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Neglected tropical disease (NTD) control in health systems: The interface between programmes and general health services

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ABSTRACT

Disease control programmes are an intrinsic part of health systems. Neglected tropical disease (NTD) control is a clear case in point. While there is a growing consensus that NTD control and health services are linked, with important mutual impacts, little is known of what actually happens at the interface between the two entities.

Here, we review the rationale, viewpoints and experiences of NTD control programmes regarding general health services, and vice versa, and compare their respective arguments. We discuss the interactions and interface between disease control and health systems, and present possible scenarios for health system strengthening by NTD- and other disease-specific programmes. Focusing on countries in sub-Saharan Africa, we suggest a number of principles that could pave the way for fruitful discussions and development of synergies.

1. Introduction

In the past years, neglected tropical diseases (NTDs) have been put high on the international agenda. The term 'neglected tropical disease' has become a common concept, next to the 'big three diseases' HIV/AIDS, tuberculosis and malaria. Both cost-effectiveness and the role in poverty reduction have been used in advocacy for funding (Hotez et al., 2009). New alliances and initiatives have been formed and extra resources have become available for NTD research and control.

Within the control of NTDs, 'preventive chemotherapy' is now one of the main strategies, whereby a range of (mostly helminth) diseases is tackled simultaneously by combined mass drug administration (MDA) with the aim of reducing current infection and preventing the development of severe disease (WHO, 2006c; Hotez et al., 2007).

While focusing on MDA, global NTD initiatives have largely ignored other manifestations of neglect, such as the social determinants and the (often weak) health systems (Spiegel et al., 2010). Nevertheless, there is a growing consensus that effective and sustainable NTD control requires well functioning health systems (Utzinger et al., 2009; Gyapong et al., 2010) and that weak health systems generally prevent progress in meeting disease-specific targets (Bellagio Study Group on Child Survival, 2003; Moerman et al., 2003; Travis et al., 2004; Koblinsky et al., 2006; Harries et al., 2009). Moreover, there are recent concerns that, like other global health initiatives (GHIs) addressing single disease issues (WHO Maximizing Positive Synergies Collaborative Group, 2009), mass campaigns may undermine health systems that are already fragile in countries with few resources (Singh, 2006). They may also draw attention and resources away from complementary strategies needed to sustainably reduce disease burden, such as health system strengthening and socio-environmental measures (Utzinger et al., 2009; Spiegel et al., 2010).

While the link between NTD control and health services is generally acknowledged, evidence for (positive or negative) interactions has so far been mainly based on opinions. Little is known of what actually happens at the interface between NTD control programmes and general health systems, let alone that we would know how to create synergies between the two.

The aim of this paper was to examine the interface between current drug-based NTD control programmes and general health services, as well as the interactions of both entities with the community – their joint target population. We discuss the rationale, viewpoints and experiences of NTD control programmes regarding general health services, and vice versa, and confront their respective arguments. We reason that both use a strong internally coherent approach hindering constructive discussions towards complementarity. Yet, one cannot do without the other, and improvements in health call for both approaches. Focusing on countries in sub-Saharan Africa, we suggest a number of principles that could pave the way for fruitful synergies.

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2. Current NTD control initiatives and their perspective on health systems

2.1. The history and rationale of current NTD control programmes

The landscape of NTD control has changed over the past 5–10 years, starting with the 54th World Health Assembly (WHA) resolution, urging member states to attain, by 2010, a minimum target of regularly administering anthelminthic drugs to at least 75% of all school-aged children at risk of morbidity. During a WHO expert meeting in 2001, the global strategy for the prevention and control of schistosomiasis and soil-transmitted helminthiases was refined (Savioli et al., 2009). Thanks to a grant from the Bill & Melinda Gates Foundation, the Schistosomiasis Control Initiative (SCI) was launched in 2003, aiming at the concurrent control of schistosomiasis and soil-transmitted helminthiases (Fenwick et al., 2009). The central feature of control was large-scale administration of anthelminthic drugs to at-risk populations (i.e. school-aged children) without prior diagnosis, to prevent the development of (severe) morbidity by reducing infection levels, the so-called 'preventive chemotherapy' (WHO, 2002).

