

Human resources for control of tuberculosis and HIV-associated tuberculosis

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SUMMARY

The global targets for tuberculosis (TB) control were postponed from 2000 to 2005, but on current evidence a further postponement may be necessary. Of the constraints preventing these targets being met, the primary one appears to be the lack of adequately trained and qualified staff. This paper outlines: 1) the human resources and skills for global TB and human immunodeficiency virus (HIV) TB control, including the human resources for implementing the DOTS strategy, the additional human resources for implementing joint HIV-TB control strategies and what is known about human resource gaps at global level; 2) the attempts to quantify human resource gaps by focusing on a small country in

sub-Saharan Africa, Malawi; and 3) the main constraints to human resources and their possible solutions, under six main headings: human resource planning; production of human resources; distribution of the workforce; motivation and staff retention; quality of existing staff; and the effect of HIV/AIDS. We recommend an urgent shift in thinking about the human resource paradigm, and exhort international policy makers and the donor community to make a concerted effort to bridge the current gaps by investing for real change.

KEY WORDS: human resources; TB control; HIV-TB control

BACKGROUND

Burden of tuberculosis and HIV/AIDS

THE GLOBAL BURDEN of tuberculosis (TB) and the human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) is enormous. The estimated annual number of new TB cases globally is about 8.5 million, with the global incidence rate growing at approximately 0.4% per annum.¹ Africa is the World Health Organization (WHO) region worst hit, with a TB incidence rate approaching 300 per 100 000 population per year, and an annual rate of increase of cases estimated at 6%.² The number of adults and children living in the world with HIV/AIDS is estimated at over 40 million.³ Each year, about 5 million people are newly infected with HIV and about 3 million people die. Sub-Saharan Africa bears the brunt of this global catastrophe. In 2002, it was home to 29.4 million people living with HIV/AIDS (70% of the global total). In that same year there were 3.5 million new infections in the region and 2.4 million people died of AIDS, representing 77% of global AIDS deaths for that year. The TB and HIV/AIDS epidemics overlap, particularly in sub-Saharan Africa

where almost 70% of dually infected people currently live.² Where co-infection occurs, HIV infection is the most important driving force behind the current TB epidemic.

Strategy and framework for TB and HIV-TB control

The overall aim of TB control is to reduce the mortality, morbidity and transmission of the disease. The main intervention is standardised combination chemotherapy for all identified sputum smear-positive TB patients, the main sources of infection. The framework for effective TB control incorporates a global strategy known as DOTS.⁴ The five components of this strategy are outlined in Table 1. Currently, 155 countries (of 210) implement the DOTS strategy. Of these, 22 high TB burden countries (HBC) together account for almost 80% of the total estimated TB cases; success in TB control here will translate into overall global success. The global targets for TB control adopted by the World Health Assembly (WHA) in 1991 were to cure 85% of newly detected cases of sputum smear-positive pulmonary tuberculosis (PTB) and to detect 70% of the estimated smear-positive PTB cases by 2000. By 1997, it became apparent that

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Table 1 The five components of the DOTS strategy

- 1 Sustained political commitment
- 2 Access to quality-assured TB sputum microscopy services
- 3 Provision of standardised short-course chemotherapy for all cases of TB under proper case management conditions, including direct observation of treatment
- 4 Uninterrupted supply of quality assured drugs
- 5 Standardised recording and reporting system.

TB = tuberculosis.

these targets could not be met, and at the WHA in May 2000 they were postponed to 2005.⁵

HIV adversely affects TB control; the main problems are an increase in 1) the number of registered TB cases, 2) case fatality rates and 3) recurrent disease after successful completion of anti-tuberculosis treatment. If the burden of HIV-TB is to be tackled effectively, TB and HIV programmes have to share mutual concerns: prevention and care of HIV should be a priority for TB control, and TB care and prevention should be a priority for HIV/AIDS programmes. The expanded scope of the strategy for TB control in high HIV prevalence populations comprises additional interventions against TB and against HIV, beyond TB case finding and treatment (Table 2).^{6,7} Implementing these interventions will depend on the availability of adequate human resources.

In this paper we discuss: 1) human resources and skills for global TB and HIV-TB control; 2) attempts to quantify the human resource gaps: the case of Malawi; and 3) the main constraints related to human resources, their reasons and possible solutions.

HUMAN RESOURCES AND SKILLS FOR GLOBAL TB AND HIV-TB CONTROL

Human resources for implementing the DOTS strategy

TB programmes are usually organised on a three-tier system: central, regional (or provincial) and district. Central and regional levels support the district level, where TB activities become fully integrated with the general health services.

