEDS TO KNOW ABOUT TUBERCULOSIS**

On qualifying as a doctor, the generalist should:

• **Know the tuberculosis burden and the National Tuberculosis Control Programme.**

1. Describe the importance of tuberculosis in his/her country and compare tuberculosis epidemiology worldwide with the situation in the countries of the region in which the doctor is practising.
2. Explain the transmission of the tubercle bacillus within a community, the factors favouring transmission, and the factors which increase risk of progression from infection to disease.
3. List the aims and objectives, the strategy and the main components of the National Tuberculosis Control Programme in his/her country.

• **Know the fundamental scientific facts about tuberculosis.**

4. Describe the main biological characteristics and conditions of replication of *Mycobacterium tuberculosis* in man, as well as the appearance of *Mycobacterium tuberculosis* on sputum smear microscopy and morphological characteristics of *Mycobacterium tuberculosis* colonies in culture.
5. Describe the consequences of *Mycobacterium tuberculosis* infection and disease in terms of the histopathological and immunological changes.

• **Know how to manage tuberculosis.**

6. Diagnose pulmonary tuberculosis in adults.
  - 6.1 Identify the symptoms, physical signs, and the chest x-ray features suggestive of pulmonary tuberculosis.

- 6.2 Collect sputum samples (optimally three) from tuberculosis suspects for smear examination in the nearest laboratory.
- 6.3 Know how to prepare and stain a sputum smear in order to be able to identify tubercle bacilli on microscopy.
- 6.4 Classify pulmonary tuberculosis cases as smear positive or smear negative in accordance with National Tuberculosis Programme policy.
- 6.5 Start an individual record for the patient.
- 6.6 Notify the case to the District tuberculosis coordinator and/or to the National Tuberculosis Programme official.
- 7. Diagnose the more common forms of extra-pulmonary tuberculosis (for example, meningitis, pleural, lymph node, bone and joint, peritoneal, etc.) and childhood tuberculosis.
  - 7.1 Identify symptoms, physical signs, radiological, biochemical, and cytological features suggestive of tuberculosis.
  - 7.2 Describe the criteria of diagnosis recommended by the National Tuberculosis Programme for extrapulmonary tuberculosis and childhood tuberculosis.
  - 7.3 Notify the case to the District tuberculosis coordinator and/or to the National Tuberculosis Programme official.
- 8. Treat a tuberculosis patient until cured.
  - 8.1 List the explanations that should be given to a patient and/or to his/her relative(s) before starting treatment.
  - 8.2 Prescribe antituberculosis chemotherapy in keeping with the National Tuberculosis Programme policy, according to the treatment category of the patient and to any special indications (e.g., pregnancy, renal failure, liver disease).
  - 8.3 Ensure the submission and examination of sputum smear samples at intervals during the course of treatment as recommended by the National Tuberculosis Programme.
  - 8.4 Be aware of common side-effects of antituberculosis drugs and recognise quickly those requiring immediate action or referral.
  - 8.5 Ensure directly observed treatment, at least during the initial phase of treatment.
  - 8.6 Know the criteria of treatment success, failure and relapse.
  - 8.7 Report outcome of treatment to the District tuberculosis coordinator and/or to the National Tuberculosis Programme official.

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9. Check the household contacts of a patient with smear positive pulmonary tuberculosis.
  10. Prescribe isoniazid and/or BCG vaccination, in accordance with National Tuberculosis Programme policy, for household contacts of a patient with smear positive pulmonary tuberculosis.
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## **Table 2**

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### **THE ATTITUDES AND PRACTICAL SKILLS WHICH THE FUTURE DOCTOR NEEDS IN MANAGING TUBERCULOSIS**

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At the end of training the future doctor should be able to:

1. Relate well to patients, relatives, the community and the health team, with appropriate knowledge of language and culture.
  2. Take a history and perform a clinical examination in order to identify correctly the patient's medical and social (family, job) problems.
  3. Prepare three sputum smears using known AFB positive sputum, stain them and then read the slides under the microscope correctly, reporting the number of bacilli according to the internationally recognised grading system.
  4. Recognise correctly from a series of normal and abnormal chest radiographs the appearances consistent with active pulmonary tuberculosis.
  5. Perform an intradermal tuberculin test, read and record the result of the tuberculin reaction.
  6. Perform a pleural tap and send the fluid for microscopic examination (and culture if available) and chemical analysis.
  7. Perform lymph node aspiration and send the aspirate for microscopic examination (and culture if available).
  8. Explain to an adult with tuberculosis and to the parent of a child with tuberculosis the diagnosis of tuberculosis, the means of transmission, and the management plan.
  9. Complete the treatment cards and registration of a series of pulmonary and extra-pulmonary patients according to the National Tuberculosis Programme's documents and registers.
  10. Make the appropriate management decisions, including referral to a specialist, in the following situations:
-

- 10.1 complication of tuberculosis (e.g., severe haemoptysis, pneumothorax, etc.)
- 10.2 side effects of antituberculosis drugs
- 10.3 transfer of the patient out of the District where the patient was registered
- 10.4 premature treatment interruption
- 10.5 concomitant disease (e.g. HIV, diabetes, renal failure, liver disease, etc.) and special situations (e.g. pregnancy)
- 11. Advise a nurse or other appropriate health worker on
  - 11.1 health education of a tuberculosis patient and family
  - 11.2 how to collect sputum samples (ideally three) over the course of two days, and to send them correctly labelled to the nearest laboratory with a properly completed request form for smear examination
  - 11.3 ensuring direct observation of treatment
  - 11.4 recognising severe side effects (like jaundice, hypersensitivity, deafness, etc.)
  - 11.5 tracing a patient who has not attended
- 12. Register correctly the outcome of treatment in a series of patients.
- 13. Make the professional links
  - 13.1 with the nearest laboratory for microscopy (and culture if available), chemical and cytological analysis.
  - 13.2 with the referral hospital or tuberculosis consultant.
  - 13.3 with the medical coordinator of the National Tuberculosis Programme in the District where the patient is registered.

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### **3.4 Additional managerial skills needed by future District tuberculosis coordinators**

If the National Tuberculosis Programme and the Health Department of a particular country employs doctors as District tuberculosis coordinators or managers, then the medical school(s) in that country should ensure that the managerial skills described in Table 3 are taught as an extra part of the curriculum, perhaps as a special course.