In 2005, the term 'neglected tropical diseases' was introduced to refer to diseases that affect the poorest populations in low-income countries and receive little or no advocacy or funding (Molyneux et al., 2005). An initial inventory listed 13 NTDs, of which seven were helminth infections (Hotez et al., 2006). In 2006, the Global Network for Neglected Tropical Disease was launched as a first-ever global effort to combat NTDs in an integrated framework (GNNTD, 2010), followed by the U.S. Government's Neglected Tropical Diseases Initiative in 2008 (The NTD Initiative, 2010) and other global initiatives. The emphasis of current global NTD control strategies is on MDA. They address the seven most prevalent NTDs (ascariasis, trichuriasis, hookworm infection, schistosomiasis, lymphatic filariasis, trachoma, and onchocerciasis) with a set of 4 drugs (ivermectin or diethylcarbamazine, praziquantel, albendazole or mebendazole, and azithromycin), using a 'rapid impact' package of integrated drug delivery according to guidelines put forth by the World Health Organization (WHO, 2006c). This strategy is often referred to as 'integrated NTD control', whereby 'integrated' refers to the simultaneous control of several neglected diseases by combined MDA (see Table 2 – definition A), as opposed to the previously separate control programmes for each specific disease (WHO, 2006c; Grépin and Reich, 2008; Utzinger et al., 2009). Since 2007, these integrated control programmes have been introduced in various countries in sub-Saharan Africa, with Mali, Uganda, Ghana, Niger and Burkina Faso being the first, followed by, and still expanding to other countries (e.g. Kolaczinski et al., 2007; Fenwick et al., 2009; Rumunu et al., 2009).

While these programmes are still running, the case has been made for expanding the WHO list of NTDs, which is currently focusing on 17 neglected tropical diseases, and still not exhaustive (WHO, 2006a, 2010; Hotez et al., 2007; Hotez and Pecoul, 2010). Also, initiatives have been taken for a further integration with other drug-delivery programmes, and even to link with those against AIDS, malaria, and tuberculosis (Blackburn et al., 2006; Hotez et al., 2006). Moreover, NTD control programmes are now operational in other countries beyond sub-Saharan Africa, while further extensions are planned (e.g. Hotez et al., 2008; Bitran et al., 2009; Narain et al., 2010; Hotez and Ehrenberg, 2010; WHO, 2010). Here, we will focus on neglected tropical helminth diseases in sub-Saharan Africa and the current control strategy as described above.

Several arguments are at the basis of the current integrated MDA approach to control NTDs. First, there is extensive geographical overlap and co-endemicity among these diseases, and multiple NTDs occur in the same individuals and communities. Moreover, they all share a similar strategy ('preventive chemotherapy'), with overlapping risk groups (e.g. children) and similar (existing) or compatible delivery channels to reach these (e.g. use of community volunteers). For each of these NTDs, effective, safe and inexpensive drugs, often donated by the main pharmaceutical companies, are available, which target multiple neglected pathogens concurrently (Brady et al., 2006; Hotez et al., 2006; Lammie et al., 2006). Last but not least, the intervention is simple and requires a minimal infrastructure: there is no need for individual diagnosis and drugs can be safely and effectively distributed, even by non-medically trained personnel after instruction (Albonico et al., 2006; WHO, 2006c). This means that preventive chemotherapy for NTDs is feasible at peripheral level without depending too much on the (often weak) general health services (Hotez et al., 2009). Currently, schools are considered to be a convenient and appropriate venue for administering deworming medication to children (Albonico et al., 2006). The successful example of community-directed drug treatment with ivermectine for onchocerciasis has been expanded to deliver additional NTD drugs (Hotez et al., 2009). Community involvement is believed to assure both good treatment acceptability (Albonico et al., 2006) and high coverage of the MDA campaigns (Amazigo et al., 2002; Hotez and Pecoul, 2010). Gabrielli et al. (2006) for instance found that adding a community-based campaign to a school-based distribution scheme can lead to high coverage rates where school enrolment is low.

The strategy of integrated control–targeting multiple NTDs simultaneously through MDA at the community level – thus offers opportunities for enhanced cost-effectiveness and feasibility in low-resource settings. These logistical and economic arguments, together with success stories on the control and elimination of drug-based programmes for individual NTDs and the anticipated effect on poverty reduction (e.g. Diawara et al., 2009; Hotez et al., 2009) have proven to be an excellent advocacy tool for resource mobilisation, and laid the foundation of the current integrated NTD control initiatives.

So far, most literature on the integrated control of NTDs has been on the concept of the integrated approach and potential benefits, represented by an impressive series of policy papers by Hotez, Molyneux, Fenwick and colleagues. A few years after the implementation of integrated programmes in various countries in sub-Saharan Africa, results are now slowly coming in, mostly on treatment coverage and disease prevalence (e.g. Garba et al., 2006; Fenwick et al., 2009). Several country experiences have been documented, for instance from Burkina Faso, Nigeria, Uganda, Southern Sudan, Tanzania and Mozambique (Gabrielli et al., 2006; Richards et al., 2006; Kolaczinski et al., 2007, 2010; Kabatereine et al., 2010). Successes have been reported, but also new challenges have arisen, including those concerning health system interactions, which will be discussed later.

2.2. The perspective of current NTD control on health services and systems

To our knowledge, current NTD control initiatives do not explicitly mention in their programmes or mission statements specific ideas or objectives with respect to the position and role of health services. Nevertheless, their general point of view on health systems may be derived from the present literature on NTD control and from the way the NTD programmes are organised.

A first view is that health services are weak, suffering from staff shortages, inadequate infrastructure and limited resources, and as a result are underutilised. It is reasoned that NTDs affect the poor-

Table 1
Comparison of the main elements underlying the disease control and the health systems perspective.