The central unit typically comprises a programme manager or director assisted by one or two deputy programme managers, although numbers will vary from country to country. Personnel in these positions may be medical doctors, nurses or paramedical staff, such as clinical officers, who are usually full-time employees. The central unit also employs support staff, which includes personnel to collate and analyse national data. A central reference mycobacterial laboratory, staffed by one or more laboratory technicians, is also part of the central unit. It supports the national smear microscopy service and provides a national mycobacterial culture and drug sensitivity testing service, principally for patients with previously treated TB. The core activities of a central unit are national planning, co-ordination of standardised anti-tuberculosis measures, training and supervision of personnel involved in TB work, coordination of health education and promotion, procurement of drugs, equipment and supplies, monitoring and evaluation.

Regional TB units are staffed by one or more officers, depending on the size of the region. Regional TB officers

Table 2 Interventions to control TB in high HIV prevalent populations*

Full implementation of the DOTS strategy	
Additional interventions beyond effective case finding and treatment	
Interventions directly against TB	Interventions against HIV (and therefore indirectly against TB)
<ul style="list-style-type: none"> • Through TB case detection and treatment <ul style="list-style-type: none"> Intensified TB case finding in high-risk groups HIV-positive VCT clients Intravenous drug users Patients with STIs PLHA support groups Home based care patients Prisoners Household contacts of TB patients • Through prevention of new TB cases <ul style="list-style-type: none"> Isoniazid preventive treatment for PLHA <ul style="list-style-type: none"> Treatment to prevent a first ever episode of TB Treatment to prevent a recurrent episode of TB 	<ul style="list-style-type: none"> • By preventing HIV transmission <ul style="list-style-type: none"> Condom promotion Treatment of STIs Voluntary counselling and HIV testing Safe injecting drug use Sexual behavioural changes Prevention of mother-to-child transmission of HIV Safe blood Universal precautions by health care workers Targeted interventions to high risk locations, e.g., brothels IEC activities Life skills Antiretroviral treatment • By increasing immune function in PLHA <ul style="list-style-type: none"> Antiretroviral treatment • By providing care for PLHA <ul style="list-style-type: none"> Treatment of HIV-related diseases (infections and tumours) Prevention of HIV-related infections Psycho-social support Palliative care Nutritional support

* Adapted from the WHO Guidelines for implementing collaborative TB and HIV programme activities.⁷

TB = tuberculosis; HIV = human immunodeficiency virus; VCT = voluntary counselling and testing; STI = sexually transmitted infection; PLHA = people living with HIV/AIDS; IEC = information, education and communication.

are usually full-time employees, and may be medical doctors, nurses or paramedical staff such as clinical officers. Their main activities are regional co-ordination, supervision, training, monitoring and evaluation.

TB activities at district level are headed by a District TB officer (DTO), who may be supported by one or more assistant DTOs depending on the size of the district and the TB burden. DTOs are often full-time employees, although if the district is small and the TB burden is light they may be part-time. DTOs may be clinically trained (i.e., medical doctors, nurses and paramedical staff), but as their role is more that of co-ordinating and administering district TB control activities a clinical background is not a prerequisite for the position. The DTO's main duties are implementation of TB control activities, supervision and training of general health workers, maintaining up to date and accurate registers, ordering supplies and collaborating with the laboratory smear microscopy service. Other essential staff needed for implementing district TB control activities are laboratory staff, trained radiography personnel and health centre level personnel who are involved in TB work in addition to general medical duties. TB services at district level are integrated within the general health services. Patient care is thus part of the responsibility of general health services. Community members may also be involved in TB control: for example, traditional healers in case finding and family members and teachers in directly observed treatment (DOT) supervision.

Additional human resources for implementing HIV-TB control strategies

As HIV-TB activities in many countries with a high dual HIV-TB burden are only beginning to be implemented, it is difficult to comment with sound evidence on the additional human resources that are needed. The gateway to any HIV-related care and support activity is counselling and HIV testing (CT) using a variety of different approaches, which may include services for: 1) those who want to know their HIV status, 2) diagnostic reasons and 3) routine prevention of HIV infection as for mother-to-child transmission prevention. An efficient, quality-assured CT service requires sufficient numbers of trained full-time counsellors, support staff and a mechanism that ensures regular supervision and evaluation. A CT unit requires one counsellor for an average of 8–10 counselling sessions per day.

HIV-infected TB patients experience a high frequency of opportunistic infections, thus burdening clinicians and nurses in hospitals and health centres with the additional tasks of diagnosing and managing these complications. Nutritional support is now considered to be a rational step towards optimising current management of patients with HIV/AIDS and TB. This means more food-related organisational logistics and personnel trained in nutrition at health facility

level. At least one nurse or nutritional assistant is required for nutrition-related activities in a TB unit catering for 30 patients.

