Large funding inflows, limited local capacity and emerging disease control priorities: a situational assessment of tuberculosis control in Myanmar

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Abstract

There are numerous challenges in planning and implementing effective disease control programmes in Myanmar, which is undergoing internal political and economic transformations whilst experiencing massive inflows of external funding. The objective of our study—involving key informant discussions, participant observations and linked literature reviews—was to analyse how tuberculosis (TB) control strategies in Myanmar are influenced by the broader political, economic, epidemiological and health systems context using the Systemic Rapid Assessment conceptual and analytical framework. Our findings indicate that the substantial influx of donor funding, in the order of one billion dollars over a 5-year period, may be too rapid for the country’s infrastructure to effectively utilize. TB control strategies thus far have tended to favour medical or technological approaches rather than infrastructure development, and appear to be driven more by perceived urgency to ‘do something’ rather informed by evidence of cost-effectiveness and sustainable long-term impact. Progress has been made towards ambitious targets for scaling up treatment of drug-resistant TB, although there are concerns about ensuring quality of care. We also find substantial disparities in health and funding allocation between regions and ethnic groups, which are related to the political context and health system infrastructure. Our situational assessment of emerging TB control strategies in this transitioning health system indicates that large investments by international donors may be pushing Myanmar to scale up TB and drug-resistant TB services too quickly, without due consideration given to the health system (service delivery infrastructure, human resource capacity, quality of care, equity) and epidemiological (evidence of effectiveness of interventions, prevention of new cases) context.

Keywords: Tuberculosis, Myanmar, health systems, funding, policy
Key Messages

- Myanmar is experiencing large political and economic changes, along with a massive influx of donor funding for health (including tuberculosis (TB) specifically), with very limited evidence to inform decisions on how resources should be allocated.
- Our findings indicate that TB control strategies appear to be favouring a medical and technological approach, with less attention to wider infrastructure development and human resource capacity. The current response to the TB epidemic also appeared to be driven more by urgency to act than evidence of cost-effectiveness, long-term impact and appropriateness for the current health system context.

Introduction

After decades of isolation following a military coup in 1962 and subsequent international sanctions, Myanmar is becoming increasingly connected to the rest of the world whilst undergoing large political changes at home. On 8th November 2015, the country held its first elections since a nominally civilian government was introduced in 2011. Led by Nobel Peace Prize laureate Aung San Suu Kyi, the opposition National League for Democracy (NLD) won an overwhelming victory, signalling a further shift in power away from the military. Economically, the situation in Myanmar is rapidly improving alongside these political shifts, due in large part to the lifting of international sanctions and a massive influx in aid funding and foreign investments. An unprecedented level of international development aid—estimated at USD1 billion over the next 5 years—is currently pouring into the country to support national health priorities (Morrison et al. 2013), which include tuberculosis (TB), HIV/AIDS and malaria (MoHS Myanmar 2014a).

In parallel, more epidemiological information is becoming available, raising concern about the prevalence of infectious diseases among the country’s predominantly-rural population of 52 million (Ministry of Immigration and Population Myanmar 2015). At 3180 per 100,000 population, the malaria incidence is almost double the regional average (WHO 2013). Although the national HIV epidemic is reported to have stabilized since 2000, hot spots of high transmission have been identified at several locations and approximately 10% of TB patients co-infected with HIV (MoHS Myanmar 2014b). Myanmar also has the highest TB prevalence among regional countries including Vietnam, Indonesia, Thailand and Malaysia, estimated at 525 per 100,000 (SEARO 2015), with ~9000 new cases generated every year (SEARO/C24 2015). At 3180 per 100,000 population, the malaria incidence is almost double the regional average (WHO 2013). Although the national HIV epidemic is reported to have stabilized since 2000, hot spots of high transmission have been identified at several locations and approximately two-thirds of patients requiring treatment do have access to treatment (SEARO 2015). TB remains a leading cause of death. Myanmar has the highest TB prevalence among regional countries including Vietnam, Indonesia, Thailand and Malaysia, estimated at 525 per 100,000 (SEARO 2015), with ~10% of TB patients co-infected with HIV (MoHS Myanmar 2014b). Myanmar also has among the highest multidrug resistant TB (MDR-TB) incidence rates globally, with ~9000 new cases generated every year (SEARO 2015; WHO 2015b). The most recent nationwide drug resistance survey reported an estimated MDR-TB incidence of 5% in new TB patients and 27.1% in patients known to have been previously treated for TB (MoHS Myanmar 2014a).