	Disease control programmes	Health care systems
Objective	Reduction of burden of disease	Contribute to physical, mental and social well-being
Analysis of health problem	Focus on the presence of a disease in a population	Focus on suffering people
Decision-making criteria	Evidence of burden of disease and cost-effectiveness	Technical, social and political criteria
Strategic approach to implementation	Preference for short term actions based on technical solutions and aiming at rapid results	A long-term, iterative approach that aims at protecting people and responding to needs
Concept of 'community'	Intervention target, beneficiaries	Beneficiaries as well as the drivers to which health services are accountable
Concept of 'participation'	Target oriented: Instrumental to attaining goals	Empowering

Source: Adapted from Criel et al. (2004).

est communities, which are served by the weakest health systems (Baker et al., 2010). The response of the current NTD control programmes has been to operate in a relatively autonomous way from the formal health system. NTD control activities require only infrequent (once or twice yearly) contact with health providers and much of the delivery can actually be carried out by non-medical staff. NTD programmes rely therefore mostly upon existing community resources such as schoolteachers or community health workers. In other words, citing Utzinger et al. (2009), the "*justification for such a mass campaign is encapsulated in the following statement: 'need for parallel delivery systems because of health system failure*'."

A second view deals with health systems strengthening. NTD control programmes consider that they strengthen health systems by improving efficiency, with special focus on functions essential for implementation of their own programmes. Hotez and Pecoul (2010) put forward that bundling of activities and programmes reduces costs and the strain on otherwise overburdened health systems. It is also argued that improved coordination and collaboration with better resourced programmes, such as HIV/AIDS, tuberculosis and malaria programmes, would lead to higher efficiency (Gyapong et al., 2010). Also community-based distribution of NTD drugs is presented as an example of health system strengthening, because it contributes to the health system's delivery capacity for prevention and allows for better treatment coverage. Furthermore, NTD control programmes are believed to strengthen monitoring, surveillance and evaluation systems as well as laboratory capacity (Hotez et al., 2007; Molyneux, 2008).

In addition, Gyapong et al. (2010) argue that NTD control programmes can actually strengthen the community participation axis of the health system, by providing community-level health interventions in countries where the general health services do not reach the community. This involvement of the community is in the first place instrumental to reach a high coverage. Indeed, in a 'manifesto' for advancing the control and eventual elimination of NTDs, Hotez and Pecoul (2010) state that nothing is more important to the success of global NTD control than the involvement of communities themselves: community-based drug distributions account for much of the high-level coverage for onchocerciasis and lymphatic filariasis, and are vital for ensuring that in the near future treatment coverage for soil-transmitted helminthiases, schistosomiasis, and other NTDs reaches similar levels.

A third view concerns the role of health system actors in NTD control programmes. While NTD programmes tend to be organised as parallel autonomous systems, some do acknowledge the support that general health services can offer in terms of supervision, training and monitoring (Gyapong et al., 2010). Hotez and Pecoul (2010) mentioned that effective NTD control requires strong leadership of the Ministry of Health to ensure better coordination of vertical programmes.

3. Health systems and their perspective on disease control programmes

3.1. The history and rationale of health systems and health service delivery systems

WHO defines a health system as "*all organizations, people and actions whose primary intent is to promote, restore or maintain health*" and defines health as physical, mental and social well-being rather than the absence of disease (WHO, 2007).

The goals of a health system are to improve health and health equity in ways that are responsive, financially fair and that make the best, or most efficient, use of available resources (WHO, 2000). The principles underlying this view have their origins in the 1978 Alma Ata Declaration on Primary Health Care (PHC) (WHO, 1978). These were recently updated and revived by the World Health Report 2008 – "Primary Health Care now more than ever" (WHO, 2008).

Health systems based on the principles of PHC rely on three pillars: (i) an integrated health service delivery system; (ii) active community participation; and (iii) actions addressing broader social determinants of health (Segall, 2003). Here, we focus primarily on interactions between health service delivery and disease control programmes (first pillar), but we will also briefly describe the two other pillars, as they influence the way service delivery is envisioned.

Views on community participation (second pillar) distinguish target-oriented and empowerment approaches (Rifkin, 1996). In a target-oriented approach, participation is considered as a way to mobilise community resources to support health services and health interventions chosen by experts. In an empowerment approach, participation aims at enabling local people to take power over decisions affecting their lives and their health through bottom-up processes (Perez et al., 2009).

In practice, these approaches are not necessarily incompatible, but the emphasis is different (see Table 1). In target-oriented approaches, people are recipients or 'beneficiaries' of preventive and curative activities, while the empowerment approach emphasises the active role of communities and individuals in deciding over their well-being and caring for their health. In the latter view, health service providers are in the first place accountable to the community (Rifkin, 1996; Perez et al., 2009). PHC based health systems tend to move from target-oriented to empowerment approaches. An implication is that priority setting is not only based on evidence of technical effectiveness and efficiency, but also on patients' and communities' preferences and thus on social and political choices.