Many countries, with support from the Global Fund against AIDS, Tuberculosis and Malaria (GFATM), will start to provide highly active antiretroviral therapy (HAART) to their HIV-infected sick population, including those with TB. The complexity of treatment means that services will, at least initially, have to be delivered from special antiretroviral (ARV) clinics. Minimum staff requirements for such a clinic in Malawi are estimated to be one clinical officer, one nurse, one drug adherence counsellor and one ward clerk equivalent, all full-time. The best ways of treating HIV-infected TB patients with HAART have yet to be worked out, but include seeing patients at different clinics for anti-tuberculosis medication and ARV drugs, or at the same site, managed by personnel trained in both TB and HIV care.

Human resource gaps: information available at a global level

There is a dearth of published information on human resources and TB control at a global level, and almost none relating to HIV-TB control. The 2003 WHO Report on Global TB Control¹ identified five primary constraints preventing WHO targets for TB control from being achieved (Table 3), of which lack of human resources was the main constraint. A recent WHO questionnaire survey in HBCs also tried to look at the quality of existing staff and identify gaps. Some general points about human resources for TB control can be made from the WHO report and the survey.

Human resource policies appear to be generally weak or absent. There is poor communication between technical disease control programmes and human resource planners in terms of the numbers of staff needed on the ground. Most countries have limited information about the number of health care workers providing TB control services at different levels of the health system. Many countries report insufficient staff at the peripheral level for current case detection levels, and several have identified a need for additional staff to achieve a case detection rate of 70%.¹

National TB Programmes (NTPs) estimate that too few staff have been trained, although there is limited information on how many have been trained or are in need of training. Links with continuing education

Table 3 The five primary constraints to reaching global targets for TB control

- 1 Lack of qualified staff
- 2 Inadequate preparation for the decentralisation of TB control activities envisaged under health sector reform
- 3 Non-compliance of the private sector with the DOTS strategy
- 4 Weak health infrastructure
- 5 Poor political commitment

TB = tuberculosis.

programmes and other in-service training programmes are inadequate.

There is poor retention of staff and sub-optimal distribution of the existing health workforce. There is little evidence-based assessment of the effect of HIV/AIDS on the health workforce, especially in the hardest hit countries in sub-Saharan Africa.

ATTEMPTS TO QUANTIFY THE HUMAN RESOURCE GAP: THE CASE OF MALAWI

Human resources for TB control activities

Malawi is one of the poorest countries in Africa, with an estimated per capita income of US\$170 in 2000. Poverty levels are high, with 65% of the population of 10.5 million defined as poor.⁸ Health expenditure is approximately \$12.4 per capita, of which government accounts for approximately \$3 and donors \$4.⁹ The rest is provided by private sources. Health facilities include central, district, mission and rural hospitals, supported by a network of health centres, clinics, maternity units and dispensaries.¹⁰

A survey was conducted in all 43 hospitals in Malawi (3 central, 22 district and 18 mission) which in 1998 registered and treated patients with TB.¹¹ As very few patients in Malawi are treated for TB in the private for-profit sector,^{12,13} an analysis of the 43 registration sites provides a comprehensive country-wide analysis. In 1998, 88 257 TB suspects contributed approximately 230 000 sputum specimens for smear microscopy, performed in 45 laboratories by 86 trained laboratory staff. Of note, nearly 40% of hospitals had only one trained laboratory staff member. There were 55 667 chest X-rays performed. All but two hospitals had X-ray facilities, and the total number of trained radiographers was 44. Of note, one third of hospitals had no trained radiographer on site. There were 23 285 patients (30% with smear-positive PTB) registered for TB treatment. Of new smear-positive PTB patients, 69% were successfully treated, 22% died and 9% had another outcome such as default, transfer out or failure.¹² To cope with this burden, there were 43 DTOs and 40 assistant DTOs, none of whom were medically qualified. One third of the DTOs were part-time employees, and 14% had received no formal training. The central unit in 1998 comprised one programme manager, one deputy manager, one technical advisor and a number of support staff. Seven regional TB officers served the three regions of the country.

