

# How health systems in sub-Saharan Africa can benefit from tuberculosis and other infectious disease programmes

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## SUMMARY

Weak and dysfunctional health systems in low-income countries, particularly in sub-Saharan Africa, are recognised as major obstacles to attaining the health-related Millennium Development Goals by 2015. Some progress is being made towards achieving the targets of Millennium Development Goal 6 for tuberculosis (TB), HIV/AIDS and malaria, with the achievements largely resulting from clearly defined strategies and intervention delivery systems combined with large amounts of external funding. This article is divided into four main sections. The first highlights the crucial elements that are needed in low-income countries in sub-Saharan Africa to deliver good quality health care through general health systems. The second discusses the main characteristics of infectious disease and TB control programmes. The third illustrates how TB control and other infectious

disease programmes can help to strengthen these components, particularly in human resources; infrastructure; procurement and distribution; monitoring, evaluation and supervision; leadership and stewardship. The fourth and final section looks at progress made to date at the international level in terms of policy and guidelines, with some specific suggestions about this might be moved forward at the national level. For TB and other infectious disease programmes to drive broad improvements in health care systems and patient care, the lessons that have been learnt must be consciously applied to the broader health system, and sufficient financial input and the engagement of all players are essential.

**KEY WORDS:** health systems; sub-Saharan Africa; TB control programmes; HIV/AIDS; primary health care

## GENERAL HEALTH SYSTEMS IN LOW-INCOME COUNTRIES

THERE IS A GENERAL CONSENSUS that health systems in many low-income countries in sub-Saharan Africa are weak and dysfunctional,<sup>1</sup> and that, unless concerted efforts are made to strengthen them, there is a strong likelihood that Africa in particular may fail to meet health-related Millennium Development Goal (MDG) targets. Moreover, the global economic downturn has exacerbated health challenges in the region and makes progress toward the MDGs even more urgent.

The crucial elements that are needed for a health system to function and deliver quality care are shown in the Table, and in sub-Saharan Africa there are major deficiencies and shortcomings in each of these areas. Sub-Saharan Africa carries 25% of the world's disease burden, yet only 1.3% of the share of the world's health workforce.<sup>2</sup> An assessment of health care worker availability against health system needs

reveals stark gaps, with an estimated 720 000 physicians and 670 000 nurses needed to bridge the void.<sup>3</sup> There are various contributory causes of the health care worker crisis in Africa, but low training capacity; lack of professional opportunities; the frustrations that arise from poor working conditions; migration out of the public sector, the health sector or out of the country; strict budgetary caps on the hiring and remuneration of civil servant employees; and attrition are the most important. HIV/AIDS and tuberculosis (TB) are the dominant causes of attrition. A formal study in Malawi in 1999 in all district and main mission hospitals found a 2% annual death rate in key health care workers, with AIDS and TB accounting for 75% or more of these deaths.<sup>4</sup>

Infrastructure in most government facilities in low-income African countries is poor. Hospital wards, outpatient clinics, health centres and health posts, along with their water and electricity supplies and sanitation, are usually in need of repair, renovation or expansion.<sup>1</sup> Pharmacies in many peripheral hospitals

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**Table** The vital elements of a health system to ensure quality care

- Adequate numbers of skilled human resources
- Good physical infrastructure
- Efficient procurement and distribution of drugs and health commodities
- Regular, reliable and timely monitoring and evaluation
- Sound financial management
- Good leadership and stewardship

and health centres are too small to store and properly manage the large quantities of drugs that are now coming into countries for the treatment of specific diseases such as malaria, TB and HIV/AIDS. Poor laboratory services are the rule across the continent.<sup>5,6</sup>

A central medical store or hospital pharmacy announcement of a penicillin stock-out comes as no surprise to anyone familiar with working in government health facilities. Procurement and distribution systems for drugs, commodities and equipment are weak, erratic and dysfunctional.<sup>7</sup> Reviews in several African countries point to frequent stock interruptions of essential drugs, with a lack of systematic monitoring of drug consumption or forecasting being one of the important contributory factors.<sup>8,9</sup> Monitoring and evaluation of service outputs and health outcomes suffer similar problems, and for most diseases and conditions, accurate data on disease burden, trends and treatment results are generally unavailable. There is also little or no capacity to track the way money is spent or to link financial inputs to health-related outputs.<sup>10</sup> Finally, the quality of leadership and stewardship varies at all levels of the health sector, from the top positions in the Ministries of Health down to officers in charge of hospitals or health centres.