Efforts to influence social determinants of health (third pillar) are another essential component of PHC-based health systems (CSDH, 2008). The understanding of links between non-medical interventions and improvements in health goes back to the 19th century and is based on strong empirical evidence (Rasanathan et al., 2010). The poorest people in society are most at risk of

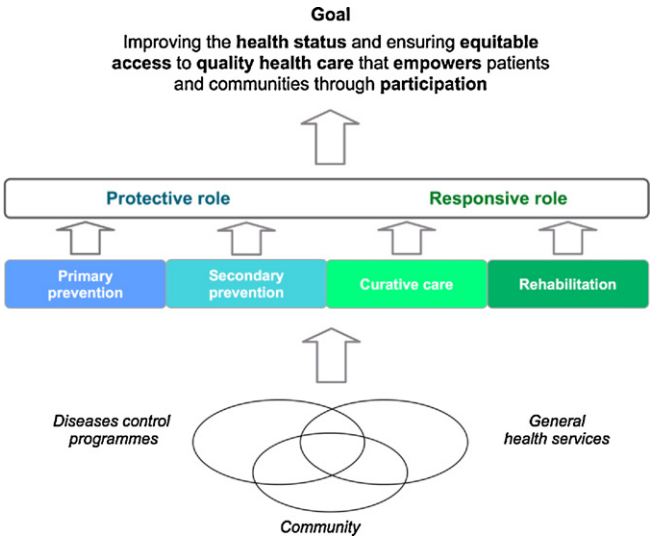

Fig. 1. The health service delivery system: goals, roles, types of care and providers.

suffering from poor health; it also means little control over life circumstances and social exclusion (Marmot, 2006). Even in the absence of material poverty, those higher in the social hierarchy tend to have better health than those in lower social positions (CSDH, 2008). Working on social determinants thus contributes to attaining equity.

This paper is mostly concerned with the first pillar – integrated health service delivery – that aims at improving health status through health care. It aims at equitable access to quality care that empowers patients and communities through participation. Its two main roles are to protect the population and to respond to its demands and needs. It does so by organising the provision of care that ranges from primary and secondary prevention to curative care and rehabilitation. In practice, this range is rather a continuum of care (Coulibaly et al., 2008), which is provided by multiple actors, including the general health services (first-line health centres, family practitioners, hospitals), disease control programmes and the community (see Fig. 1). This relationship between public health functions and individual patient care is one of the defining characteristics of the primary health care approach (WHO, 2003).

In practice, many disease control programmes contribute mainly to prevention, such as the onchocerciasis control programme. Others are predominantly based on case finding and treatment of infected people (e.g. tuberculosis, Chagas' disease, human trypanosomiasis). A number of programmes combine prevention, promotion, curative care and rehabilitation: for instance, the Surgery, Antibiotics, Facial cleanliness, and Environmental improvement (SAFE) strategy with 4 components for trachoma control (http://www.cartercenter.org/health/trachoma/safe.html; WHO, 2006d). Its surgery component contributes to curative care for affected patients and to prevention of blindness. Administering antibiotics is a curative care element, which also may reduce transmission in the community. Facial cleanliness measures and environmental improvements are primary preventive measures.

Integration of the various care and service providers is important from an efficiency point of view (Table 2 – definition C). The provision of integrated *care* – i.e. provision of curative and preventive care at first line (Table 2 – definition B) – is desirable for its effect on effectiveness. First-line health services are for many people the first entry point into the health care system. By providing accessible curative care that responds directly to people's "felt needs", they may gradually build trust relations with the community. Trust is not only an important outcome *per se* (Gilson, 2003), but it is also assumed that prevention activities, which by their nature do not all spontaneously respond to felt needs, will be better accepted if proposed by trustworthy and responsive care providers. Besides, such curative services provide the "reservoir" of patients for case finding of various diseases (e.g. malaria or tuberculosis (Unger et al., 2006)), as well as opportunities for personalised health education. Health promotion and disease prevention activities are expected to be more effective if carried out at first line level in an integrated way rather than organised as parallel activities (Starfield et al., 2005).

Table 2
Meanings of integration.

A. From a **disease control perspective**, "integration" often refers to combining different programmes leading to bundling different activities (integrated NTD control; Integrated Management of Child Illness; integration of HIV/AIDS and reproductive health activities, etc.)

The **health systems community** usually has other views on "integration":

B. *Integrated care* means that individuals and communities get curative, preventive and health promotion services from a single multipurpose operational unit – usually a health centre. It is also sometimes referred to as comprehensive care.

C. An *integrated health service delivery system* is a system in which all elements (first line health services, referral hospital, etc.) aim at a common objective and are organised and coordinated to be complementary.

D. *Integration of health activities of a given disease programme in the general health services* means that these programme activities are carried out by staff from general services, whereby the disease programme provides the required resources to the general health services.