All central and regional unit staff have undergone training in the management of TB at district level, and all are capable of teaching on the annual 2-week TB district management training courses for the DTOs and their assistants. This training course caters for about 25 TB officers. Every year DTOs and their assistants train peripheral health care staff in TB control in 1-day training sessions. In 1998, 2909 periph-

eral health care workers were trained in 129 zonal health centre training sessions.¹² The NTP also invests in 1-day briefing sessions for traditional healers, particularly on case finding; in 1998 approximately 1500 traditional healers were briefed about NTP activities.¹²

Relating human resources to quality of TB control is a difficult area because no formal evaluation has been carried out. However, the Malawi NTP collates data on treatment outcome of TB patients, and since the beginning of 2003 has been measuring work activities against NTP targets which are thought to reflect good performance and effort by programme staff. Regional level data (unpublished) in relation to TB burden and the number of full-time hospital TB officers and full-time regional TB officers are shown in Table 4. For patients registered in 2001, treatment outcomes were generally better from North to Central Region to South. Likewise, for the first quarter of 2003, the North achieved all four targets, the Central Region achieved three targets, and the South only one. The number of registered TB cases per annum per one full-time hospital TB officer was 155 in the North, 308 in the Central Region and 522 in the South. From these data, it might be possible to say that there should be on average one full-time hospital TB officer for 150–300 registered TB cases per year. Clearly, there should also be an increase in the number of regional TB officers serving the Southern region. On this basis, the Southern region has TB-specific human resource gaps, which translates into a poorer quality of TB control compared with the other two regions. More work in this area is definitely needed. This could also be extended to looking at the human resource needs for delivering good quality HAART.

Human resource needs for HIV-TB activities

An assessment was undertaken of HIV/AIDS and HIV-TB activities in the government and mission health sectors for the whole of Malawi for 2002.¹³ This provides some insights into the human resource needs and gaps. An estimated 900 000 people are living with HIV/AIDS,¹⁴ of whom 150 000–200 000 may be in need of care and support, including being potentially eligible for HAART.

In 2002, approximately 35 000 HIV tests were carried out in the integrated CT sites (i.e., within the health sector) for patients and individuals wanting to know their HIV status, a small number given the size of Malawi's epidemic. In 2002, 26 532 TB patients were registered for treatment, of whom 2130 (8%) were counselled and HIV tested; 77% of these were HIV-positive. In the public health sector, of 456 trained counsellors, only 38 were full-time. A detailed analysis showed that hospitals with a high annual volume of HIV testing had 1) full-time counsellors, usually lay persons, 2) counsellors who were allowed to do rapid whole blood testing and 3) a dedicated room for CT. It was clear from the situational analysis that a scaling

Table 4 Relation between TB burden, full-time TB staff and programme performance by region in Malawi

	Northern region	Central region	Southern region
TB registration facilities, <i>n</i>	11	14	19
TB programme full-time staff in 2001–2002, <i>n</i>			
Regional TB officers	2	3	3
District TB officers	16	29	29
TB cases registered in 2002, <i>n</i>	2475	8932	15 125
Some treatment outcomes for new smear +ve PTB cases registered in 2001			
Cure rate, %	69	68	67
Default rate, %	2	5	7
Transfer out, %	3	3	3
Treatment completed (with no smears done), %	1	2	3
Programme performance in first quarter of 2003			
TB cases identified as smear-positive in the laboratory registers who were started on treatment, %	94 (target >90%) Target achieved	94 (target >90%) Target achieved	87 (target >90%) Target NOT achieved
Smear-negative PTB cases with all smears examined, %	90 (target >85%) Target achieved	92 (target >85%) Target achieved	87 (target >85%) Target achieved
New smear-positive PTB cases who defaulted/transferred, completed treatment with no smears examined, %	2 (target <10%) Target achieved	9 (target <10%) Target achieved	13 (target <10%) Target NOT achieved
Patients with relapse PTB in whom sputum was sent for culture and drug sensitivity, %	75 (target >60%) Target achieved	57 (target >60%) Target NOT achieved	31 (target >60%) Target NOT achieved

TB = tuberculosis; PTB = pulmonary tuberculosis.

up of CT services for patients was urgently needed, and would require many more full-time counsellors.

Malawi has developed a 2-year national ARV scale-up plan (2004–2005), with the aim of having up to 50 sites in the country delivering HAART to about 36 000 patients within the first year. This ambitious plan is being undertaken using existing staff and a simple delivery system using the first-line ARV treatment regimen only. A more sophisticated approach, using a variety of different ARV treatment regimens in case of side effects and a package of comprehensive HIV care, will require more input, which is being provided in Thyolo district in the Southern Region of Malawi. In this district with a population of nearly 500 000 people, Médecins sans Frontières (MSF) is working closely with the District Health Management Team to provide a good quality comprehensive HIV care and support package for the district (Table 5). The input regarding additional staff is considerable: the additional annual budget for these activities, including the provision of HAART for the first 500 eligible patients a year, is about \$1.2 million. This approach is not possible on a national scale unless there is considerably more input in terms of resources and personnel.