It is widely recognized that the TB/MDR-TB epidemic in Myanmar needs to be addressed urgently, and resources are rapidly being channelled towards this (MoHS Myanmar 2011). However, there is no clear basis upon which resource allocation decisions are being made or even should be made, given the extremely limited evidence available to inform such decisions (Khan et al. 2016). In principle, in order to make and sustain long-term improvements in TB control, TB in Myanmar (or any other country) should not be viewed in isolation from the state of the general health system. Instead, an understanding of broad health system constraints as well as TB-specific challenges is both needed to plan an effective TB control strategy. Indeed, the WHO recommends that reviews of TB programmes should be broader, and should specifically analyse the ‘current structure of health service management and financing, and potential changes over the next 5 years which will affect the national TB programme (NTP)’ (WHO 1998a). Given that the generation of new TB and MDR-TB cases, as well as long-term TB control, is strongly related to the overall functioning of a given health system and the overarching context in which it is embedded, we adopted the Systemic Rapid Assessment (SYSRA) conceptual and analytical framework developed by Atun et al. (2004). The SYSRA framework is designed to assess not only the specific infectious disease control programme of interest, but also broader factors related to the health system in which the programme is embedded (Figure 1).

In light of the dearth of published literature on TB control in Myanmar, and the limited examples globally of broad situational assessments analysing the wider context in which TB control systems are embedded, we applied the SYSRA framework and toolkit to conduct a situational assessment of TB control in Myanmar.

Methods

Application of SYSRA toolkit

We applied the main principles of a situational assessment in line with the SYSRA toolkit: (1) use of multiple methods by a multidisciplinary team, (2) accessing multiple data sources and (3) following an iterative process of hypothesis formation and testing. An interdisciplinary team consisting of an economist, a social scientist, an epidemiologist, a health systems research specialist and a clinician with health policy research expertise conducted the situational assessment between November 2013 and August 2015.

The SYSRA toolkit defines two components of a situational assessment which guided the structure of the study:

1. A ‘horizontal assessment’ of the health system within which the TB programme is embedded from a variety of perspectives: the external environment (considering political, legislative, economic, socio-demographic and technological factors), health system structure and functionality, healthcare delivery, financing and resource allocation and information systems; and

2. A ‘vertical assessment’ of TB-specific components of the programme such as epidemiology, service delivery, diagnostics laboratory networks, and treatment (Figure 1) (Atun et al. 2004).

Stages one and two

As described in detail by Atun et al. (2004) and summarized here, the situational analysis was performed in three stages, of which the first two were conducted in country (Figure 2). During the preparatory phase, prior to the research team’s visit to Myanmar, a brief review of published reports and literature was conducted to guide application of the toolkit. In stage one, semi-structured discussions were held in English with 10 key informants with expertise in a
broad range of health system and TB programme components using the predefined ‘screening’ questions for each component outlined in the SYSRA toolkit (Figure 1). Key informants included senior officials in government health and research bodies, international funding organizations, UN agencies and local and multinational managers of health service delivery organizations. This was supplemented with participant observations at the following TB and general health organizations in Yangon: University of Public Health, Aung San TB Hospital, Lower Myanmar TB Center, North Okkalapa Township Health Department, two private pharmacies, one informal drug seller and one private [Myanmar Medical Association (MMA)] clinic managing TB.

In stage two, questions and gaps identified through the screening questions in stage one were addressed through a round of more detailed discussions with four new key informants and by revisiting relevant key informants from the first stage. In both stages one and two, at least two members of the multidisciplinary team participated in key information discussions, so that data could be collected and interpreted from a variety of disciplinary perspectives. Separate notes were taken simultaneously by the researchers during discussions and written up independently later to avoid interviewer bias.

The project team met daily during the first two stages of the situational assessment to analyse and triangulate the data collected and identify areas for further investigation, at stage three. Permissions and verbal consent from key informants and representatives of organizations visited was obtained prior to engagement with them.