Source: Adapted from Criel et al. (2004) and Utzinger et al. (2009).

In practice, models for integrated health care organisation have been implemented to a varying degree. In general, the performance of health systems of many low- and middle-income countries (LMICs) is still poor (Reich et al., 2008). Governance problems, chronic under funding and problems within the health workforce are major reasons for this low performance. Health workers have been neglected until the end of the 20th century (Narabsimhan et al., 2004), contributing not only to widespread demotivation and understaffed rural facilities, but also to inadequate management capacity at all levels of the health system. As a result, all 3 pillars of the health system are underdeveloped or weakened in many LMICs. This currently widely accepted diagnosis of weak health systems lies at the basis of the recent call for health systems strengthening (WHO, 2008).

3.2. The health systems perspective on disease control programmes

A disease control programme is defined as a set of activities aimed at controlling or eliminating a specific disease, in contrast to the aim of a health system, which is contributing to the general well-being of the population. Despite of different objectives, disease control programmes are important for health service managers: they provide know-how, resources and guidelines to control one or more diseases and can contribute to both the protective and the responsive role of a health system.

From a health systems perspective, a key issue is that disease control programmes fit in with the general service delivery systems. This is usually referred to as integration (Table 2 – definition D). Disease control programmes can be integrated to different degrees (Atun et al., 2010). Full integration implies decentralisation of both operational (or functional) and administrative (or structural) responsibilities (Mercenier, 1983; Mills, 1983; De Brouwere and Pangu, 1989; Feenstra, 1993; Criel et al., 1997). This means (i) that local services and care providers operationally implement disease control activities during routine activities at service level or during outreach activities, together with activities from other programmes and/or across diseases; and (ii) that local planning, organisation and management of disease control activities designed at central level is delegated to local service managers

(often the district management team). This will ensure an optimal balance between different programmes and secure smooth functioning of general health services. Examples of fully integrated programmes are nowadays routine immunisation and, in many countries, tuberculosis control or leprosy control (Pandey et al., 2006). Prerequisites for successful integration are well functioning services and skilled district managers: only robust health systems are likely to implement effectively additional control programmes without reducing their overall performance. Full integration may also imply that some programmes are implemented more slowly than others, according to local context and local priority settings.

The opposite configuration of full integration is a non-integrated vertical programme, whereby the management and operational activities are organised separately from the general health services. In this case, some or all the activities that make up the programme are provided through a structure that is parallel to the general health services. Such organisation of disease control is usually indicated in specific situations: (i) for rare problems that require specialised expertise (e.g. screening for sleeping sickness); (ii) when specific groups are targeted (e.g. commercial sex workers); (iii) for vector control and environmental activities (e.g. spraying of houses with residual insecticides); or (iv) when disease control activities are expected to strain existing services (Criel et al., 1997). The national trypanosomiasis control programme in affected countries is a typical example. The relatively low prevalence of the disease does not allow health staff at peripheral health facilities to invest in maintaining good clinical skills for diagnosis and treatment. Instead, a central programme deploys mobile teams with expert staff to screen the population at village level in outreach clinics. Patients are tested and referred to the general health services when needed.

A third configuration is the operationally integrated programme: its activities are planned and managed by central programme managers, but carried out by general health services (Unger et al., 2003). The current NTD control programmes are examples of this type of integration. They are managed at central level by a specific programme coordination team, but the distribution of the drugs, and training and supervision of the community health workers who actually administer the drugs to the population is carried out by staff of the general health services. Such configuration may have negative effects on the general service delivery. Mobilising staff for centrally planned disease specific activities may interfere with locally defined priorities and divert the general services from its responsive role. These side effects are compounded by the fact that, in practice, multiple programmes compete for attention of the managers and staff of the general health services. In the Democratic Republic of the Congo, for example, there are presently more than 50 national disease control programmes, all interacting with the district level for implementation of their activities. Nevertheless, donors prefer this configuration: control and monitoring is facilitated through standard implementation of activities, while the use of existing infrastructure and staff provides substantial savings (Unger et al., 2003).

4. What do we know about the interface?

So far, the interface between the current integrated NTD control programmes and general health services has not been studied systematically. In this section, we will therefore look into past and current experience with other mass campaigns as well as other disease control modalities to explore these interactions.

Mass campaigns have been used in the past to attempt to eliminate or eradicate single NTDs such as onchocerciasis (Molyneux et al., 2005) and lymphatic filariasis (Esterre et al., 2005), as well as other communicable diseases like malaria (Talisuna et al., 2004) and human African trypanosomiasis (Van Hoof et al., 1946; De Scheitz and Van Hoye, 1953; Burke, 1971). In these cases, the impact of mass campaigns on general health services was not evaluated. There is only one report, by Baker et al. (2007), who evaluated the process and impact of an elimination programme for lymphatic filariasis on health care delivery and vice versa, after the actual integration of this programme into PHC at clinic level in the Dominican Republic. Benefits for the lymphatic filariasis control programme included an increase in drug coverage; benefits for the general health services included improved information systems and strengthened relationships between the health services and the community.