HUMAN RESOURCES: CONSTRAINTS AND SOLUTIONS

From the foregoing discussion, it is apparent that there are deficiencies in the quantity and quality of human resources currently on the ground to cope with the burden of TB and the HIV-TB epidemic. These defi-

ciencies will be particularly noticeable if there is to be 1) a scale-up in notified cases to reach case detection rates of 70% or higher, and 2) the establishment of a comprehensive package of HIV-TB prevention and care services, including delivery of HAART. The constraints of human resources and possible solutions can be discussed under six main headings.

Human resource planning

Most countries currently have an enormous gap in knowledge of the human resource capacity needed to deliver the packages of DOTS and HIV-TB activities. With some interventions, such as the delivery of HAART, it is still not clear what minimum human resources are needed to implement such a service. This will in all probability have to be determined by adopting a philosophy of 'learn as you go'.

Potential solutions

Both Ministries of Health and technical disease control programmes need to produce realistic estimates of the human resources needed at central, regional, district and peripheral level, to deliver the essential HIV and TB services. International technical agencies, such as the WHO, should assist countries in this task. Estimates of the numbers of people required in the posts need to be shared with the training institutions so that need is matched with supply.

Production of human resources

Educational institutions (medical schools, nursing schools, schools for health sciences) produce the

Table 5 Thyolo District, Malawi: the comprehensive package of HIV/AIDS care and prevention services, and the additional staff required to manage these services (2003)

	Comments
HIV care and prevention services	
Home based care (HBC)	Over 1000 patients looked after in HBC programmes by a team of a community volunteers and nurses One volunteer takes care of 7–8 HBC patients One community nurse supervisor/trainer is required per 50 trained HBC volunteers
Community mobilisation centres	Two community mobilisation centres provide pre-school activities for 500 orphans and vocational training and income generation activities (tailoring, carpentry, etc) for 75 orphans from HIV-TB affected households Infrastructure support given for construction of centres and provision of raw materials
Counselling and HIV testing (CT)	In 2001, 97% of 1103 registered TB patients accepted CT
IEC/behaviour change interventions	Community PLHA groups involving TB patients enhance this activity and its coverage
Health centre management	Performance-related bonuses for well run health centres
Prevention of mother-to-child transmission using VCT and nevirapine for HIV-positive mothers	In 2002, 91% of 3376 new antenatal clinic attendees at the hospital accepted VCT for PMTCT interventions
Treatment of opportunistic infections	In May 2003, 81% of 274 medical in-patients with clinically suspected AIDS tested HIV-positive and were offered continuum of care support
Hospital support	Infrastructure development included construction of CT units, in-patient facilities, consultation rooms and TB offices
Nutritional support	All TB patients are offered a dry ration (corn soya blend) supplement of 1250 kcal/day during the intensive phase of anti-tuberculosis treatment and, when required, in the continuation phase
Provision of HAART	HAART offered from April 2003: in the first 6 months 220 patients started on HAART
Additional staff for HIV/AIDS activities	
Expatriate staff (3)	Two medical doctors and one laboratory assistant (temporary for training)
National staff—clinical (43)	Six clinical officers, 4 medical assistants, 17 nurses, 6 nurse counsellors, 8 community nurses, 2 laboratory technicians
National staff—non clinical (10)	Four counsellors, 4 IEC team members, 2 receptionists.

HIV = human immunodeficiency virus; AIDS = acquired immune-deficiency syndrome; IEC = Information, education and communication; PLHA = people living with HIV/AIDS; PMTCT = prevention of mother-to-child transmission of HIV; VCT = voluntary counselling and testing; HAART = highly active antiretroviral therapy.

trained personnel, who then enter the health services as trained professional staff. Many developing countries are not producing enough doctors, nurses or paramedical officers to run the basic health services, let alone serve in disease control programmes, and Ministries of Health often have no training policy. In the last 10–15 years there has been little interest from international development agencies to support tertiary level education at medical or nurse training schools; this philosophy has had a negative impact on the quality of training offered in these institutions.¹⁵ The training institutions often fail to provide quality, needs-based health professional education and training, due, in part, to a lack of information on human resource needs. Technical programmes, for example, often have strong plans with well-defined strategies but no clear picture of the human resources needed to implement those strategies. Curricula are also often designed without specific reference to national health development plans or needs for health care provision. Undergraduates frequently complete their training without any concept of or exposure to how disease control programmes truly operate.