Stage three
Stage three was conducted out of the country over a longer period between December 2013 and August 2015, with individual research team members conducting follow-up visits to Myanmar. The objective of the final stage was to obtain additional information on areas identified as critical to the success of the programme and not easily collected during rapid assessment stages one and two. This was done through paired reviews of published literature on Myanmar up to 30 June 2015, and further review of unpublished research that the researchers were able to access (detailed below). To adapt the
SYSRA toolkit to a context of rapid change, we included an element of ethnographic research through direct and indirect observation of, and interaction with, policy-makers as outlined by Gilson (2012). During stage three, members of the research team participated in key TB and health systems related meetings and conferences in-country, including the Myanmar Health Forum 'Investing in Health: the key to achieving a people-centred development' held in Nay Pyi Taw on 28–29 July 2015 (3MDG 2015).

The literature review for the horizontal component of the situational analysis was conducted using a systematic approach, incorporating both peer-reviewed and grey literature. In line with the SYSRA framework, this component aimed to capture the extent of published literature on the external environment; health system(s) structure and organization; healthcare delivery; financing arrangements and resource allocation; and information system(s) in Myanmar. Inclusion criteria included publication online in English and exclusion criteria included studies focussing exclusively on migrants from Myanmar in a second-country setting, with the exception of studies performed in countries bordering on Myanmar. Searches of the peer-reviewed literature meeting the inclusion and exclusion criteria were performed through Medline, accessed via PubMed using search terms detailed in Table 1.

The vertical component of the literature review aimed to collate and describe the published literature describing TB epidemiology, prevention and control in Myanmar, both currently and historically. Inclusion criteria were structured around the vertical programme components for TB control and prevention in Myanmar, drawn directly from the SYSRA toolkit (Figure 1). Methods and results are described in detail in a separate publication (Khan et al. 2016).

Analysis
Qualitative data collected in the form of field notes from participant observations and notes taken during key informant discussions were analysed by two members of the research team using a deductive thematic analysis approach based on the components already defined in the SYSRA framework. Information from 137 and 77 papers from the horizontal and vertical literature reviews respectively were extracted in NVIVO, with codes structured around individual components of the SYSRA framework; this information was integrated with findings from the qualitative analysis component of the situational assessment (Davis et al. 2015; Footer et al. 2014; Grundy et al. 2014; Htet et al. 2015; Low et al. 2014; Parmar et al. 2014, 2015).

Results
External context
Political context
A common theme emerging from the semi-structured discussions was that the external environment in which the Myanmar health system is embedded is in the midst of radical change. Until the recent dissolution of the State Peace and Development Council in 2011, Myanmar had been ruled by a military regime since 1962, a situation complicated by a long and continuing history of intrastate conflict as indicated by several publications identified in the literature reviews (Grundy et al. 2014; MacDonald 2007; Mahn et al. 2008). Evidence from the literature also suggests that, particularly in the so-called ‘black zones’ (i.e. conflict areas along the Thai-Myanmar border), long-term conflict and forced displacement of populations, alongside on-going human rights abuses and targeting of community health workers (Lee et al. 2009), have resulted in extensive disruption of healthcare infrastructure, health delivery systems, and disease surveillance in affected areas (Beyrer et al. 2007; Brown et al. 2012; Carrara et al. 2013; Lee et al. 2006; Mahn et al. 2008).

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Socioeconomic and demographic context

The total population of Myanmar is currently reported at 51.5 million, with a projected growth to 54 million by 2030 (Ministry of Immigration and Population Myanmar 2015). There is a trend toward increasing urbanization, with 30% of the population currently residing in urban areas. Discussions with representatives of non-governmental and governmental service delivery organizations, and the published literature highlighted that Myanmar's economy has suffered from years of stagnation compounded by heavy allocation of national revenues toward military spending, a situation that has prompted emigration of millions of Burmese (Carrara et al. 2013) and has resulted in a daily struggle to purchase basic essentials for millions more who have remained (Beyer 2007).

Although the country remains one of the poorest in Asia (Sabapathy et al. 2012; UNDP 2013), Myanmar's economic situation is now markedly improving following the lifting of economic sanctions and an influx in commitments of aid funding (Table 2). However, Myanmar continues to face many social and economic challenges. For instance, many Burmese continue to grapple with the challenge of covering the costs of daily essentials, including food supplies and medical care, largely due to the high rate of inflation (Kenyon 2013; Htet et al. 2015). Furthermore, a study by Burmese authors revealed disparities in education according to income, with rates of illiteracy significantly higher in lower income populations; similar disparities were noted in health outcomes by income (Ohnmar et al. 2005). For TB control in Myanmar, representatives of organizations involved in delivering TB care confirmed that MDR-TB treatment can only be accessed in certain areas and migrant workers face particular difficulties in accessing healthcare.