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**Table 3**

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**THE MANAGERIAL SKILLS NEEDED BY THE  
DISTRICT TUBERCULOSIS COORDINATOR**

At the end of a special training course for District tuberculosis coordinators the doctor should be able to:

1. Decide the equipment needed for a sputum smear microscopy laboratory and ensure that the equipment is maintained and the laboratory runs smoothly.
  2. Train the primary health care workers in the following:
    - 2.1 selection of tuberculosis suspects from patients with respiratory symptoms.
    - 2.2 supervised administration of ambulatory treatment to tuberculosis patients in relevant circumstances.
    - 2.3 recognition of side-effects of anti-tuberculosis drugs and appropriate referral.
    - 2.4 tracing patients who have not attended or whose treatment has been interrupted.
    - 2.5 identification of household contacts of a patient with smear positive pulmonary tuberculosis and giving appropriate advice.
  3. Plan the procurement and supply of anti-tuberculosis drugs, laboratory reagents, forms and registers for the District.
  4. Implement and update the District tuberculosis register and check the laboratory tuberculosis register regularly.
  5. Supervise the personnel involved in case finding and treatment in the District primary health care services.
  6. Complete and check the quarterly reports concerning:
    - 6.1 case detection
    - 6.2 treatment outcome results through cohort analysis of new and previously treated smear positive pulmonary tuberculosis patients
    - 6.3 District programme management.
  7. Forward these reports to the next supervisory level, with supplementary comments if necessary.
-

### 3.5 Educational Strategy

Various educational strategies are employed in medical schools (as reported in Annex 1). Having defined the required knowledge, skills and attitudes necessary for the doctor of the future in tuberculosis control, it must be defined how, when and where that education should take place. Within the constraints of available resources, the arrangement of how, when and where should be determined by the best possible learning process: students (or learners) should be in the optimal conditions and circumstances to acquire all the competencies as efficiently as possible. In the case of tuberculosis, how, when and where are inter-dependent.

Three educational options:

- *Sequential*

This has been and is the most widely used form in various medical schools, with basic scientific and biological aspects taught in the earlier part of the curriculum. Traditionally clinical training has come later in the students career, and public health training provided at a separate time, early, in the middle or late. Whilst sequential training is easiest for the teachers it can leave the student with disjointed knowledge and skills unless substantial time is devoted towards the end of training to pulling together all the various elements in a revision course.

- *Fully integrated*

In this option modular training is provided in a fully integrated manner. The bio-medical and scientific elements can be integrated with clinical and public health teaching either as part of a module devoted wholly to tuberculosis or as part of a module devoted to respiratory diseases in general. Although modular training is optimal for the student, considerable reorganization and institutional change is likely to be necessary to implement such training. The resources of the medical school may not permit fully integrated modular training and a compromise may be necessary.

- *Semi-integrated*

Some medical schools provide integrated modular training in the fundamental bio-medical subjects early in the curriculum and follow this in later years with integrated clinical and public health modules for tuberculosis. This should be considered as a transitional compromise, the optimal eventual aim being fully integrated modular training.

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Within each option different approaches, each having their specific advantages and constraints, can be considered,<sup>1</sup> e.g. plenary lectures in the classroom/lecture theatre, lectures in smaller groups, problem-solving, singly or in groups, simulation or role-playing exercises, practical work, projects, reading of textbooks or specially prepared material, audio-visual techniques, etc. Whenever possible the approaches which favour the active participation of learners should be preferred.

The *sites of learning* can and should vary. The precinct of the medical school is obviously a major site but teaching about tuberculosis should also be provided within chest and/or general hospitals, usually but not exclusively at the bedside. Students should also experience and learn about tuberculosis at sites in the community agreed upon and/or managed by the medical school, e.g., in the Chest Clinic and in Primary Care sites, both in the public sector and, if colleagues agree, also in the private sector with selected practitioners.

### **3.6 Assessment of medical students' performance.**

Traditionally, this has been by examination. Usually, the assessment of medical students' performance is mainly centred on the assessment of theoretical knowledge. For the qualifying examination teachers propose questions covering the disciplines they themselves have taught. These questions may (or may not) be selected for the examination. In this situation, knowledge about tuberculosis and tuberculosis control may (or may not) be assessed; a good performance on tuberculosis has not as a rule been mandatory for qualification as a doctor. Methods of examination or assessment vary but it is nowadays agreed that examination by multiple-choice questions is better than by the more traditional essay-type questions. Even if a final examination by multiple choice questions covers all the aspects of clinical tuberculosis and tuberculosis control, the assessment of the practical skills is rarely performed, and if so, poor performance of a student is not an obstacle to qualifying.

In recent years some medical schools have incorporated continuous assessment of student performance as a method of evaluation, especially for practical skills.

There is general acceptance that evaluation of attitudes and clinical skills at the bedside is a vital cornerstone in the assessment of the future doctor. The OSCE (objective structured clinical examination) is also a desirable technique of integrated examination of

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<sup>1</sup> Guilbert J.J. Education handbook for health personnel. WHO offset publication N°35, revised 1992.

competencies.<sup>1</sup> However, there are practical difficulties such as numbers of students, pressure of work in hospitals, etc., which may make it impossible to include a clinical examination as part of final examinations and to apply the most appropriate examination tools. In these instances such assessment of attitudes and clinical skills should take place at other stages in the course but should nevertheless contribute to the final marks for graduating. The same practical constraints may make it necessary to hold oral (*viva*) examinations at intervals during the course rather than at the end. In better resourced medical schools audio-visual methodology can be employed in evaluation of the students. If training has taken place in the community then assessment by the trainer in the community should contribute to the final mark. Feedback on evaluation should take place for students who fail. There should also be a means of feedback to teachers if students consistently under-perform in particular topics, i.e. a form of evaluation of teachers.

For a community and country with high prevalence of tuberculosis it is important, even mandatory, that evaluation of fitness to practise in the field of tuberculosis should form an integral part of the examination and/or assessment process. Students who do not pass theoretically and practically in tuberculosis should have to re-sit and pass before they are allowed to graduate as doctors.

### **3.7 Feedback on the medical schools**

The reputation of a medical school is based not only on what is taught and who teaches it, but also on the validity, efficacy and relevance of its assessment of its students' ability and readiness to practise as qualified doctors in the community and in his/her country and eventually in other countries. Medical schools should encourage and have the means to receive feedback on the performance of their graduates after qualifying e.g. from the National Tuberculosis Programme and/or the Ministry/Department of Health or the National Regulatory body for Medical Practice and/or from Medical Professional Associations. Have they taught the students medical practice that is relevant to the community they serve and have they trained them adequately in tuberculosis control?