Potential solutions

The need for health care staff on the ground has to be matched with an adequate supply from the training

institutions, and Ministries of Health need to provide explicit training policies. With regard to TB control, it is vital for programmes to decide on the tasks needed to implement the strategies, and then to calculate how much time, how many people and which mix of skills are needed to carry out those tasks. Programmes must establish formal written job descriptions and the specific skills and training base needed for their key officer/coordinator positions: i.e., programme manager, regional TB officer, DTO. For example, Malawi may decide that clinical officers are the appropriate cadre for regional TB officers and health assistants are the appropriate cadre for DTOs. A training institution may not have the capacity to specifically train DTOs, but if it trains enough health assistants, the NTP can take the responsibility for carrying out the specific TB training itself with the use of WHO training modules.

Disease control programmes need to interact with the training institutions, so that the important components of disease control are integrated into the undergraduate curricula. The WHO has produced a document with recommendations about how the principles of TB control can be incorporated into medical school curricula.¹⁶ Several medical schools have already identified the TB control knowledge gaps among their students,¹⁷ and some have also integrated NTP modules into the medical student curricula.^{18,19} Such curricula

Table 6 Interim solutions in the production of human resources

Identify non-governmental organisations (NGOs) who can work collaboratively with government health institutions and provide additional expatriate or national staff to fill senior positions
Recruit back to the service retired personnel who are still able and can fill key vacant positions
Negotiate with qualified staff in private clinics and hospitals to work part-time and help fill gaps in the public health services
Be flexible about the necessary criteria for filling much needed positions, for example, allowing lay persons to be trained as counsellors and providing them with the necessary skills to do HIV testing
Identify those components of a task that can be carried out by non-skilled staff, thereby allowing the trained staff to concentrate more on the tasks that require a skill-base; e.g., training laboratory aides to do the preparation of sputum smears, thereby allowing laboratory technicians more time to examine smears under the light microscope
Enhance the role that community-based organisations and NGOs can play in supporting the DOTS programme and the joint HIV-TB strategy at community level

HIV = human immunodeficiency virus; TB = tuberculosis.

will also have to incorporate issues related to the establishment of joint HIV-TB activities, particularly in countries with a high burden of dual infection.

If training institutions start to increase their undergraduate intake to match the needs of the health services, there will still be a considerable time gap between recruitment and needs being met, as it generally takes several years to train a professional health care worker. Interim solutions will have to be found, particularly if headway is to be made with meeting targets for TB control in 2005 (Table 6).

Reducing the technical burden of TB control as a whole would reduce the current high demand for trained staff. Sputum smear microscopy, for instance, is labour-intensive and requires trained laboratory staff for reading smears. New diagnostic tools that could simplify case finding might be helpful in reducing the workload for laboratory staff. Other technical constraints, which have an influence on human resources, include the fact that treatment delivery is still relatively complex, with multiple drugs, long duration of anti-tuberculosis treatment (6–8 months) and high required frequency of contact with health workers. Solutions related to frequency and duration of anti-tuberculosis treatment may lie in the development of new drugs or the development of new treatment methods (such as long-acting preparations). Widespread introduction of fixed-dose drug combinations²⁰ would simplify treatment delivery.

Distribution of the workforce

Poor distribution of existing staff is identified as a human resource constraint for effective NTP implementation.¹ There is often a concentration of qualified health staff in urban areas compared to rural areas. In several countries and regions, the private sector is also better staffed than the public sector due to better pay and general conditions of service.

Table 7 Possible composition of a rural posting package

Financial incentives for working in a rural area
Provision of free housing or a supplementary housing allowance
Provision of a motorcycle or a transport allowance to supervisory staff to enable easier movement outside working hours
Offers of a financial package for schooling, which might allow families posted to rural areas to keep their children in boarding school in urban areas

Potential solutions

Disease burden should be matched by the appropriate human resource capacity. It makes no sense to have two DTOs serving a district with 250 TB patients a year and the same number serving a district with 2500 per year. Nevertheless, this state of affairs often occurs on the ground. Clear recommendations need to be developed to guide programmes in matching the ratio of disease burden to programme staff. Countries that allow health assistants or medical assistants to be DTOs may find it easier to place staff in rural areas compared with countries that insist on TB officers being medical doctors, as the latter often dislike lengthy postings to rural areas.

The reasons why individuals in many settings are hesitant to take up postings in rural areas are quite understandable. Basic amenities and essential food items are often lacking, accommodation and public transport facilities are limited and opportunities for good schooling for children are not available. If people are to accept postings in rural areas and remain motivated, these difficulties need to be taken into consideration. A rural posting package could be considered (Table 7).