Health system structure and functionality

All key informants agreed that public, private non-profit and private for-profit providers are active components of the health system, with the private sector playing a major role in service provision. On the public healthcare side, the MOHS is organized into three levels: (1) central, (2) state or region and (3) township, with health committees appointed at each level to oversee health sector functioning.

Findings from our discussions and literature review confirm that low investment, internal conflict and little infrastructure development have negatively impacted health system functioning for several decades (Low et al. 2014). This is reflected in general indicators of health systems functioning such as the high maternal mortality ratio (200 per 100,000 live births) and physician-to-population ratio (5 per 10,000) (UNDP 2014).

Our structured discussions revealed that substantial funding from international agencies is now being directed towards Myanmar, but that the overarching investment strategy and the mechanism for deciding priorities is still being formulated. Both funders and service delivery organizations confirmed that there is 'lots of money coming in but no priority setting being undertaken' (quote from female service delivery organization manager). To help with strategic planning and resource allocation decisions, a multi-stakeholder forum—known as the country coordination mechanism—was initially set up and recently replaced with the Myanmar Health Sector Coordinating Committee (M-HSCC). Infectious diseases such as TB and HIV as well as maternal and child health (MCH) fall under the remit of the M-HSCC. Specific Technical and Strategy Groups provide strategic recommendations to the M-HSCC on how to allocate funding. Although the M-HSCC has a broad mandate, our discussions suggested that evolving health priorities and influence by varied agendas hampers its strategic function.

TB control is managed by the NTP, which comes under the Department of Public Health within the MOHS and implemented by a dedicated TB team or a trained TB coordinator at the level of each township. A National Strategic Plan for TB control (2011–15) is in place (National Tuberculosis Programme 2010). The NTP is overseen by an Expert Committee (EC), which is dominated by private chest consultants (retired senior government chest physicians). The EC's mandate is to provide guidance on clinical aspects of TB management. For example, key informant discussions revealed that the EC has advised against trials evaluating a shorter regimen for MDR-TB treatment, despite support from other stakeholders.

A key informant involved in managing the main public-private partnership programme covering Burmese doctors estimated that there are ~20,000 registered private doctors in Myanmar. Most doctors working in public hospitals also run private clinics outside of their public sector working hours to supplement the low salaries they are paid in government hospitals (USD 130–150 per month). Based on discussions with healthcare delivery organization representatives, it is estimated that there are up to 30 private clinics and 100 drug shops for every government health centre in Myanmar. Indeed, during site visits to one township in Yangon, our team found that a total of 6 government health facilities at different levels and 157 known private clinics and maternity homes. Private clinics offering TB-related services fall into two categories: clinics that are part of the public–private mix programme (PPM) and those that operate completely independently of the government TB programme. Myanmar's PPM programme for TB operates across the country and is recognized as a model for private sector engagement globally. The PPM programme allows private providers to be involved in one of three schemes, ranging from referral of suspected TB cases to

**Table 2. Summary of key socioeconomic indicators in Myanmar**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Data</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment to population ratio as a % of population aged 15 and older</td>
<td>75.9%</td>
<td>Human Development Report 2015</td>
</tr>
<tr>
<td>Employed individuals earning &lt;$US2 per day as a % of total employed</td>
<td>66.9%</td>
<td>Human Development Report 2015</td>
</tr>
<tr>
<td>Literacy rate in person aged 15 years and older</td>
<td>89.5%</td>
<td>Ministry of Immigration and Population Myanmar 2015</td>
</tr>
<tr>
<td>Population with access to electricity</td>
<td>48.8%</td>
<td>Human Development Report 2015</td>
</tr>
<tr>
<td>Mobile phone subscribers per 100 people in 2015</td>
<td>76.7%</td>
<td>The World Bank 2016</td>
</tr>
</tbody>
</table>
government centres for diagnosis and treatment to provision of free treatment to NTP-confirmed TB cases themselves using drugs provided by the NTP. PSI Myanmar and the MMA are the largest institutional private providers operating as part of this program, contributing 16 and 2% to total case-finding (Thin Thin 2013). Although the PPM is a flexible system that allows TB diagnosis and management in the private sector to be regulated and recorded, the majority of for-profit providers are not part of the PPM programme and they continue to diagnose and treat TB without any reporting to the government. This is consistent with the state of the private sector more generally—our literature reviews indicated that, for many years, the State’s governance, oversight, and regulatory control over the private health sector has been minimal in Myanmar (Thein and Nyo 1999; Oehlers 2005). The contribution of the unregulated private sector to delays in diagnosis, TB transmission and emergence of drug resistance through inappropriate treatment is poorly studied in Myanmar as evidenced by the lack of either peer-reviewed or grey literature retrieved on this topic.