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1. Harden, RM and Gleeson, FR. Assessment of clinical competence using an Objective Structured Clinical Examination Med Educ, 1979, 13: 41-47 WHO/TB/98.236

## **4. ENSURING SUSTAINABLE CHANGE IN MEDICAL EDUCATION AND IN MEDICAL PRACTICE IN THE REALM OF TUBERCULOSIS THROUGH PARTNERSHIP**

### **4.1 Tuberculosis task force**

To respond to the urgent need for practitioners properly trained in tuberculosis a "task force for tuberculosis" should be set up in each medical school. The task force should aim to ensure that:

1. Essential knowledge and skills are covered by every teacher in their respective fields of tuberculosis teaching/training.
2. Evaluation covers essential knowledge, skills and attitudes.
3. Progress is made towards the ideal of integrated modules, which move from integrated teaching (easier for the teacher) to integrated learning (more beneficial to the student).
4. The content of the curriculum and the systems of evaluation are updated according to priorities in the National Tuberculosis Control Programme.

The composition of the task force should be a matter for local decision but it should certainly contain a bacteriologist, histopathologist, chest physician, radiologist, infectious disease physician, and public health physician or official as well as representatives of the medical students. A convener should be identified by the Ministry of Health/Dean of medical school/NTP Coordinator.

The task force should obtain consensus within itself on what changes and improvements are required. It should then strive to obtain consensus within the medical school, notably the curriculum committee.

*A plan of action* should then be formulated.

- The *resources* necessary to apply that plan should be identified and obtained. WHO may be able to advise here.
- The plan should be *activated*.
- The *results of the action should be evaluated* and further strategy discussed, chosen and initiated.
- Those task forces who progress quickest should report their methodology and results to other slower task forces. WHO should facilitate this exchange of experience.

#### **4.2 Partnerships in the training of doctors**

The task force is meant to initiate change in the curriculum for tuberculosis in medical schools. For such change to be sustainable it must enlist and encourage input from the National Tuberculosis Programme and from the Health Ministry and Health Departments. In due course a representative from the National Tuberculosis Control Programme and/or from the Ministry of Health could be co-opted to the curriculum committee. The outcome of the National Tuberculosis Control Programme might in part reflect relevance and quality of the training given by the medical school to doctors in the Programme.

In like manner, the support and advice from medical professional associations should be sought. Members of such associations may themselves have been taught at that medical school: their subsequent experience as qualified doctors should enable them to comment constructively on the tuberculosis-related content of the curriculum and on the way it had been taught and evaluated.

The community in general, via its links with policy-makers and managers in the Health Department, its links with medical associations and its involvement with NGOs can in a broad, but relevant, manner provide feedback and comment on the performance of the graduates from its medical school. Such comment should be encouraged by the task force, if not by the medical school itself.

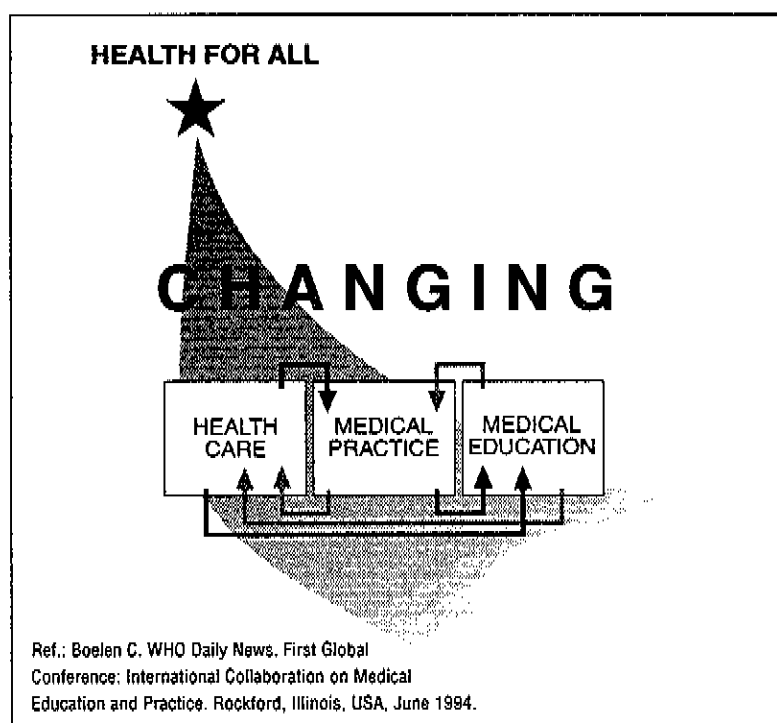
Medical schools have an obligation to direct their educational, service and research activities towards addressing the health concerns of priority to the community and/or country that ultimately funds their existence and function and whom they therefore have a duty to serve.

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### 4.3 Partnerships in medical practice and post graduate training

To optimise the impact of tuberculosis control it is important to understand the relationship between medical education, medical practice and the delivery of health care, and to suggest ways of creating productive partnerships.

The doctor plays a principal role, and thus has a large influence on tuberculosis control; however, the roles of other actors need to be analysed and their respective potential utilised as efficiently as possible.



#### 4.3.1 Practice Guidelines

In providing good undergraduate training and evaluation in tuberculosis the medical school already contributes to practice guidelines but its contribution should not stop there. Together with the National Tuberculosis Programme managers, it should work actively with medical professional associations (private and public sector) and with local and national and international organizations (e.g. WHO, IUATLD) to draw up and evaluate guidelines for good

medical practice in tuberculosis. NGOs, medical charitable organizations, and pharmaceutical companies should be able to assist with or contribute to the costs of printing, distributing and evaluating practice guidelines. Research activities conducted by medical schools should be consistent with the needs of the National Tuberculosis Programme.

#### **4.3.2 Organization of Care**

This is primarily the responsibility of the Ministry of Health and its Regional and District departments but the medical school, with input from the managers of the National Tuberculosis Programme and input from medical professional associations, should play a role in evaluating the organization of care, i.e. perform operational research into the organization and delivery of health care in the country.

In organizing care Health Departments should in reciprocal manner enlist the advice and cooperation of the medical schools and the representatives of the professionals involved in health care. International organizations such as WHO and IUATLD have much to offer in terms of advice and expertise in this area. The use of government health facilities is not only by demand but indicates respect and trust of the community: the Health Departments should question the quality and quantity of care they are providing if many of their citizens vote with their feet and wallets by attending private practitioners. Health workers in the public sector could well learn from the private sector aspects of practice which could improve the public sector service.

#### **4.3.3 Continuing Education**

This is currently provided to a greater or lesser extent by medical schools (post-graduate seminars, courses and diplomas), the Government Health Departments (courses and certificates) and the medical professional associations. The task force should enlist the cooperation of medical practitioners in developing an evident, open programme of continuing medical education in tuberculosis in their district/province/country. It is crucial that, as a profession, doctors should be seen to be striving to keep up to date and to be well informed.