Among other programmes using mass campaigns, only a few studies on polio eradication examined the effects on health service delivery, again showing a mix of positive and negative effects. Positive effects included higher coverage of vitamin A supplementation delivered through the polio campaigns, and improved coordination among enterovirus laboratories worldwide. Other positive effects were improved health systems management capacity and social mobilisation, but these effects were highly context-related and are not generalizable as such (Loevinsohn et al., 2002). Among the negative effects, (severe) disruptions in the delivery of other services were reported (Loevinsohn et al., 2002). Mogedal and Stenson (2000) found that staff preferred to work for the polio eradication campaign because of the higher per diem rates and extra funding, and that they spent yearly about 5% of their working time on polio eradication. While this might appear minor when compared with the benefits, it should be realised that the general health services have to absorb not only one, but multiple programme activities like immunisation days, NTD campaigns, vitamin A supplementation, impregnated bed net distribution, etc. In Cambodia for example, Men et al. (2005) found that campaigns focusing on HIV/AIDS, malaria, tuberculosis and birth spacing undermined the health service routine activities, including a considerable decrease in performance of the routine immunisation programme. Coulibaly et al. (2008) calculated that first-line staff from a rural district in Mali spent about one third of their yearly working days on disease-specific programme training or on mass campaign activities, including for NTDs. Even when not directly involved in drug distribution, staff was extensively mobilised for training, supervision, monitoring and evaluation activities, implying increased or displaced workload.

We found no thorough studies addressing the impact of mass campaigns on other pillars of the health system, i.e. community participation or social determinants of health. In a study on acceptability of mass treatment for schistosomiasis and soil-transmitted helminths in Uganda, Parker et al. (2008) found that lay people were increasingly resisting top-down implementation processes. They argue that social, economic and political aspects of mass distribution need to be reconsidered, and emphasise that populations affected by NTDs are themselves neglected. Other authors also suggest that top-down approaches characteristic of mass campaigns treat communities as passive message receptors and executors, thereby hampering an empowerment approach to community participation (Rifkin, 1996).

Observers of the emergence of GHIs over the past decade have highlighted the paucity of empirical research assessing effects of disease control campaigns on health systems and service delivery (Mills, 2005; Travis et al., 2004). The WHO Maximising Positive Synergies Collaborative Group (2009) made a detailed compilation of published and emerging evidence on interactions between GHIs and country health systems. Most available information deals with the largest GHIs addressing HIV/AIDS, malaria, tuberculosis and immunisation. The effects of GHIs on health systems appear to be mixed. Positive effects of GHIs include increased financing, free services for targeted interventions, in service training for targeted

services, improved health information related to the coverage of targeted services, and improved availability and quality of intervention related drugs and commodities. Negative effects include inadequate alignment of disease specific financing with national priorities, increased burden for the existing workforce, some attrition of the workforce from the public sector to non state sector projects, the establishment of parallel information systems, and duplication of country supply chains. Access to targeted services usually improves, but non-targeted, routine services seem to benefit from GHIs only when specifically planned or if the health system is sufficiently strong. The report, however, underlines the lack of strong evidence on interactions between GHIs and health systems.

In summary, NTD campaigns have the potential to enhance some elements of the general health services, such as the health information system, the drug procurement system, the health workforce (in terms of technical competence) and the community volunteers. On the other hand, NTD campaigns are at risk of inducing negative effects on health systems. Based on the frame proposed by Travis et al. (2004), these can be categorised as duplications, distortions and interruptions. Duplications result from parallel systems of information, procurement or accountability. Distortions are caused by imbalances in resource allocation (such as differences in salary, per diems and other non-financial incentives) with consequences for the provision of responsive health services. Interruptions result from displacement of routine services due to the demand of specific programme activities such as training, fieldwork, administration and accounting.

As mentioned previously, there is a lack of studies on the interface between current integrated NTD control programmes and general health services. Many of the issues raised above are not specific for NTD campaigns, but could be applied to disease control campaigns or GHIs in general. Yet, this does not take away from the fact that they also apply to NTD programmes, and that these programmes are as such a clear case in point. NTD mass campaigns are currently high on the agenda in many countries, and the number of countries, NTDs, and other programmes involved, is ever growing. Further research is therefore timely and needed to go beyond opinion-based discussions on effects of NTD campaigns on health systems and health care delivery. In particular, the opportunity costs of NTD mass campaigns for the delivery of general health services need to be assessed (WHO Maximizing Positive Synergies Collaborative Group, 2009).

5. The way forward: finding the right balance

The Millennium Development Goals (MDGs) and the wave of GHIs have focused most of the global health attention on disease control, but there is now a wide acknowledgement that attaining the MDGs requires strong health systems. Similarly, weak health systems may keep NTD control programmes from attaining their goals and prevent progress in meeting disease-specific targets. This realisation has resulted in the call for health systems strengthening and in GHIs taking up this role (WHO Maximising Positive Synergies Collaborative Group, 2009).