Healthcare provision

Based on our discussions, document review and observations at health facilities we were able to summarize the categorization of public health facilities in Myanmar by size and understand how TB care fits within the healthcare system: The Township Health Centre, headed by the township medical officer, is responsible for managing primary and secondary medical services. In each township, there is a township hospital with up to 50 beds, depending on population size in the catchment area. In rural townships, there are up to two station hospitals operating under the township hospital. There are also several Rural Health Centres (RHC) and RHC sub-centres, which are the smallest health facilities in rural areas. In urban areas, urban health centre (UHCs), UHC sub-centres, school health teams and MCH teams operate under the township hospital.

Township Health Centres, rather than the peripheral health centres, function as TB diagnostic and treatment units. TB registers are maintained at this level by TB coordinators, who are often nurses responsible for coordinating and reporting of TB control activities in the facility. In addition to their involvement in TB control activities; these nurses are often overloaded with other infectious disease work and care for hospitalized patients. Sputum microscopy is conducted at Township laboratories or specialist TB laboratories. There are currently only two reference laboratories in the country that conduct culture and drug sensitivity testing to diagnose MDR-TB, one in Yangon and one in Mandalay. Xpert MTB/ RIF machines for rapid detection of rifampicin resistance have been rolled out to 38 district and township facilities between 2013 and 2015 (Myint 2015). New MDR-TB management guidelines recommend Xpert/MTB testing for all new TB patients with the following risk factors: HIV-positive, MDR-TB contacts and residents of Yangon (Myint 2015). The impact on reducing delays to diagnosis and treatment of MDR-TB, and the cost-effectiveness of using this approach, has not been evaluated yet.

Key informant discussions and site observations suggest that health workers known as Basic Health Staff (BHS), who are often trained midwives, function as the backbone of the service delivery system at the community level. The BHS are responsible for community-based infectious disease work, vaccination drives and for daily delivery of MDR-TB treatment. Owing to the large workload on BHS, direct observation of treatment is not practised for drug-sensitive TB treatment; patients are given up to one month of TB medications to take at home without health worker supervision.

The TB coordinators from each township hospital are responsible for allocating a treatment supporter from each patient’s family to help ensure adherence. International NGOs and local service delivery organizations shared common concerns about poor adherence to treatment owing to this lack of a formal system of treatment support and monitoring, and the possibility that poor adherence may be driving drug-resistance.

Although first-line TB treatment is available in most townships, the MDR-TB treatment programme was active in only 108 out of 325 townships as of April 2015 (Myint 2015). When this was investigated through detailed discussions, it was found that only residents of these 108 townships are eligible for MDR-TB treatment. In response to these clear geographical inequalities in service delivery and access to care, patients are known to move from rural to urban townships in order to access free drugs. Even those patients living in townships providing MDR-TB treatment are subject to long waiting times of up to one year between diagnosis and treatment initiation. Although this has not been systematically studied, representatives of international funding and service delivery organizations stated that a sizeable proportion of MDR-TB patients are known to die while waiting for treatment and expressed concern that many untreated patients will likely transmit the infection to contacts. Owing to a substantial increase in diagnostic and treatment capacity, there has already been an increase in annual MDR-TB patient enrolment from 442 to 1537 between 2012 and 2014, and a large jump to 4400 is planned by 2016 (Myint 2015). A common theme emerging from the key informants, linking to concerns about current capacity to ensure adherence to TB treatment, was that MDR-TB treatment may be being scaled up too quickly, based on what one international service delivery organization representative summarized as a ‘narrow and short-term focus’.