### DISEASE-SPECIFIC AND TUBERCULOSIS CONTROL PROGRAMMES

Disease-specific programmes have three important components: an intervention strategy, a monitoring and evaluation system that is inextricably linked to drug procurement and distribution, and a services delivery system.<sup>11</sup> Typical examples of disease-specific programmes include: TB control through DOTS, malaria control, polio eradication, and, most recently, the '3 by 5' initiative to scale up antiretroviral therapy (ART) for patients with HIV/AIDS (placing 3 million people in developing countries on antiretroviral therapy by the end of 2005),<sup>12</sup> which has now been taken over by universal access to HIV prevention, care and treatment. Although disease-specific programmes cannot work in isolation from the rest of the health sector, they tend to be more successful because of a targeted focus, specific dedicated human resources and budget lines, and external funding. Attention is paid to all aspects of disease control, spanning the continuum from prevention to treatment and follow-up,

using standardised packages of care, structured monitoring and regular reporting.

The DOTS framework for TB control clearly illustrates the important aspects of a disease-specific programme. The original 5-point policy package, which was officially adopted in 1994 and underpins the framework, emphasises political commitment, case finding of the most infectious TB cases in the community, standardised and effective chemotherapy for those cases, uninterrupted drug supplies and a monitoring and evaluation system.<sup>13</sup> Having regular and reliable data on the number of cases diagnosed, the number cured and completing treatment and stock levels of anti-tuberculosis drugs in pharmacies allows rational drug forecasting, and a continuous supply of drugs without interruption is the norm in most well-performing programmes. A golden principle for the management of a chronic infectious disease—and this also includes the provision of ART for HIV/AIDS—is that drug stock-outs and medication interruptions must be avoided at all costs, to give the bacterium or virus the least possible chance to develop resistance to the drugs.

For a national TB control effort, typically there is central administrative responsibility and coordination of the strategy; provincial or regional supervision, monitoring and evaluation; and district-based implementation of the interventions with facility monitoring, usually through district TB officers. The identification and diagnosis of TB suspects and the delivery of DOTS interventions are situated within and delivered by the general health system.<sup>14</sup> Thus, if general health systems do not function, there are risks that disease-specific programmes will also fail to deliver.

In contrast to other health-related MDGs, there is better progress with key infectious diseases such as TB, malaria and HIV/AIDS (clustered together under MDG6) in terms of targets to be reached by 2015.<sup>15</sup> Recent data indicate that the rise in TB incidence has already been halted and is beginning to be reversed globally,<sup>16</sup> although considerable challenges still remain with reaching the Stop TB Partnership goal of reducing TB prevalence and mortality to 50% by 2015. Malaria deaths have declined in several African countries, and a few nations have managed to cut malaria deaths by half through a combination of bed net distribution, indoor spraying, better treatment access and improved disease surveillance.<sup>17</sup> Access to ART in low- and middle-income countries has increased from 400 000 in 2003 to 3 million in 2007, and in sub-Saharan Africa, an estimated 2.1 million patients were receiving ART by December 2007.<sup>18</sup> Although there are still major challenges with meeting the malaria and HIV/AIDS-related MDG targets on time, achievements have been made, and it is pertinent to ask: how can the attainment of these successes be used to strengthen general health service delivery?

## HOW CAN DISEASE-SPECIFIC PROGRAMMES STRENGTHEN GENERAL HEALTH SYSTEMS?

### *Human resources for health*

In areas of high HIV prevalence, health workers are at the same or higher risk of HIV/AIDS compared with the general population.<sup>4</sup> Ensuring that health workers have easy and prioritised access to confidential HIV testing and counselling, and are placed on ART if there are clinical and immunological indications, can save many lives, and, as has been reported from Malawi,<sup>19</sup> this can contribute to mitigating the human resource crisis.