Medical schools and medical professional associations may, in conjunction with well-funded schools and associations in the developed countries invite experts in tuberculosis to lecture in the

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medical schools. International health organizations such as WHO should prime this process with some funding. Pharmaceutical companies can also provide support to continuing education. Teachers from medical schools should have the opportunity (leave and funding) to attend national, regional and international meetings on tuberculosis and ultimately to have a chance to spend time in renowned tuberculosis units outside their country.

Local communities are likely to support continuing education for their doctors and may even play a part in raising funds for this process, through NGOs, national institutions, other organizations or groups.

#### **4.3.4 Performance Assessment**

It will be some time before doctors in developing countries with high prevalence of tuberculosis have to face up to being assessed at regular intervals for fitness to practise in the same way as have doctors in the United States and some other developed countries. But when that time approaches the medical schools and the medical professional associations should be prepared and ready to take on this task on behalf of the Ministry of Health or the Ministry of Education, who themselves will be responsible to the community for ensuring the continued competence of the medical practitioners serving the community.

Some of the partnerships necessary for change in the training of doctors and for the successful performance of doctors in the context of the National Tuberculosis Programme have been discussed but other facets of partnership are bound to emerge as the medical schools and the medical profession respond to the challenge posed by tuberculosis to so many of the citizens of today and of tomorrow.

Finally, the overall assessment of medical education in tuberculosis control is reflected in the outcomes of the National Tuberculosis Programme: case detection rate and rate of smear positive cases; success rate and cure rate; and surveillance of primary antituberculosis drug resistance.

## 5. RECOMMENDATIONS

1. In each medical school a task force for tuberculosis should be set up in order to produce changes in the curriculum which will ensure that the graduates have the knowledge, skills and attitudes essential to the proper management of tuberculosis in the individual patient as well as in the community.
2. The task force of the medical school should be comprised of representatives of all those groups involved in teaching e.g., Bacteriologist, Histopathologist, Chest Physician or Infectious Disease Physician or General Physician with expertise in tuberculosis, Radiologist, Public Health Physician or representative of the National Tuberculosis Programme and representatives of the medical students.
3. The task force should use this document as the basis for its deliberations and plans of action for improving the curriculum for tuberculosis and the evaluation of the graduates.
4. The task force should encourage partnerships between medical schools, Government Health Authorities, Medical Professional Associations and concerned organizations and groups in the community in achieving, sustaining, evaluating and updating the changes in medical education and medical practice.
5. These partners should extend their remit to include continuing post-graduate education, practice guidelines, and performance assessment for doctors as well as the organization of health care locally and regionally.
6. WHO should act as the catalyst for these plans for change. Ministers of Health, National Tuberculosis Programme Coordinators/Managers, Deans of medical schools, presidents of relevant medical professional associations and relevant NGOs should be sent this report with a covering letter from WHO. WHO Regional Offices will identify and inform other key personnel and organizations, at country and regional level.

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These recommendations should, if translated into action, result in improved detection of patients with smear positive tuberculosis, improved cure rates and reduction of the proportion of resistant and multi-drug resistant tuberculosis.



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# ANNEX 1

## TEACHING TUBERCULOSIS IN VARIOUS COUNTRIES

Participants reported their own experiences during the workshop. These documents are not meant to be general descriptions of the way tuberculosis is taught in all medical schools of a country; rather they are descriptions of the situation in particular medical schools, to be used as a starting point for group discussion.

### *Algeria*

- Teaching tuberculosis in Algiers University

### *Colombia*

- Surveys (1986-1996) on the knowledge of tuberculosis control in Colombian schools of medicine

### *Indonesia*

- Present situation of undergraduate training on tuberculosis in medical schools

### *Italy*

- Teaching experiences on tuberculosis in the Institute of Microbiology, Università Cattolica del Sacro Cuore

### *Latvia*

- Undergraduate medical education in tuberculosis at the Medical Academy of Larvia

### *Philippines*

- The teaching of tuberculosis at the University of Santo Tomas, Manila

### *South Africa*

- The teaching of tuberculosis in the University of Cape Town

### *Thailand*

- The teaching of tuberculosis in four medical schools of Thailand and in the Faculty of Public Health, Mahidol University

### *Vietnam*

- Integrating medical education with antituberculosis programme at the University Training Centre, Ho Chi Minh City

### *Australia, Norway and United Kingdom*

- A collaborative survey

***IN ALGERIA - Teaching tuberculosis in Algiers University***

Since 1963, after the country's independence, strong institutional relations were established between the universities responsible for the teaching of tuberculosis (bacteriologists, clinicians, epidemiologists) and the National Tuberculosis Programme. All of the technical and organizational innovations introduced in the Programme since 1966 were founded upon the results of operational research conducted by groups of researchers in the medical schools: development of network microscopy laboratories, drug resistance surveillance, integration of tuberculosis control activities, clinical trials of intermittent and short-term chemotherapy, cohort analyses, registration and reporting of cases, seminars on the evaluation of case finding and treatment.

● From 1963 to 1973, the teaching of tuberculosis was done in the traditional manner. The teaching of theoretical knowledge was done in the form of academic lectures spread out over the curriculum of the 3-year clinical cycle (3rd, 4th, and 5th years). Practical skills and "bedside" teaching involved only a small proportion of medical students, those who did rotations in hospital services specialised in tuberculosis and respiratory disease.

The evaluation of theoretical knowledge of tuberculosis was irregular and optional, given during the examinations at the end of each year. The grade received by a student for the practical stage had no influence on the student's progression.

According to an evaluation performed in 1974, only 30% of students were capable of solving practical problems of the diagnosis and treatment of tuberculosis at the end of the traditional curriculum of studies.

● Since 1973, institutional reform of medical studies has allowed for teaching medicine by integrated modules during the 3-year clinical cycle. Since then, tuberculosis is taught in a module called "tuberculosis and respiratory disease", which is taught in the specialised university hospital services where the students are working full-time. During this 6-week module, the teaching is intensive and integrated; practice and theory are taught together. Ten days are devoted to tuberculosis. Printed or photocopied documents are distributed to the students concerning theoretical notions on the epidemiology, clinical and therapeutic aspects of tuberculosis, and the technical directives of the National Tuberculosis Programme. Small group discussions permit the study of simulated

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cases with a view to solving problems of diagnosis and treatment. The workshops and role playing in the small groups permit teaching about the function of a tuberculosis control centre (keeping of registers and of individual files on the patients) as well as the methods of evaluation of case finding and treatment (cohort analysis). In the same period, practical work on bacteriology (focused on the microscopy of tuberculosis), a demonstration of histopathology, and reading of thoracic x-rays complete the students' training.