Our discussions indicated that 70–90% of patients first seek care at private health facilities, such as private clinics or drug shops. This estimate is in line with the findings of a drug sensitivity study conducted at a TB centre in Yangon in 2003–04, which reported that 78% of cases seen there had been previously treated at private clinics before presenting to the TB centre, with a mean private treatment duration of 33 days (Aung et al. 2007). Thus, for-profit private providers are responsible for healthcare delivery to a substantial proportion of TB suspects and patients. According to a key informant involved in large scale health service delivery, there are several reasons why patients do not use the government health facilities despite the free treatment available. These include: inconvenient opening timings, shortages in drug supply, long distances, long waiting times, poor quality of service provided by over-worked staff, and the possibility that a ‘donation’ may be requested even though services are intended to be provided free of cost.

Discussions and participant observations revealed that first- and second-line antibiotics are widely available at a low cost in informal drug stores, although some key informant from international agencies were not aware of this. During stage one of the situational assessments the research team was able to purchase a range of antibiotics easily in a number of drug shops. Information gathered during key informant discussions suggests that rifampicin is commonly dispensed to patients complaining of a cough, and anecdotal information suggests that roadside betel leaf sellers add crushed antibiotic tablets to customers’ betel leaf preparations to help with their coughs.

Numerous non-profit international organizations are active in delivering health services in Myanmar, including Medicines Sans Frontiers-Holland (MSF-H), PSI and Merlin. Certain aspects of health service delivery in specific townships and regions have
already been taken over by the large international organizations. These organizations tend to work according to their own service delivery operational procedures, and therefore the quality and range of services varies geographically. MSF-H and FHI 360 are particularly active in providing care to HIV-TB and MDR-TB patients, respectively, whereas the MMA, PSI, World Vision, Cesvi, Malteser and the International Organization for Migration are involved in community level management of drug-sensitive TB through Global Fund support (Myanmar Health Sector Coordinating Committee 2014). Key informant discussions revealed that there are concerns about the potential for a parallel healthcare delivery system to develop through the activities of these organizations, and steps are being taken to maximize integration with the government system.

Financing and resource allocation

Analysis of published reports and studies showed that the government of Myanmar spends a mere four USD per person annually on health, the lowest of any country globally (WHO 2015a), rendering the country’s health system heavily dependent on foreign assistance. Over 80% of direct healthcare costs are paid for by patients themselves, an out-of-pocket expenditure rate that, at nearly 75%, ranks among the highest in the world (National Tuberculosis Programme 2010; UNDP 2014). Furthermore, there are notable disparities in funding allocation, with a recent paper highlighting disproportionately higher allocations to several states with better health (Zaw et al. 2015).

In recognition of the need to strengthen health financing, the government has made a commitment to increasing funding with an ultimate goal of attaining universal health coverage by 2030. Target indicators to achieve universal coverage were articulated in the WHO Country Cooperation Strategy Myanmar, 2014–18. These include: reducing out-of-pocket expenditures to 30–40% total health expenditure; increasing total expenditure on health to ≥4–5% of GDP; achieving >90% coverage of risk-pooling and prepayment health payment programmes and approximating 100% coverage of social assistance/safety-net schemes for vulnerable populations (WHO 2014).

Specific initiatives to achieve these targets include increasing tax-based government expenditures on health; introducing a Civil Servant Medical Benefit Scheme in 2016 to provide full coverage for all civil servants; expanding social health insurance programmes in parallel with revisions in national social security law; introducing a new social protection policy that benefits the informal health sector; and planning for the development of voluntary private health insurance (Zaw 2015).