TB is a very important occupational risk for health care workers, causing substantial morbidity and mortality, although this can be reduced by implementation of administrative and environmental measures and attention to personal protective interventions.<sup>20</sup> In particular, HIV-infected health care workers should not work in high-risk areas such as medical wards, TB wards or rooms where fiberoptic bronchoscopy or sputum induction procedures take place. TB infection control, particularly in health care settings, is high on the international agenda under the 'Three Is' (infection control, intensified case finding and isoniazid preventive therapy),<sup>21</sup> and an integral component of this are organisational activities that aim primarily to identify and strengthen national infection control co-ordinating bodies dealing with blood safety, sterilisation of instruments and safe disposal of infectious waste.

The shortage of health care workers, and the realisation that this compromises the delivery of HIV-related disease-specific interventions, has led to the important concept of task shifting, which allows less skilled workers to take on tasks previously assigned to more highly trained personnel such as nurses, clinical officers or medical doctors.<sup>22,23</sup> This concept can be broadened to include the community, where nurses and volunteers can help with early diagnosis and management of opportunistic infection, adherence counselling, defaulter tracing and family support, all of which can contribute to better HIV care and treatment outcomes.<sup>24</sup> There is consensus that task shifting for HIV services and community support should be aligned with the broader strengthening of health systems if it is to prove sustainable. Finally, the political momentum and urgency behind delivering specific disease control interventions is also creating an impetus in resource-limited settings towards addressing the core issue of poor salaries and conditions of service of health care workers, who tragically also have to cope with the highest disease burdens.

### *Infrastructure*

Renovation of out-patient clinic rooms, enlargement of pharmacies, upgrading of laboratories, and provision of microscopes, glass slides and reagents, while

procured and provided by disease-specific programmes to support the diagnosis and management of their patients, can also serve to strengthen the health services. Microscopes procured by a National TB Programme (NTP) for the screening of sputum smears can be used for other activities, such as screening malaria parasites, performing white blood cell differential counts, and examining cerebrospinal fluid, urine and stool specimens. Improving microscope quality and investing in regular maintenance, repair work and new parts benefit not only the NTP but also all the other important outputs required for a good laboratory service.<sup>25,26</sup> Other examples include the need for haemoglobin measurements in HIV-infected patients taking zidovudine-based ART regimens, as this resource is invaluable for assessment and good management of pregnant women and children, especially in malaria-endemic areas, or the provision of motor vehicles, motor bikes and bicycles for district TB supervisory work which can also be used for general supervision of health centres and health posts.

### *Procurement and distribution*

Standardised treatment for TB in well-run national programmes and, in Malawi, a standardised ART regimen with 6-monthly drug forecasting based on data on incident and prevalent cases, facility drug stock assessments and a facility-based 3-month buffer stock,<sup>27</sup> result in generally uninterrupted drug supplies. With some adaptation, similar systems can be developed to forecast, procure and distribute the drugs needed for the treatment of chronic diseases, such as diabetes mellitus, hypertension, asthma and epilepsy, which are so often not available in health facilities. Uninterrupted supplies of medications for chronic diseases would go a long way to improving health care worker and patient confidence in general health services.

### *Monitoring, evaluation and supervision*

Regular, reliable and updated data are crucial to the efficient running of any health care institution, and this has been one of the great strengths of NTPs. There are many ways in which this important component can be used to strengthen the general health systems. The use of standardised outcome definitions with quarterly cohort analysis to systematically determine cases started on treatment and cases retained on treatment can be applied to the monitoring and management of chronic diseases, which are becoming increasingly important in primary health care.<sup>15</sup> Consideration should be given to linking the management of chronic infectious and non-infectious diseases, as has happened for example with the setting up of chronic disease clinics in Cambodia that provide integrated care for HIV/AIDS, diabetes and hypertension.<sup>28</sup> Efforts to reduce mother-to-child-transmission of HIV should not be run as 'stand-alone' interventions, but rather as an integral part of an overall maternal and child

health care package. Regular, structured supervision is essential to ensure that management and facility-based monitoring systems are of good quality. Chronic care supervisory teams could work together, and in a cost-effective way provide the necessary oversight of these integrated clinics using the same personnel, vehicles, fuel and personal allowances. Obtaining accurate and regular data on health outcomes would be the first step in allowing financial inputs to be linked to health outputs.