The evaluation of practical skills is a prerequisite for taking the final theoretical examination and constitutes a substantial part of the final grade. This practical evaluation consists of the clinical examination of a patient, the colouring and reading of a sputum smear, and the reading of 10 thoracic x-rays. The examination of theoretical knowledge is done by multiple-choice questions (mainly of the problem-solving type). 30% to 50% of the final examination questions are about tuberculosis and tuberculosis control. All of the grades obtained in the course of practical and theoretical tests help to determine whether or not a student has successfully completed the module "tuberculosis and respiratory disease". Successful completion of the module is mandatory for graduation.

- During the course of supervisory visits to the National Tuberculosis Programme in the various districts of the country, it has been noted since 1980 that the change in medical teaching methods has permitted young doctors to actively participate in the application of the national tuberculosis control programme.

### *IN COLOMBIA - Surveys (1986-1996) on the knowledge of tuberculosis control in Colombian schools of medicine*

The advisory committee for the official tuberculosis control programme initiated in 1954 represents the most important medical related institutions. Led by the National Academy of Medicine, the advisory committee organized a survey on the knowledge of the National Tuberculosis Programme among the first-year medical interns who had just completed their official terms as medical students in 1986. The results of the survey were analysed and a campaign was organized to improve the teaching of the Programme in all Colombian schools of medicine (21 in 1986). Ten years later, 20 new medical schools have been approved. In 1996, the advisory committee decided to retest the survey in 10 medical schools under

the most similar conditions possible. 355 questionnaires were answered and analysed. (Tables 1 and 2)

Table 1. Opinion of medical students on the training in tuberculosis

Selection of main questions	% of negative answers	
	1986	1996
1. Have you had training in tuberculosis epidemiology?	26%	21%
2. Have you had training in the tuberculosis control of the Ministry of Health?	70%	55%
3. Have you had training in bacteriological methods of diagnosis?	32%	31%
4. Have you acted in the treatment of patients in a first-level control centre?	9%	50%
5. Have you acted in the treatment of positive cases?	86%	16%
6. Have you had training in the management of tuberculosis in children?	25%	45%
7. In your opinion, was the training in tuberculosis control programme adequate?	42%	67%

Table 2. Knowledge of medical interns on tuberculosis

Selection of main questions	% of wrong/negative answers	
	1986	1996
1. Is tuberculin applied intradermally?	22%	48%
2. Bactericidal drugs are? (answer: isoniazid, rifampicin, pyrazinamide, streptomycin)	85%	67%
3. The ideal plan of treatment (by name) is...? (answer: short course chemotherapy, supervised)	84%	6%
4. When is a person with pulmonary tuberculosis considered contagious? (answer: when sputum positive)	46%	7%
5. According to the norm, bacilloscopy should be ordered to...? (answer: respiratory symptomatics)	65%	26%

**Conclusion:**

Training in National Tuberculosis Programme policy is insufficient and inadequate in several medical schools. Management of a tuberculosis case (in adults and in children) was better known in 1986. However, epidemiological and managerial elements of tuberculosis control programme are ignored.

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***IN INDONESIA - Present situation of undergraduate training on tuberculosis in medical schools.***

● ***Links between medical schools and the National Tuberculosis Programme (NTP)***

Basically there are no formal links between medical education and the NTP because most medical schools are rather independent of government policies and because the medical schools belong to a different ministry (the Ministry of Education). As a rule, all medical schools' curriculum must follow strictly the Core Curriculum set by the Consortium of Health Sciences (CHS). The Core Curriculum covers 80% of all medical education content: the medical schools may fill the other 20% with content on various subjects depending on their own vision and mission. Unfortunately, the tuberculosis control programme is not explicitly included in the Core Curriculum, nor in the additional curriculum content in the majority of medical schools. A small number of medical schools implemented the national tuberculosis control programme during field practice in community medicine teaching and training modules by using the NTP manual.

● ***Objectives of teaching both theory and practical skills in tuberculosis***

Educational objectives were announced to the students both in written form and verbally at the beginning of their studies, but not specifically to the NTP. The students were informed of general instructional objectives, specific behavioral objectives, levels of competence and learning experience which cover definition, epidemiology, pathogenesis, pathology, bacteriology, diagnostic procedure, diagnosis and differential diagnosis, management (outpatient, hospitalised and Health Centres setting), prevention, defining prognosis and referral system.

● ***Organization of teaching clinical tuberculosis and tuberculosis control***

Several departments were involved in tuberculosis education and training which includes: pathology, microbiology, pharmacology, radiology, pediatrics, internal medicine, respiratory and community medicine. Theoretical content spread out over several years rather than at the same period of time consisted of: pathology, mycobacteriology (microbiology) and pharmacology theory and practice and lecture of tuberculosis in the third year.

First clinical practice in the fourth year followed by advanced clinical and field practice in the fifth year. Teaching clinical tuberculosis is part of a module on pulmonary diseases given by pediatrics, pulmonary and internal medicine. Tuberculosis control is taught by community medicine. Clinical teaching modules are based mainly on organ systems such as cardiovascular, respiratory, gastroenterology, etc., not upon diseases like immunology, oncology or infectious diseases.

Theoretical and practical training is mandatory for all medical students, including sputum AFB staining, Tuberculin testing and x-ray reading. However, practical training does not take place at the same time as theoretical training. Communication with the patients takes place during senior clerkship in the hospital setting and the community medicine setting (HC).

● *Assessment of knowledge and competence required*

Assessment of theoretical knowledge is mandatory for each student and the evaluation is usually performed at the end of the module. However, it does not include topics on the NTP. Methods of assessment range from written examinations (mostly multiple-choice), to case studies, to verbal examination using real patients rather than simulated cases.

Acquisition of practical skills is usually done at random. Practical skills evaluation is done mainly on history and physical examination, reading of chest x-rays, tuberculin test reading and sputum smear interpretation.

Evaluations are made at the end of each period of teaching. Those who do not pass the evaluation are re-evaluated depending on other subject results. Favourable evaluation is not mandatory for grading nor for graduation.

● *Conclusions*

1. The National Tuberculosis Programme is not an explicit part of current medical curriculum in Indonesian medical schools.
2. Teaching and learning about tuberculosis is still not done in an integrated manner between various departments.
3. All students are evaluated on their theoretical knowledge, but practical evaluation is done only at random.
4. Based on the present situation and the new government policy toward stronger effort in controlling tuberculosis with the new

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NTP policy, there is a strong need to include and implement the National Tuberculosis Programme in the curriculum of medical schools.

***IN ITALY - Teaching experiences on tuberculosis in the Institute of Microbiology, Università Cattolica del Sacro Cuore***

Microbiology teaching occurs at the third of six years of medical school. There are no institutional links between the Medical School and the institutions involved in the tuberculosis control programme. As there is no technical manual available, the teaching relies mainly upon internationally accepted manuals, such as the American Society for Microbiology's manuals. However, it is clear that closer ties between medical schools and public health associations would be highly desirable and would allow a better allocation of resources in the future.