In the above sections, we showed how both the NTD control and the health system community have built up a rationale of how disease control programmes and general health services should be organised and managed (see Table 1). We also discussed the interactions and interface between both entities, which are actually central in the current health systems strengthening debate. The WHO states that "*in no circumstances may any intervention undermine or jeopardize progress towards the long-term goal of an effective, inclusive health system of good quality for all*" (Daumerie and Kindhauser, 2006).

Yet, many health system strengthening approaches currently used by NTD control and other GHIs are selective in nature (Marchal et al., 2009) and the control strategies they favour may, unintentionally, erode the capacity of health systems to respond to general health needs (Oliveira-Cruz et al., 2004; Travis et al., 2004; Shiffman, 2008; WHO, 2009).

To find out what can be done to better coordinate the actors working at the interface between general health services and disease control programmes and to avoid negative effects, a first step is to move beyond framing the discussion in opposing terms (Criel et al., 2004; Mills, 2005; Uplekar and Raviglione, 2007; Reich et al., 2008). Starting from the goals and core responsibilities of health systems, we propose a number of principles that may help in bridging the gap between the two communities while recognising the essential role each is playing.

5.1. Understanding goals, functions and activities within health systems

An effective health system implies that both disease-specific health outcomes and global health status improvement are pursued simultaneously. Such a health system plays two roles at the same time: a protective and a responsive role (see Fig. 1). This means that a wide set of activities needs to be organised, ranging from focused activities (e.g. chlorination of water or tetanus vaccination) to general services (e.g. surgery at the district level).

In practice, these activities are grouped into packages and organised through different delivery platforms. Tetanus vaccination of neonates is part of the immunisation programme, which itself is meshed into the policies for care for children under the age of 5 years. Providing surgical care is part of the package of services of hospitals, which are usually planned at the national level of the health system and part of the national policy on hospitals.

From an organisational point of view, the delivery platforms can be categorised in three main types: parallel programmes, integrated programmes and general care. The latter two are provided by general health services like health districts or hospitals, as these are multipurpose in scope, closer to those in need, and offer permanent services.

Parallel programmes are – by their nature-organised as autonomous entities, although in reality, they always interact somehow with general health services. MDA for helminth diseases through schoolteachers, for instance, may require supervision by general health service staff, drug storage by the district pharmacy and monitoring by the routine health information system staff.

This interface between parallel programmes and general health services can easily become a zone of conflict, due to competition for resources; the scarcer the resources (e.g. competent staff), the more intense the competition, not only between general health services and programmes, but also between programmes. Priority-setting then becomes quite important. However, little is known on the actual perceptions of policymakers, programme managers or health service staff regarding programme-health services interrelationships and on the actual decision-making processes. Furthermore, since the desired balance between the protective and responsive role should be a societal decision, such processes ideally also involve representatives of all layers of society.

5.2. How can health systems be strengthened by disease-specific programmes?

Funding for NTD initiatives and other GHIs can be allocated to two broad categories of activities: (i) direct focused action, in line with the GHI's specific aim and often resulting in quick wins; and (ii) building overall health system capacity. As mentioned above, many GHIs would now like to move from selective to comprehen-

sive health system strengthening. We argue that there are three 'positive' scenarios to do so.

5.2.1. The 'do no harm' scenario

The 'do no harm' scenario asks disease control programmes to anticipate potential negative effects of their direct focused action and to minimise harm for general health services. They should especially take into account that they are one of the many similar focused programmes within a health system. This 'do no harm' can also be called 'avoiding the zero sum game', the latter implying that a 'gain' on one side implies a 'loss' at the other. Both short- and long-term effects need to be considered.

Disease control programmes are part of a complex health system (De Savigny and Adam, 2009), the components of which they influence directly or indirectly. This calls for a systematic *impact* assessment of the disease control programme in terms of (i) alignment with local priorities (OECD, 2005); and (ii) demand on local health workers and infrastructure. In other words, the absorption capacity of the local district-level health systems and the main problems these are facing need to be considered. In practice, instituting parallel funding, planning and accounting cycles, and additional reporting and data information systems needs to be avoided (WHO, 2006b). Salary scales for their personnel should be as close as possible to existing Ministry of Health scales to avoid internal brain drain, an approach which proved to be successful in Benin (Gbangbadthoré et al., 2006). Moreover, programme activities should be integrated where appropriate, while sufficient resources should be brought in when new services are required (unless there is sufficient spare local capacity).

5.2.2. The selective health system strengthening scenario

In this scenario, the aim is not only to avoid harm but also to strengthen those health system capacities that are required to successfully implement and support the disease control programme's direct focused action. This strategy may effectively attain short-term gains on both sides, as long as additional resources are made available and allocated to increase the absorption capacity of the health system.

