

**Complex Interventions in Complex Systems: Health Systems
Analysis of Antiretroviral Treatment Scaleup in Burkina Faso,
Tanzania and Uganda**

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Dekan

*Dedicated to my children and husband,
Nils, Jarvis and Roman*

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Acronyms

ACT	Artemisinin-based combination therapy
AGREE	Appraisal of Guidelines, Research and Evaluation in Europe
AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
ARV	Antiretroviral drug
ARVMAC	Effects of Antiretrovirals for HIV on African health systems, Maternal and Child Health
CCM	Country Coordinating Mechanism
CMH	Commission for Macroeconomics and Health
CMLS	Comité Ministériel de Lutte contre le SIDA
CNLS	Conseil national de Lutte contre le SIDA
CONAPO	Conseil national de la population
CPIA	Country Policy and Institutional Assessment
CSR	Creditor Reporting System
DANIDA	Danish International Development Agency
DfID	UK Department for International Development
DHS	Demographic and health surveillance site
DMO	District medical officers
DSF	Direction de la santé de la famille
DSS	Demographic Surveillance Site
ECD	Equipe cadre de district
EPI	Expanded Programmes on Immunization
FBO	Faith-based organisation
FY	Fiscal Year
GAVI	Global Alliance for Vaccines and Immunization
GFATM	Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria
GHI	Global Health Initiative
GIST	Global Joint Problem Solving and Implementation Support Team
GT	Grounded theory
HAART	Highly active antiretroviral therapy
HAI	Health Action International
HC	Health centre
HIS	Health information system
HIV	Human immunodeficiency virus
HMN	Health Metrics Network
HSS	Health systems strengthening

IDI	Infectious Diseases Institute
IMCI	Integrated Management of Childhood Illness
IMF	International Monetary Fund
JCRC	Joint Clinical Research Center
JMS	Joint Medical Store
LMIS	Logistics management information system
MAP	Multi-Country AIDS Programme
MDGs	United Nations Millennium Development Goals
MOF	Ministry of Finance
MOH	Ministry of Health
MOHSW	Ministry of Health and Social Welfare
MRC	Medical Research Council
MSD	Medical Stores Department
MUJHU	Makerere & John Hopkins University Research Collaboration
NACP	National AIDS Control Programme
NCPI	National Composite Policy Index
NCTP	National Care and Treatment Plan
NGO	Non Governmental Organisation
NHA	National Health Accounts
NMS	National Medical Store
ODA	Official Development Assistance
ODI	Overseas Development Institute
OECD	Organisation for Economic Cooperation and Development
OI	Opportunistic infections
OOP	Out of pocket
PASS	Pharmaceutical Administration and Supply Service
PEPFAR	US President's Emergency Plan for AIDS relief
PIDC	Paediatric infectious diseases clinic
PMTCT	Preventing Mother-To-Child-Transmission
PPP	Purchasing Power Parity
PSU	Pharmaceutical Supplies Unit
SCM	Supply Chain Management
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infections
SWAp	Sector-Wide Approach
SYSRA	Systemic Rapid Assessment
TACAIDS	Tanzania Commission for AIDS
TASO	The AIDS Support Organisation
TB	Tuberculosis
TEHIP	Tanzania Ministry of Health's Essential Health Interventions

	Programme
THE	Total Health Expenditure
UAC	Ugandan AIDS Commission
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV and AIDS
UNGASS	United Nations General Assembly Special Session
UNICEF	United Nations Children's Fund
US	United States
USD	United States Dollar
VCT	VCT Voluntary Counselling and Testing
WHO	World Health Organisation

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Summary

Background: Antiretroviral treatment (ART) is the most complex health intervention ever taken to scale in low-income countries and will remain largely dependent on external funding in the future. Less than expected progress towards international thresholds such as the Millennium Development Goals (MDGs) has renewed interest in health systems needed to underpin scaled up interventions. Expectations are that disease-specific programmes potentially strengthen health systems if well integrated. Corresponding efforts however remain under resourced and poorly defined. Despite the increasing prominence of and discussions on health systems strengthening, there has been little research that goes beyond studying individual effects to focus on dynamic processes and linkages among different components of a health system. Important questions such as how funding translates into interventions at district level and should be distributed according to burden of diseases have not been evaluated empirically.

Methods: The case studies compiled in this thesis applied and combined different frameworks for policy, cost analysis, and systems thinking. They combined findings from the literature and key informant interviews with observations at health service delivery level in study districts and data on budget allocations. Case studies focused on sub-systems, including supply chain management in Tanzania and Uganda, incentive systems in Tanzania, drug stock outs in Uganda and health policy making in Burkina Faso. For all three countries we examined funding for HIV/AIDS compared to other essential health interventions against burdens of diseases.