The students are informed of the general purpose of their education at the beginning of medical school, but no specific address is given regarding the topic of tuberculosis control.

The theoretical content on tuberculosis is spread over many years. The main part of this topic is covered by microbiology (3rd year), pathology (3rd year), infectious diseases (4th year), internal medicine of the lung (4th year) and community health (6th year). However, a part of tuberculosis is also covered in radiology (5th year) and bone disease (6th year) courses. Theoretical training is mandatory for all students, as well as practical training. Regarding microbiology, the practical training includes staining of sputum smears on slides by acid-fast methods and microscope observations of the acid-fast bacteria. Theoretical training and practical training take place at the same time and on the same site (medical school).

It is mandatory for each student to be evaluated on microbiology. However, the choice of the topics on which the students will be evaluated is randomly decided by the examining jury. The evaluation takes place as an oral examination. Practical skills are not evaluated. The theoretical evaluation can take place at the end of the semester or later, by the student's choice. A favourable evaluation is required to obtain the degree in Medicine. The performance of the student is marked on a fraction of 30, the maximum being 30/30 and the minimum required for successful evaluation 18/30. The marks contribute to the final average obtained at the moment of the degree, that is stated in a fraction of 110, the maximum being 110/110 *summa cum laude*.

***IN LATVIA - Undergraduate medical education in tuberculosis at the Medical Academy of Latvia***

The Medical Academy of Latvia (AML) is the only institution responsible for undergraduate medical high education. One of the separate departments of the Academy is a chair of tuberculosis (TB), where future doctors, generalists, have lectures and clinical training in tuberculosis: 18 hours of lectures and 50 hours of clinical training.

***Topics of the lectures:***

1. Up-to-date epidemiology of tuberculosis, and WHO/IUATLD Strategy for Tuberculosis Control (DOTS). Contagion of Tuberculosis. Atypical (Nontuberculosis) Mycobacteria and Mycobacterioses. Immunity and Allergy of Tuberculosis.
2. Epidemiological and clinical classification of Pulmonary Tuberculosis. Case finding and diagnosis of Tuberculosis. Primary and Postprimary Tuberculosis.
3. Disseminated and Focal Pulmonary Tuberculosis.
4. Infiltrative Pulmonary Tuberculosis. Tuberculoma.
5. Cavitary (Cavernous and Fibrocavernous) Pulmonary Tuberculosis.
6. Cirrhotic Pulmonary Tuberculosis. Tuberculosis Pleuritis.
7. Intrathoracic Sarcoidosis.
8. The Main Complications of Pulmonary Tuberculosis.
9. Short-course Chemotherapy of Tuberculosis: Principles and Regimens. Side-effects of Antituberculosis Drugs.

Clinical training of the medical students is conducted in the tuberculosis hospital, where the future doctors take histories and perform clinical examinations on pulmonary tuberculosis patients.

At the end of the clinical training each student writes a clinical file (protocol) on a real pulmonary tuberculosis patient whom he/she has examined. Clinical training is followed by examination.

***Examination consists of three parts:***

- Part 1. 50 multiple-choice questions. If this part is successful, the next two parts follow.
- Part 2. Oral answers to two theoretical questions.
- Part 3. The student must correctly analyse one of abnormal chest x-rays with active pulmonary tuberculosis and give relevant conclusion.

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**Conclusion:**

The programme described above has mainly a clinical approach. However, the epidemiological situation in Latvia has deteriorated significantly during recent years. Therefore, medical education in tuberculosis should be revised and added to by important epidemiological issues for tuberculosis control (preparation and reading of sputum smears, etc.).

The integration of undergraduate and postgraduate education in tuberculosis within the National Tuberculosis Programme is vital.

***IN THE PHILIPPINES - The teaching of tuberculosis at the University of Santo Tomas, Manila***

Tuberculosis ranks fourth among the leading causes of death in the Philippines. Approximately 1/3 (22 million) of the population is infected with the disease. To be a Filipino, therefore, is to be exposed to tuberculosis and is to be or to be closely related to one who is infected with tuberculosis. The Filipino doctor as emphasised in the undergraduate medical curriculum will face tuberculosis whether it be in the community or in the hospital. He must know how to care for the tuberculosis patient and how to prevent the spread of the disease. Our undergraduate curriculum is traditional. Each department plays a role in helping the student learn about tuberculosis. The integration and application of what is learned piecemeal is mainly the function of the Department of Medicine, Pediatrics and Preventive Medicine in the last year of the course.

● **Objectives**

At the end of the course, the student should be able to:

1. Given a patient with tuberculosis: recognise the disease; confirm its presence: using the Tuberculin test, AFB stain and chest x-ray; identify the index case; register the patients; emphasise to the patient that tuberculosis is life-threatening, curable with prolonged continuous treatment, spreads to others; treat the patient and the index case; monitor the patients' response paying special attention to compliance, adverse drug reactions, follow up AFB smears and chest x-ray, multidrug resistant strains; refer the patient as needed; help the patients who are often family breadwinners (70%) or unable to buy medicine (90%) to correct their misconceptions about the disease and its prognosis, to accept responsibility for their treatment and for preventing the spread

of the disease; maintain patient confidentiality.

2. Given a community: disseminate information on the importance of tuberculosis in the Philippines; educate and motivate its members towards better understanding of the disease and its prevention; correct cultural biases against the disease and the patient with the disease; practise measures to control the disease including immunization, case finding and appropriate treatment; network with other healthcare providers (non-governmental and governmental services).
3. Given a problem related to the management or prevention of tuberculosis: recognise his personal competence and limitations and obtain help as needed.

● *Methods of instruction*

Lectures, group discussions, case reports, role-playing, laboratory and clinical and community work. Optional Activities: membership in SWAT, participation in national and international activities.

● *Evaluation*

Students must pass the written and practical examinations to proceed to the next level.

*IN SOUTH AFRICA - The teaching of tuberculosis in the University of Cape Town*

● *Links between the University of Cape Town (UCT) and the National Tuberculosis Control Programme*

The faculty is involved in the National Tuberculosis Control Programme in several capacities. A senior member of staff is academic advisor to the Programme on education of medical and nursing personnel. He has been given the responsibilities of compiling a curriculum to be used in all undergraduate medical schools, and of teaching the health profession about the new control programme. He also serves on the regional Western Cape Tuberculosis Programme Education Committee. He is currently involved in producing audio-visual material for educating staff on the new programme.

● *Objectives and organization of training*

Students are informed in writing of the educational objectives at the beginning of their studies.