An obvious example is investing in the health workforce. In line with their narrow focus and preference for rapid results, GHIs usually support the health workforce by providing programme-specific training to general health service staff: transfer of specific tools and techniques through workshops and short courses. However, the enclosed per diems can easily create competition among health workers and distract attention and effort from non-supported core activities. Furthermore, these workshops do often not respond to the actual training needs. As set out in the first scenario, damage to general health services needs to be minimised; a common per diem policy for all programmes would avoid competition for per diems. In addition, capacities need to take roots: local capacities for programme-specific tasks will be strengthened only if specific skill and technology transfer is accompanied by other, more general and sustainable measures that are conducive to an optimal working environment, such as (permanent) availability of diagnostic tools and drugs, transport and general infrastructure. These measures should be based on a *selective needs* assessment carried out jointly by programme and local health service managers.

5.2.3. The overall health system capacity strengthening scenario

The rationale for this approach is that, even though direct focused action can bring about quick wins, sustainability will largely depend on the continued existence of robust and resilient general health services.

Calls were made for a diagonal approach to the delivery of health interventions (Sepulveda, 2006) or to diagonally fund global health (Ooms et al., 2008), with the underlying logic that disease-specific priority interventions can strengthen the health system.

However, strengthening the overall health system capacity requires more: it needs coordinated efforts based on a coherent overall policy, managerial and administrative vision, and a long-term view. Potter and Brough (2004) provide a useful framework both for analysing and for planning such strengthening, i.e. on the basis of a *comprehensive needs* assessment. They distinguish a hierarchy of components in which 'the less tangible are the most important'. In essence, system capacity rests on processes that continue through time and on structures that institutionalise such processes.In this approach, the contribution of GHIs to health system strengthening is assessed not only by the proportion of their resources that are earmarked for health system strengthening, but also by what is or can be done with these extra resources. Concentrating on input (e.g. tools, equipment and training) while neglecting the system's organizational structures, decision making processes and its stakeholders, is likely to result in little more than short term gains, if not in disruption and distortion.

In practice, the six elements of a health system as defined by WHO can be strengthened: (i) leadership and governance; (ii) service delivery; (iii) health financing; (iv) health information systems; (v) essential medical products and technologies; and (vi) human resources for health (WHO, 2007). We would argue that the most important capacities of health systems need most attention: the governance function, the health workforce component and the service delivery component (Van Olmen et al., 2010). These form the core of the integrated health service delivery system, and are needed to ensure community participation and tackling the social determinants of health. Strengthening the governance function calls for respecting the priorities set by national- and service-level managers through harmonization between programmes and alignment with national priorities (OECD, 2005). It may also require ensuring that competent policymakers and service managers at the national as well as at the operational level are retained in service. For instance, GHIs may consider allocating funding to a salary increase of health workers, irrespective of the involvement of the latter in their own programmes.

An even wider approach to health system strengthening covers not only the service delivery component, but also the participation and empowerment elements of the local health system. Thomas et al. (2007) propose management, economic, social and human capacity (MESH) as the essential infrastructure at operational (health district) level to ensure that project/programme funding is transformed into actual health benefits for the community. Management includes financial, human resources and service management capacities, but also community engagement and shared decision-making (Unger and Criel, 1995). Economic infrastructure includes ensuring geographical access (ensuring affordable access to care) and broader economic development. Social cohesion covers organisation of the community as well as linkages between health care providers, community and government. Human infrastructure includes ensuring equitable deployment of competent health workers and contributing to salaries with real purchasing power. Obviously, strengthening MESH requires strong multisectoral collaboration between many actors, and is likely to be a slow, step-by-step approach. It may, however, be the only way to contribute meaningfully to long-lasting development of both health services and communities, which will reduce health risk exposure as well as lower the impact of negative social determinants of health.

6. Conclusions

In this paper, we examined the interface between current NTD control programmes and general health services. We showed how two different perspectives can be combined into one comprehensive health systems model.

Regarding the choice of service delivery platforms for NTD control, multiple factors need to be taken into account: the burden of disease patterns, the available interventions, the available resources (financial and health workforce) and the absorption capacity of the local health services.

NTD control programmes can be integrated into health systems to different degrees, and strengthen health systems through different scenarios. Most important is to do no harm. Managers of disease control programmes can play a crucial role in this by instituting impact or selective/comprehensive needs assessments in function of the respective scenarios.

Moreover, given the absolute scarcity of evidence, detailed follow-up and documentation of how NTD campaigns and general health services interact is essential, followed by dedicated intervention studies on synergetic approaches to integration of NTD control into health systems.

To this end, analytical frameworks to examine the (intended and unintended) effects of NTD mass campaigns on general health services need to be developed. Also the processes through which priorities for NTD control and health care in general are decided merit more attention. Particular attention should be paid to the alignment of programme goals with the priorities of the local communities and the national policies, which is the main requirement for creating true positive synergies (OECD, 2005).

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