Results: This research indicates that disease-specific programmes largely fail to address important root causes of systems weaknesses and opt for parallel processes and structures that partly weaken national systems. Findings from Tanzania and Uganda show how the current drug supply chain management is characterized by parallel processes and systems that result in poor quality and inefficiencies. They result in less than expected health system performance, stock outs and other shortages that affect delivery of ART and primary care in general. Poor performance and weak integration is amplified by weak conditions at all levels of the health system and by systems dynamics such as path-dependency and difficulties to redirect resource allocation and the interests of actors within newly created institutions. Governance and specifically stakeholder issues such as incentives and power structures present key barriers to better performance. Findings from Burkina Faso show disproportionately high budgets, as well as inefficient and poorly integrated government

structures of the national HIV/AIDS response when compared to structures of the national reproductive health programme. The analysis of national and district budgets for different interventions and against burden of diseases quantify existing misbalances. Funding for different interventions is disproportionately high for HIV/AIDS when assessed against burden of diseases. Other areas such as child and maternal health remain relatively under-funded. High differences between total per capita funding at national compared to district level especially in Burkina Faso and Uganda indicate low levels of pass-through. Gaps and misbalances are important especially when taking into account overall low per capita budget levels at district level.

Conclusions: Findings of this work provide a valuable evidence base from lessons learnt during the early years of ART in sub-Saharan African countries with relevance for countries facing similar challenges. They suggest that opportunity and needs to use ART investments to strengthen health system have not been exploited. Findings and principles of systems thinking underpin that adverse effects of non-integrated efforts are potentially more serious than currently assumed given the difficulty of correcting, reversing or remedying new structures and processes and health systems that remain weak as neglected by investments and parallel disease-specific programmes. Findings regarding (un)balanced investments are essential for international and national decisions on needs-based resource allocation. High differences between national and district per capita budgets indicate that more attention needs to be paid to the pass-through of funding and related issues with regard to absorptive capacity and effective implementation. Important barriers to systems strengthening are caused by contextual issues, dynamics and stakeholder incentives as well as issues such as path dependency, difficulties to redirect resource allocation, and interests of newly created institutions. To further assess and address these issues, there is a need for a stronger focus on system dynamics and the driving forces which impact on the sustainability and integration of disease-specific interventions. More attention needs to be paid to the low levels of budget pass-through from national to district level as this might not only reflect low levels of funding at implementation level, but also a lack of decentralization and inefficient processes. The multiplicity and complexity of existing challenges require a long-term and systems perspective, which is essentially in contrast to the current short term and programmatic nature of disease-specific programmes.

Zusammenfassung

Hintergrund: Universaler Zugang zu antiretroviralen Medikamenten gegen HIV/AIDS in Niedrigeinkommensländern ist das komplexeste Unterfangen in der Geschichte internationaler Gesundheitspolitik. Er wird auch in Zukunft weitgehend von externer Finanzierung abhängig bleiben. Die Schwierigkeiten beim Erreichen internationaler Entwicklungsziele wie die Millennium Development Goals (MDGs) haben das Interesse an Gesundheitssystemen zur Verstärkung solcher Interventionen neu entfacht. Die Erwartung besteht, dass krankheits-spezifische Programme auch das Gesundheitssystem als Ganzes stärken, falls sie gut integriert sind. Generell mangelt es aber an konzeptioneller Klarheit sowie empirischen Erhebungen zur Auswertung von Gesundheitssystemen in Bezug auf krankheits-spezifische Interventionen. Studien beschränken sich zumeist auf die Auswertung von Einzeleffekten, und lassen dabei eine ganzheitliche Betrachtung und die Evaluierung wichtiger Prozesse und Verlinkungen ausser Acht. Wichtige Fragen, wie beispielsweise die angemessene Verteilung finanzieller Mittel auf Distriktebene für verschiedene Krankheitsbereiche wurden bisher nicht untersucht.

Methode: Fallstudien der Dissertation verwenden und kombinierten Methoden zur Politik-Kosten- und Systemanalysen. Datenbasis sind Experteninterviews, Budgets, sowie Literatur, insbesondere in Form von anderen Evaluierungen und Strategiepapieren. Die Fallstudien in Tansania und Uganda fokussieren sich auf die Auswertung nationaler Logistik- und Managementsystemen der Medikamentenverteilung und deren Auswirkung auf die Stärkung der Gesundheitssysteme. Die Studien betrachten jeweils spezifische Komponenten und Aspekte der Gesundheitssysteme, in Tansania sind dies Anreizsysteme, in Uganda Auswirkungen auf Versorgungsebene und in Burkina Faso gesundheitspolitische Instanzen und - Prozesse. In allen drei Ländern wird die Budgetverteilung auf National - und Distriktebene, für unterschiedliche Krankheiten und im Vergleich zu deren Bevölkerungsbelastung verglichen.