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Theoretical content is spread over the entire training period in one form or another. Theoretical content is grouped together over the same period with different instructors. Teaching of clinical tuberculosis and tuberculosis control is part of infectious diseases as well as pneumonology. Theoretical training is mandatory for all students. Practical training includes smear examination, x-ray reading and communication with the patient. Bedside teaching provides the opportunity for practical training to take place at the same time as theoretical training.

● **Assessment**

It is mandatory for each student to be evaluated. A combination of the following is applied: Essay-type question, multiple-choice questions, real case solving (there is an over-abundance of human material), oral examinations. It is mandatory for each student to be evaluated on practical skills, especially on microscopy of sputa, examination of the patient and reading of x-rays. Continuous assessment including evaluation at the end of each block (eight weeks) as well as at the end of the year. At the end of assessment the student either passes or fails. A favourable evaluation is mandatory for graduation.

***IN THAILAND - The teaching of tuberculosis in four medical schools of Thailand and in the Faculty of Public Health, Mahidol University***

**Medical students**

All aspects of tuberculosis such as microbiology, epidemiology clinical signs and symptoms, clinical and laboratory diagnosis, treatment, prevention and control, etc., are taught from the second year through the fifth year of medical study by many departments such as Microbiology, Medicine, and Preventive and Social Medicine Departments. The stress of each aspect depends on the objectives of the study of each department.

● ***Learning process***

The students are informed both verbally and in writing of the teaching objectives for tuberculosis at the beginning of their studies. The learning process includes lecture, study in laboratory, self-study, problem solving or problem-based learning, bedside teaching and field study. The selection for any kind of learning process depends on the director of the course, the policy of the department or the medical school.

● *Evaluation*

Written examinations with both multiple choice and description, oral examination and laboratory practice from the sputum samples of patients.

● *Linkage*

There is a close institutional linkage between the medical schools and tuberculosis division, Ministry of Public Health, that is responsible for the National Tuberculosis Control Programme. The director of tuberculosis division is the guest lecturer in the Medical School so the topic of National Tuberculosis Control Programme will be included.

**Public Health Students**

There are both undergraduate and graduate students. Tuberculosis is one of the topics in Infectious Diseases courses which are the responsibility of the Microbiology Department. The undergraduate students study all aspects of tuberculosis including laboratory diagnosis and community diagnosis. The graduate students study about ecology and epidemiology of tuberculosis. The lecturer is the director of Tuberculosis division of the Ministry of Public Health. The new technology in diagnosis of tuberculosis is taught by another lecturer.

● *Learning process*

Lectures, group study and field study.

● *Evaluation:*

Written examinations (multiple choice) and reports.

***IN VIETNAM - Integrating medical education with antituberculosis programme at the University Training Centre, Ho Chi Minh City***

● *University Training Centre for Health Professionals (UTC), Ho Chi Minh City*

The UTC, founded in 1989 by a special decision of the Government of Vietnam, is comprised of the School of Medicine and the Medical Technical School. Upon completion of a 6-year curriculum, medical students of the UTC graduate with a diploma of "General Medical Doctor, community oriented". So far, the UTC has contributed much to postgraduate training and continuing education for health professionals in Ho Chi Minh City.

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● *The situation of tuberculosis in Ho Chi Minh City*

Tuberculosis is a major public health problem in Vietnam as well as in Ho Chi Minh City. It is a high-priority health programme in Ho Chi Minh City and the whole country.

● *Curriculum on tuberculosis and antituberculosis programmes*

The UTC is actively involved in programmes for the detection and treatment of tuberculosis, especially in the short course chemotherapy programme, involving diverse activities. The course on tuberculosis delivered to third-year students (30 hours total) is presented under the following topics:

- Tuberculosis
- Pathology, clinical aspects of tuberculosis
- Epidemiology
- Detection and diagnosis of tuberculosis
- Short course chemotherapy under close follow-up (S.C.C.)
- Antituberculosis Programme in Vietnam and Ho Chi Minh City (NTP)
- Combining antituberculosis with other health programmes

The sixth-year students review the topic of tuberculosis during a six-hour course where all the practical issues related to the actual trends of tuberculosis are dealt with, such as:

- How to implement the short course chemotherapy programme (SCC) in the field, in district communities and villages
- Tuberculosis and HIV infection
- Scientific bases and components of the National Tuberculosis Programme (NTP)

Moderators for such teaching topics are UTC teaching staff and clinical staff of the Health Service in Ho Chi Minh City. The chairman of the tuberculosis department is also Director of the Centre for Lung diseases Pham Ngoc Thach (centre serving Ho Chi Minh City and all South provinces of Vietnam) and is responsible for the NTP programmes for the South and South-Centre provinces. Thanks to these dispositions, the teaching of tuberculosis as a disease is favourably integrated into the antituberculosis programme.

Students receive theoretical teaching at the UTC, are clinically trained at the Pham Ngoc Thach Hospital Centre and perform in-field works in districts and villages. Students join in training courses organized

by the Pham Ngoc Thach Hospital and the Association of Medicine and Pharmacy on the treatment of tuberculosis and the management of private medical offices in regard to this issue.

● *Conclusion*

The teaching of tuberculosis as a topic with a theoretical part and a clinical part is harmoniously integrated between the UTC, tuberculosis and lung disease hospital and the NTP. Students are given the opportunity to participate in antituberculosis programmes while in school. The UTC is involved in retraining courses to young medical general practitioners and young specialists, along with the Association of Medicine and Pharmacy.

***IN AUSTRALIA, NORWAY AND THE UNITED KINGDOM - A collaborative survey***

A collaborative survey was undertaken in 1997 on the content of tuberculosis teaching in some medical schools in developed countries. Among 33 medical schools selected in the sample, 25 answered. The main questions were:

- Module taught by microbiologist, histopathologist, chest physician, public health physician
- Lectures given in the different disciplines at different stages
- Teaching about tuberculosis and tuberculosis control in developing countries

The results are summarised in Tables 1 and 2.

Table 1. Organization and content of teaching  
(25 answers)

* Lectures at intervals by different disciplines	20
Fully integrated module of training	1
Uncertain because curriculum is changing	3
Tuberculosis and tuberculosis control in developing countries	0
None of the above	1
* Lectures at intervals by different disciplines	20
Adequate coverage	9
Inadequate coverage	11

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Table 2. Summary

<i>Training in tuberculosis and tuberculosis control is:</i>	<i>Number of medical schools*</i>
Adequate for doctor in developed country	11
Inadequate for doctor in developed country	14
Adequate for doctor in developing country	0

*In one answer: "...would like to do more, but the disease does not rank high in the list of imperatives, even though we have our fair share of cases."*

#### *Conclusions of the survey*

Tuberculosis is not adequately covered in some of the medical schools in developed countries. Indigenous students do need to learn about tuberculosis as they may well practise for a time in countries with a higher prevalence than their own or in regions/cities in their own country where tuberculosis is more prevalent than usual. Students from developing countries who train and qualify in developed countries are unlikely to have been taught enough about tuberculosis to practise well in their own country.