#### *Leadership and stewardship*

The expansion of the WHO framework for TB control to some of the poorest countries of the world and the WHO '3 by 5' initiative<sup>12</sup> are examples of good international and national leadership leading to measurable improvements in TB case finding and treatment success<sup>16</sup> and access to ART in the field.<sup>18</sup> Leadership at all levels of the general health sector can learn from such examples, where a thorough understanding of the technological services, strong support for monitoring and supervision, and accountability for goals, objectives and outputs can lead to improved health outcomes. Strong leadership will be necessary to ensure that lessons learnt from TB and other infectious disease control programmes can be used and adapted to improve general health system delivery particularly related to chronic non-communicable diseases.

### **PROGRESS TO DATE AND WAYS FORWARD**

It has been argued that disease-specific programmes can be used and adapted to drive broad improvements throughout the general health system, particularly in weak areas such as human resources, laboratory infrastructure, drug forecasting, data monitoring, supervision and quality assurance.<sup>29</sup> We have outlined in the previous section how some of these components of disease-specific programmes can be used to strengthen general health systems, so the question is how to make this actually work in practice.

There has already been some conceptual and policy progress at the international level. At the beginning of this decade, the WHO Stop TB Department recognised the need for well-functioning general health systems, and pursued initiatives to contribute to integrated service delivery innovations such as the practical approach to lung health (PAL),<sup>30</sup> community engagement<sup>31</sup> and public-private mix approaches.<sup>32</sup> In 2007, the Stop TB Department became actively involved in wide-ranging discussions about how to best reach the MDGs and how to work together towards a general health system strengthening strategy and framework.<sup>33</sup> The new WHO Stop TB strategy<sup>34</sup> and the Stop TB Partnership's Global Plan to Stop TB, 2006–2015,<sup>35</sup> both demonstrate the commitment of the TB control community to contribute to stronger health systems and in this way to have a greater health

impact. Most recently a Stop TB Policy paper offers a broad framework about how NTPs can contribute to this challenging agenda and document progress and problems in the coming years.<sup>36</sup> While emphasising that NTP managers must safeguard the provision of effective TB services, the policy paper nevertheless clearly enunciates the importance of a 'health system strengthening' mind-set and lays out a set of guiding 'dos and don'ts' that promote the harmonisation of TB control planning and budgeting with sector-wide planning frameworks, optimised use of shared resources and reduction in duplicative structures.<sup>36</sup> Recognition of and funding for health system strengthening measures within the Global Fund to Fight AIDS, Tuberculosis and Malaria (the Global Fund) funding mechanism is another concrete advancement that should facilitate real progress at the country level.

Nonetheless, wide-scale implementation of these policies at national level will not be easy for various reasons. Potential for Global Fund funding aside, the fact is that most funds remain earmarked for specific disease programmes, and specific expenditure for staff, equipment, drugs, reagents and monitoring and evaluation has to be accounted for in the same way. There must therefore be a clear national strategy about how to move forward to strengthen the general health systems, with budget lines explicitly for human resource support for the health sector, general infrastructure, supervision of the whole health sector, etc. NTP managers and district health officers will need to sit together and explicitly document and budget for appropriate and relevant activities in national TB control plans and district health plans. In health facilities, there should be far better documentation of human resources and attempts made to address and monitor attrition, such as paying attention to the proportion of the health care workforce that know their HIV status, preventing those who are HIV-positive from working in high-risk areas such as medical or TB wards, monitoring the number diagnosed each year with TB and ensuring that infection control guidelines are in place and are being implemented. Attention needs to be paid to the number of microscopes that are functioning and whether they have been serviced during a specified time period; whether medications such as insulin for diabetes, phenytoin for epilepsy and bendrofluazide for hypertension are regularly in stock; and whether there are databases on incidence, burden and treatment outcomes of common diseases. The devil, as always, is in the detail, with strong commitment needed to bridge the all-too-frequent divide between policy and practice.