The withdrawal of the Global Fund from Myanmar in 2005 represented a critical disruption of health system funding, highlighted repeatedly in our key informant discussions. The Global Fund contracted over US 98 million in health-related programming assistance over a 5-year period, beginning in 2004 (Mahn et al. 2008). Their withdrawal within a year of programme initiation was a direct response to extreme restrictions by the military government on procurement of medical supplies and travel of programme staff (Eaton 2005). The high AIDS mortality rate following Global Fund withdrawal prompted foreign donors (including the UK, Australia, the European Commission, The Netherlands, Norway and Sweden) to establish the Three Diseases Fund to provide an alternative mechanism for channelling vitally important medications and funding to Myanmar in the Global Fund’s absence (Dunlop 2011); this has now been superseded by the 3MDG fund. With the recent democratic reforms and subsequent loosening of international sanctions; however, flows of aid into the country are unprecedentedly high. A new round of Global Fund grants has subsequently been approved, with funds currently supporting MDR-TB treatment and incentives for basic health service workers for TB management, among other activities (National Tuberculosis Programme 2010; Saw et al. 2013); a total of USD 24.6 million dollars is currently committed to Global Fund TB programming in Myanmar for 2015–16 (UNOPS 2015). At the same time, the government of Myanmar has matched its stated support for TB control and prevention with steadily increasing funding streams, allotting USD 3.8 million for TB control in 2014, compared with USD 1 million 1 year prior (MoHS Myanmar 2014b). Together, increased government funding and new commitments from the Global Fund and 3MDG are reducing the USD 67 million funding gap for TB projected in the most recent Five Year National Strategic Plan for Tuberculosis Control (2011–15) (National Tuberculosis Programme 2010; MoHS Myanmar 2014a).

Information systems

The health information system (HIS) in Myanmar was first established in 1978, alongside publication of the initial People’s Health Plan, but remains weak due to resource constraints. An integrated health management information system was established in 1993 for recording basic essential routine data. Most recently, the country’s first HIS Strategic Plan (2011–14) was developed in coordination between the Ministry of Health, the Central Statistical Organization, Department of Population, various UN agencies and NGOs, including members of the Health Metrics Network. Key performance objectives identified in the Strategic Plan include standardization of record forms across private and public hospitals; development of national core health indicators; establishment of a health reporting system for the private sector; improved surveillance systems; and improved data management strategies, including investment in IT infrastructure (computing equipment and software), among others (MoHS Myanmar 2010).

The TB, HIV/AIDS and malaria vertical programmes have relatively good information management with systems for paper-based record keeping in place. However, infrastructure for maintaining and sharing information electronically is currently lacking. Although historical records appear to be well maintained in paper registers in the large TB hospitals, discussions and observations at public TB health facilities indicated that analysis of historical trends and use of data for decision-making is hindered by a lack of searchable computerized databases.

As in other Asian countries, there is no system in place for information capture from the private health sector, despite its size. This is identified as a critical gap in Myanmar’s current HIS (MoHS Myanmar 2010). An exception is the private providers that are part of the PPM programme; these regularly share standardized data with the NTP, again using paper records. However, disclosure is otherwise highly selective: during key informant discussions we established that well-known specialist chest consultants are known to treat MDR-TB privately using drugs available on the local market but often do not report the treatment outcomes of private patients to the NTP owing to patient privacy concerns, despite the physicians themselves being linked to the NTP as advisers.

Discussion

Myanmar presents a unique example of disease control programme planning and implementation during a period of rapid political and
economic change and massive inflows of external funding. Our systematic assessment—incorporating discussions with funders, service delivery organizations and an analysis of published reports—indicates that large investments by international donors are being undertaken without an overarching strategy for prioritization, and may be pushing Myanmar to scale up TB and drug-resistant TB services too quickly, without enough consideration of the health system and epidemiological context. At best, this may lead to wastage and significant opportunity costs from foregone alternatives, and at worst may actively contribute to harm, for instance by reinforcing existing disparities or factors that contribute to the spread of drug resistance.

Overarching broad needs that emerged when we brought together findings from different components of the rapid Situation Assessment include: improved strategic planning of resource allocation to address health priorities, urgent investment in infrastructure to support health system functioning (with an emphasis on increased human resource capacity) and regulation of antibiotic availability through the informal/private sector. The literature review, supported by key informant discussions, also suggested a pressing need for improvements in equity of health service provision to underserved groups, including those living in rural areas, internally displaced persons, and minority groups that are not yet recognized by the state (Lee et al. 2006, 2009; Beyrer et al. 2007; Mullany et al. 2007, 2008a,b, 2010; Mahn et al. 2008; Teela et al. 2009; Brown et al. 2012; Pedersen et al. 2012; Carrara et al. 2013; Saw et al. 2013; HRW 2013).