## ANNEX 2

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## **ANNEX 3**

### **HOW TO MANAGE A WORKSHOP ON "TUBERCULOSIS CONTROL AND MEDICAL SCHOOLS"**

#### ***1. Selection of participants and facilitators***

According to the level of the workshop (regional, national, institutional) the participants are selected from among the following:

- National Tuberculosis Programme managers and Deans of medical schools
- Teachers in medical schools: bacteriology, histopathology, internal medicine, chest diseases, infectious disease, public health, community health services, preventative medicine, and disease control.
- Experts in medical education.

The facilitators are selected from among teachers who have attended a previous workshop at international or regional level.

#### ***2. Preparation for the workshop; instructions to participants***

To encourage the various participants to be active during the workshop a document should be sent to ask them:

1. to select and bring teaching material used in their medical schools.
2. to prepare a brief report on their experience.

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### ***Teaching material used in your country.***

Please bring some examples of original teaching material that has been used in your country for the teaching of clinical tuberculosis control. Such material can be:

- Lists of educational objectives, practical training activities
- manuals used in line with national tuberculosis control programmes, photocopies of original documents, slides/overheads.
- Evaluation tools: clinical training assessment, reports, evaluation of practical skills.

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### ***Reporting your experience.***

Each participant is asked to prepare a 2-3 page summary of his/her teaching experiences, (and/or those of his/her colleagues if appropriate), on the teaching of clinical tuberculosis and tuberculosis control in his/her particular institution, using the following questions as guidelines. These summaries will be produced as an annex to the final workshop report.

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### ***Links between medical education and the national tuberculosis control programme.***

- Do institutional links exist? If so, describe them.
- If there are no institutional links, is the technical manual of the national tuberculosis control programme used in teaching?

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### ***Objectives of teaching both theory and practical skills related to tuberculosis.***

Are the students informed verbally or in writing of the educational objectives at the beginning of their studies?

Organization of teaching clinical tuberculosis and tuberculosis control:

- Is the theoretical content spread out over several years? (for example, bacteriology, pathology in the third year, clinical studies in the fourth year, public health in the fifth year?)
- Is the theoretical content grouped together over the same period with different instructors (bacteriologists, clinicians, epidemiologists)?

- Is the teaching of clinical tuberculosis and tuberculosis control part of a module on infectious diseases, or on pneumology, or considered as a separate module?
- Is theoretical training mandatory for all students?
- Is practical training mandatory for all students? If yes, which?
  - tuberculin test?
  - identification of TB bacilli by microscopy (smear examination)?
  - thoracic X-ray reading?
  - communication with the patient (explanation of diagnosis and treatment)?
- Does practical training take place at the same time as theoretical training, and on the same site?

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*Assessment of knowledge and competence acquired.*

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- Theoretical knowledge: is it mandatory for each student to be evaluated, or is a random evaluation used by the examining jury?
- Methods of evaluation that are applied: dissertation? multiple choice questions? simulated case solving? oral?
- Acquisition of practical skills: is it mandatory for each student to be evaluated?
- What are the practical skills evaluated?
- When is the evaluation made?
  - At the end of each module, at the end of each period of teaching (semester, quarter, year), or at the end of a teaching cycle (pre-clinical and clinical cycle)?
- What are the consequences of the evaluation?
  - Is a favourable evaluation mandatory for graduation, or has the result of the evaluation no bearing on grading?

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### 3. *Proposed agenda for the workshop.*

#### *Day 1/ Plenary session*

Reports on:

- Tuberculosis epidemic in the world (region, country) and the potential impact of the WHO policy package ("DOTS" strategy) against tuberculosis.
- Responding to challenges for change in health care, medical practice and medical education.
- Proposals: what is the core competence required for tuberculosis control in medical education?

Presentation of some national/institutional experiences

Workshop objectives, methods of work, and expected outcome

#### *Day 2/ Working groups on education changes*

Main topics to be discussed are the following:

- Essential knowledge, practical skills and attitudes required for a future doctor.
- How to best assess knowledge, skills and attitudes of students before qualification.
- Educational strategy for achieving the educational objectives, taking into account institutional constraints.

The working group can use Table 1, "Educational Changes", to support the group's discussion and presentation during a plenary session at the end of day 2.

Table 1. Educational changes

#### A. A list of essential skills / Example: 'The 5 star doctor'

Functions	Essential skills	Training activities
1. Care giver		
2. Decision maker		
3. Communicator		
4. Community Leader		
5. Manager		

This table should be completed during the working group session for 2 professional profiles:

- general practitioner practising alone (in a health centre or private practice)
- general practitioner practising as a District Medical Officer

**B. Educational Strategy**

- WHAT?(integrated skill)
- WHERE?(different learning sites)
- WHEN?(time in curriculum, sequential or modular training)
- HOW?(problem solving approach, small groups, reading, academic lectures, simulation exercises, field practice, etc.)

**C. Evaluation System**

*Day 3/ Working groups on institutional change and planning for future action.*

Session 1 Partnership for sustainable change in medical education

The working groups can use the table 2 "Partnerships for sustainable change" to support the group's discussion and presentation during a plenary session.

Session 2 Guidelines for future action

The working groups can use the table 3 "Guidelines for future action" to support the group's discussion and presentation during a plenary session.

Table 2. Partnership for sustainable change

	<i>Medical Schools</i>	<i>Health Services</i>	<i>Medical Associations</i>	<i>Community</i>
<i>Doctors in training</i>				
<i>Curriculum Content</i>				
<i>Learning Process</i>				
<i>Performance Assessment</i>				
<i>Doctors in practice</i>				
<i>Practice Guidelines</i>				
<i>Care organization</i>				
<i>Continuing Education</i>				
<i>Performance Assessment</i>				

Table 3. Guidelines for future action

	<i>Medical schools</i>	<i>Medical professions</i>	<i>Health services</i>	<i>National bodies</i>	<i>WHO and international organizations</i>
<i>Policy and planning</i>					
<i>Programme delivery</i>					
<i>Monitoring and evaluation</i>					

#### 4. Workshop report.

After the workshop, the team of participants has to produce a comprehensive report to help the transmission of information on the desired changes in medical education on tuberculosis control and on the particular experiences of the participants.

This report should be sent to all participants, deans of medical schools of the region (subregion or country) and to the tuberculosis regional adviser.