### **CONCLUSION**

At the turn of the century, Norway built its general public health services on the basis of successful TB control. After the Second World War, Japan rebuilt its

ravaged health system by addressing high priority diseases such as TB, while at the same time building pools of community-based health workers and volunteers.<sup>1</sup> Considerable funding is now coming to countries from the Global Fund, and, with a commitment from the Global Fund to use part of this money to strengthen health systems,<sup>29</sup> there are now real opportunities to transfer the disease-specific programme knowhow towards improved health service delivery and primary health care. The opportunity must not be lost. However, if these advances are to be realised, specific plans, activities, budget lines and efforts will be required to extend the lessons learnt from disease-specific programmes to the broader health system.

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## R É S U M É

La faiblesse et les dysfonctions des systèmes de santé dans les pays à faibles revenus, particulièrement en Afrique sub-saharienne, sont considérés comme des obstacles majeurs à la réalisation des Objectifs de Développement du Millénaire (ODM) en matière de santé d'ici 2015. On observe quelques progrès vers l'accomplissement de la Cible 6 des ODM pour la tuberculose (TB), le VIH/SIDA et la malaria, ces réalisations provenant particulièrement de stratégies clairement définies et de systèmes de distribution d'interventions combinés avec de grandes quantités de subsides externes. Cet article est divisé en quatre sections principales. La première éclaire les éléments cruciaux qui sont nécessaires dans les pays à faibles revenus en Afrique sub-saharienne pour fournir des soins de santé de bonne qualité au sein des systèmes généraux de santé. La deuxième discute les caractéristiques principales des programmes de lutte contre les maladies infectieuses et la TB. La troisième illustre com-

ment les programmes de lutte contre la TB et d'autres maladies infectieuses peuvent aider à renforcer ces composantes, particulièrement en matière de ressources humaines, d'infrastructure, de gestion et de distribution, de suivi, d'évaluation et de supervision, ainsi que de direction et d'accompagnement. La quatrième et dernière section examine les progrès réalisés à ce jour au niveau international en matière de politique et de directives et indique quelques suggestions spécifiques qui pourraient les faire progresser au niveau national. Pour que les programmes concernant la TB et d'autres maladies infectieuses puissent entraîner d'importantes améliorations dans les systèmes de soins de santé et dans les soins aux patients, les leçons apprises doivent être appliquées consciencieusement aux systèmes de santé plus larges et des apports financiers suffisants ainsi que l'implication de tous les participants sont essentiels.

## R E S U M E N

Se acepta que entre los principales obstáculos al cumplimiento de los Objetivos de Desarrollo del Milenio (ODM) para el 2015 están la falta de solidez y el mal funcionamiento de los sistemas de salud en países de bajos ingresos, en particular en África subsahariana. Se han logrado algunos avances hacia la meta seis con respecto a la tuberculosis (TB), la infección por el virus de la inmunodeficiencia humana, el sida y la malaria. Estos progresos son el producto de estrategias y sistemas de aplicación de intervenciones claramente definidos, aunados a financiamientos importantes provenientes del extranjero. Este artículo se divide en cuatro secciones principales. La primera destaca los elementos primordiales que se requieren en los países de bajos ingresos de África subsahariana a fin de prestar una atención de salud de buena calidad por conducto de los sistemas generales de salud. En la segunda, se analizan las principales características de los programas de control de las enferme-

dades transmisibles y de la TB. En la tercera parte se expone la forma como estos programas dirigidos a enfermedades específicas pueden fortalecer los sistemas generales de salud, en especial los componentes de recursos humanos, infraestructura, adquisiciones y distribución, seguimiento, evaluación y supervisión, liderazgo e intendencia. La cuarta y última sección analiza los progresos alcanzados hasta la fecha a escala internacional, en materia de políticas y recomendaciones, con algunas indicaciones específicas sobre la forma de continuar avanzando a escala nacional. A fin de que los programas contra la TB y otras enfermedades específicas impulsen amplias mejoras en los sistemas de atención de salud y cuidado de los pacientes, las enseñanzas extraídas se deben aplicar en forma deliberada al más amplio sistema general de salud y se precisan además aportes económicos suficientes y un compromiso de todos los actores del sistema.