In many HBCs, private care providers comprise an important part of the health system. Although non-governmental organisations (NGOs) have been successfully involved in TB control, involvement of the private sector has so far been limited. Identifying private providers who genuinely wish to collaborate in the DOTS strategy should be encouraged,^{21,22} as this will help to bring more health care workers on board as well as bridging the public-private sector divide.

Motivation and staff retention

This factor is influenced by recruitment and retention strategies that take into account a number of variables including salaries, other monetary and non-monetary benefits, career development opportunities, management capacity and flexibility in working schedules. Salary levels are not the only factors that contribute to poor retention. Poor working conditions, perceived high occupational risk, high workloads leading to burn-out, lack of counselling services and support for health care personnel, lack of supervision and working in remote areas all contribute to difficulties in recruitment and retention of health care workers.

In government it is usually impossible to increase the salaries of one sector without taking into account the needs of other sectors. Government salaries of

health professionals therefore usually remain low in those resource-poor countries that may have the greatest needs. To augment their salaries through per diems, health professional staff in resource-poor countries often devote excessive time to attending workshops, some of which are unrelated to their own field of activity. Per diems are generally provided by donors, NGOs or international partners and not by the state itself. The plethora of workshops in the developing world further depletes the scarce availability of personnel who should be at their posts doing their jobs.

Potential solutions

Ways to motivate staff need to be found. The importance of leadership and good management as general measures to improve staff morale cannot be overemphasised. Performance-related bonuses for good work done might help to maintain staff in their posts. This should be based on formal evaluations done on a monthly basis, for example, to ensure that such bonuses do not end up being perceived as a right but remain performance linked. Regular supervision, monitoring and evaluation provide health professionals with a sense that their work is important and needs to be done well. Certificates or other such rewards for good work create a feeling of appreciation and worth. However, incentives will not replace an unacceptably low salary level that is insufficient to cover basic living costs. International financing institutions and health reform strategies^{23,24} in developing countries that have placed restrictions on new employment as well as a moratorium on salary adjustments despite growing deflation will have to be more flexible and integrate innovative mechanisms for salary adjustments within their financing policies. Ministries of Health also need established health service commissions to look at issues such as career progression and promotions.

Ministries of Health need to strictly regulate the number of workshops taking place, while at the same time acknowledging the need to keep existing staff up to date in their field. They also need to ensure that these workshops are genuinely necessary and that they are not being used as an alibi for providing per diems.

Quality of existing staff

Health care workers who deliver patient services often have difficulties in keeping up to date with new developments in TB control and in HIV-TB activities. This is particularly the case with the delivery of HAART, where the field is changing rapidly.

Potential solutions

NTPs need to invest in in-service training for their own programme staff, as well as for peripheral level staff engaged in diagnosis and treatment of TB. This can take the form of on-the-job training by trainers or focused national, regional and district seminars, possibly linked to an assessment system. Central and re-

gional level staff may need to learn new skills such as writing papers and reports or critical analysis techniques, or they may need to update and improve skills already acquired, such as computer word processing, advocacy or management. Overseas training, such as for a masters degree, is highly sought after by central and regional level staff, and NTPs need to persuade international development agencies, through clear training plans, to invest in supporting such training opportunities. Enrolment in a masters programme overseas needs to be explicitly linked to an obligation from the post-graduate student to return to the country of origin and a firm commitment to serve for a specified period of time in the disease control programme. A masters programme can involve a staff member being away for a period of up to 1 year; this should only be allowed if there is a replacement to ensure that programme performance is not compromised. Alternatively, the possibilities of undertaking distance-based master's courses should be examined, as this approach is less expensive and is less disruptive. Finally, access via the Internet to peer-reviewed publications is an important step in reducing the health information gap between rich and poor countries.²⁵

HIV/AIDS

The effects of the HIV/AIDS pandemic on the health work force, especially in sub-Saharan Africa, are significant and enduring. Although empirical data on the size of the problem are lacking, HIV/AIDS in sub-Saharan Africa is said to have reduced service provider numbers to below critical levels. A study in the semi-urban and rural areas of Malawi showed that hospital health care workers had a 2.0% annual death rate, similar to that seen in teachers (2.3%).²⁶ In the 2-year period from 1996 to 1997, 15 TB officers left the TB programme in Malawi: four died, three of these deaths being HIV-related.²⁷ Attrition is not only due to death. Prolonged periods of illness in staff with HIV/AIDS tend to block existing posts because of restrictive labour legislation in many countries.