In terms of TB control specifically, our assessment indicated a need for improved systems to support adherence to treatment in drug-sensitive TB patients and increased capacity for community management of MDR-TB treatment; both of these are essential to prevent generation and expansion of resistance.

With respect to the human resource deficit, the community-based BHS are highly overworked, owing to multiple responsibilities ranging from MCH to MDR-TB treatment support, and are a critical element of the health system that requires attention. With funding coming in to strengthen different vertical programmes such as TB, MCH, malaria and HIV, it is likely that further pressure will be put on BHS to implement activities for these programmes.

Although poorly documented in the literature, key informant discussions indicated that patient preference to visit private/informal health providers for TB symptoms likely leads to delays in treatment and incorrect TB treatment. The wide availability and use of antibiotics in the informal healthcare system may be contributing to the ever-widening drug resistance profile of circulating TB strains in Myanmar, as it has in neighbouring India (Phyu et al. 2005). There is already substantial evidence that inappropriate use of antimicrobials has contributed to the epidemic of multi-drug resistant *Plasmodium falciparum* malaria along the Thai-Myanmar border (Dondorp et al. 2004; Beyrer et al. 2006; Newton et al. 2008a,b; Delacollette et al. 2009; Brown et al. 2012). The PPM project with the MMA and PSI represents a promising initiative to regulate activities of private doctors (Montagu et al. 2013), but much more work needs to be done to regulate informal private providers, such as drug shops.

Key informant discussions revealed that the lack of second line drugs for the waiting list of diagnosed MDR-TB patients had received a lot of attention, and there is pressure on donors and the NTP to act on this (UNITAID 2013). Funding from international (3MDG, UNITAID, GF etc.) and domestic sources has now been specifically allocated to scale up MDR-TB treatment, with a rapid increase in the number of MDR-TB patient being initiated on treatment between 2012 and 2014. However, our analysis suggests that increasing access to drugs and diagnostic tests for MDR-TB treatment may not be sufficient to address the epidemic in this context; in addition, there is a need for increased laboratory capacity, electronic data management systems and additional health staff at every level to support treatment of MDR-TB patients. There is an equally pressing, but less prioritized, need to identify the main routes through which almost 9000 MDR-TB cases are being generated every year.

Key strengths of this study, which is the first of its kind in Myanmar, include the use of a well-established framework and linked toolkit that has been applied to TB control assessments in regional countries, and triangulation of multiple information sources by a multi-disciplinary team (Conseil et al. 2010; Hanvoravongchai et al. 2010). However, we acknowledge inherent limitations in the methodology; the use of semi-structured discussion guides can result in some topics that respondents would like to comment on being excluded (although we did allow time for an unstructured conversation at the end of each discussion), the rapid assessment process does not allow for a line-by-line qualitative analysis involving recording and transcription of all discussions, and the reliance on literature published in English may have limited the information we were able to access.

**Conclusion**

Our findings indicate that new TB and MDR-TB control interventions are being introduced in Myanmar owing to the staggering influx of donor funding, without an overarching strategy based on evidence of cost-effectiveness, long-term impact and appropriateness for the current health system context. Our literature review and discussions identified very limited evidence to inform resource allocation decisions at present. In the absence of such evidence, we found that TB control strategies were tending towards a medical and technological approach. Our analysis of the human resource capacity and technological infrastructure indicates that the impact of the roll out of Xpert/RIF machines to numerous health facilities, for example, may be limited without reliable electricity and basic computers for data management and monitoring. Similarly, numerous stakeholders interviewed expressed concerns about raising targets for TB treatment when human resource capacity to ensure quality of care still needs considerable strengthening.

Finally, the study indicates that there are substantial disparities in health and funding allocation between regions and ethnic groups, which are related to the political context and health system infrastructure. Other researchers have also highlighted the need for policies that address rather than exacerbate health disparities (Zaw et al. 2015). It remains uncertain whether the current government has the will, capacity, and power to address health inequities; under the current political system, the ruling NLD government would not be able to prevent continued attacks on ethnic minority groups and persecution of Myanmar’s disenfranchised Muslim communities living in the northwest Rakhine area, which has extremely poor access to healthcare. Success of the TB control programme, and indeed of wider health sector reform, depends on whether political commitment and resource allocation is focused on strategies that result in long-term improvements in health of all groups in Myanmar.

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