Potential solutions

Setting up an occupational health service, particularly focusing on HIV prevention and care activities, would go a long way to aiding the health service to retain its staff in reasonably good health. CT services, the provision of isoniazid to HIV-positive health workers to prevent nosocomial-transmitted TB, and post HIV exposure prophylaxis could be integrated into the occupational package.²⁸⁻³⁰ These interventions, along with the potential of ARV therapy for HIV-infected staff, would be some key interventions to tackle the crippling effects of HIV/AIDS on the work force.

CONCLUSION

Translating policies, plans and strategies into implementation in any setting depends on the availability

of trained people. The global targets for TB control previously set to be achieved in 2000 had to be postponed by the WHA to 2005. It is likely that these targets will not be achieved by 2005, and that further postponement may be necessary. One of the primary constraints to reaching the set global targets has been the lack of qualified staff.

During the past 15–20 years, when policies and targets have been set, little or no emphasis has been placed on the question of human resource development, motivation, and retention within the public health services. Many financing and health reform strategies in developing countries have placed restrictions on new employment and a moratorium on financial investments for addressing pressing human resource issues. As qualified health care workers leave the public services for greener pastures elsewhere, governments and infectious disease control programme managers are left powerless to intervene. The advent of HIV has further increased the TB and HIV-TB programme burden. Its effects on service delivery through death of qualified staff, absenteeism due to repeated illness and reduced overall work capacity is seriously crippling existing services in many high HIV prevalence countries.

There has to be a shift in the human resources paradigm. We have highlighted some of the main human resource constraints facing TB and HIV-TB control and have suggested possible ways forward. International policy makers and donors will now have to make an urgent, concerted effort to bridge the current gaps by investing for real change. Otherwise, we will continue to set new dates for achieving global targets for TB control, and will simply continue to postpone them. And the sad reality is that many more people with TB and TB-HIV will continue to die unnecessarily.

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R É S U M É

Les objectifs mondiaux pour la lutte antituberculeuse (TB) ont été postposés de 2000 à 2005, mais sur la base des données actuelles, il pourrait être nécessaire de les postposer davantage. Parmi les contraintes empêchant d'atteindre ces objectifs, la principale semble être le manque de personnel adéquatement formé et qualifié. Cet article décrit : 1) les ressources et capacités humaines pour la lutte mondiale contre la tuberculose et le VIH-TB, comportant les ressources humaines pour la mise en œuvre de la stratégie DOTS, les ressources humaines complémentaires pour la réalisation des stratégies conjointes de lutte contre le VIH et la TB et ce que l'on connaît au sujet des déficiences en ressources humaines au niveau mondial ; 2) les tentatives de quantification des

déficiences en ressources humaines, en se concentrant sur un petit pays d'Afrique subsaharienne, le Malawi ; et 3) les contraintes principales concernant les ressources humaines ainsi que les solutions possibles sous six aspects principaux : la planification des ressources humaines ; l'obtention de ressources humaines ; la distribution du personnel ; la motivation et la stabilité du personnel ; la qualité du personnel existant et l'effet du VIH/SIDA. Nous recommandons une évolution urgente de la pensée concernant le paradigme des ressources humaines et nous exhortons les décideurs internationaux de stratégie ainsi que la collectivité des donateurs à concerter leurs efforts pour compenser les déficiences actuelles en investissant sur des modifications réelles.

R E S U M E N

Los objetivos mundiales de la lucha contra la tuberculosis (TB) se prorrogaron del 2000 al 2005 y los datos actuales sugieren que puede ser necesario un nuevo aplazamiento. Entre las limitaciones que interfieren con el alcance de estos objetivos, la primera parece ser la falta de personal calificado y adecuadamente adiestrado. En este artículo se plantean los aspectos generales de : 1) los recursos humanos y aptitudes necesarios para el control mundial de la TB y de la TB asociada con el virus de la inmunodeficiencia humana (VIH), entre ellos los recursos humanos para la aplicación de la estrategia DOTS, los recursos humanos adicionales para aplicar las estrategias conjuntas de control del VIH y la TB, y lo que se conoce sobre la carencia de recursos humanos al nivel mundial ; 2) los intentos para cuantificar la caren-

cia de recursos humanos, analizando el caso de un pequeño país de África subsahariana (Malawi) ; 3) las mayores limitaciones con los recursos humanos y sus posibles soluciones en seis encabezados principales : planificación de los recursos humanos, producción de recursos humanos, distribución de la fuerza de trabajo, motivación y conservación del personal, calidad del personal existente y el efecto de la pandemia VIH y sida. Se recomienda un cambio urgente en la forma de considerar el sistema de los recursos humanos y se exhorta a los encargados de definir las políticas internacionales y a la comunidad de donantes a realizar un esfuerzo concertado para colmar las carencias actuales, invirtiendo para un cambio real.