Resultate: Krankheits-spezifische, vertikale Programme tragen zur Schwächung nationaler Gesundheitssysteme durch den Aufbau paralleler Strukturen und Prozesse bei. Ergebnisse aus Tansania und Uganda zeigen Ineffizienzen und mangelnde Qualität der Medikamenten Wertschöpfungsketten aufgrund paralleler Prozesse. Auswirkungen sind schlechtere Leistungen der Gesundheitssysteme, Medikamentenengpässe und anderen Schwächen der HIV- und Basisversorgung im Allgemeinen. Schwächen der Gesundheitssysteme und systemische Faktoren verstärken die Auswirkungen mangelnder Integration. Systemische

Kettenreaktionen resultieren aus der Schwierigkeit, entstehende Interessen und Strukturen zu ändern und umzulenken; von Bedeutung sind hierbei insbesondere Governance Faktoren wie zum Beispiel Stakeholder Interessen. Ergebnisse der Studie in Burkina Faso zeigen überproportional hohe Budgets sowie ineffiziente und unzureichend integrierte Regierungsstrukturen im nationalen HIV/AIDS Programm, im Vergleich zu Standardprogrammen der nationalen Gesundheitsversorgung. Die Analyse der National- und Distriktbudgets in Burkina Faso, Tanzania und Uganda quantifizieren entsprechende Missverhältnisse. Eine disproportional hohe Finanzierung zeigt sich insbesondere im Bereich HIV/AIDS. Andere Bereiche wie Mütter- und Kindersterblichkeit sind verhältnismässig unterfinanziert. Diese Lücken und Ungleichgewichte sind insbesondere von Bedeutung in Anbetracht der tiefen pro Kopf Krankheitsbudgets auf Distriktebene. Hohe Unterschiede zwischen pro Kopf Budgets auf National- im Vergleich zur Distriktebene indizieren ein niedriges Durchsickern der Finanzierung.

Schlussfolgerungen: Diese Arbeit liefert wichtige Erkenntnisse aus den ersten Jahren eines weiten Zugangs zu antiretroviralen Medikamenten in Afrika südlich der Sahara. Sie zeigen, dass Erwartungen einer Stärkung von Gesundheitssystemen durch die zusätzlichen Mittel vertikaler Programme bisher nicht erfüllt wurden. Eine Schwächung der Systeme resultierte insbesondere aus parallelen Prozessen vertikaler Programme. Bei systemanalytischer Betrachtung ist anzunehmen, dass sich jetzige schwächende Tendenzen in der Zukunft weiterhin verstärken. Ursachen liegen in der Schwierigkeit, neue Strukturen und Interessen umzulenken, fehlenden Anreizsystemen sowie fehlender zwischenzeitlichen Stärkung existierender Systeme. Die Erkenntnisse hinsichtlich der Ungleichgewichte in der Finanzierung verschiedener Krankheitsbereiche sowie mangelndes Durchsickern der Finanzmittel sind essentiell für eine bedarfs- und kapazitätsgerechten Budgetallokation internationaler und nationaler Entscheidungsträger. Generell erfordert die Vielschichtigkeit und Komplexität der bestehenden Herausforderungen eine langfristige und system-bezogene Perspektive, im Gegensatz zu den heute weitgehend kurzfristigen und programm-spezifischen Ansätzen externer Unterstützung.

1 Introduction

“Many of the local and global challenges facing us today are embedded in interconnected systems. Addressing these challenges means moving beyond the limitations of the perspectives, methods and tools of traditional reductionistic science.” - Fritjof Capra

The last decade has seen increasing global investments and national efforts to scale up health interventions in low- and middle-income countries. Scaling up antiretroviral treatment has been one of the most widespread of these interventions. Progress, however, has been slower than anticipated when compared to the aspiration of 80% universal coverage levels for antiretroviral therapy (ART) by 2010. The actual coverage achieved was around 36% (WHO and UNAIDS 2010; United Nations 2009).

Less than expected progress against international thresholds such as the Millennium Development Goals (MDGs) has renewed interest in health systems needed to underpin scaled up interventions, including ART. Efforts to improve and develop health systems, however, remain under resourced with negligible growth in funding, compared to the rapid growth of funding for HIV/AIDS treatment with ART (Kates et al. 2010). The first large-scale reviews of health system effects of disease specific programmes provide mixed results, pointing out effects that are both positive and negative (Biesma et al. 2009; Samb et al. 2009a; Yu et al. 2008). The World Health Organisation (WHO) in its 2010 report, “Towards Universal Access”, argues that HIV programme expansion has driven better health systems performance, given that it increased international attention to the need for systems strengthening. The report does not, however, show if and how this has translated into stronger health systems (WHO and UNAIDS 2010). Old debates have consequently risen between the relative merits of vertical as opposed to horizontal or integrated programmes (Bossert 2011). Such controversies are fuelled by a lack of conceptual clarity and a diverse mix of programmes presented as health system interventions (Marchal et al. 2009). To address these issues, the present work seeks to increase conceptual clarity of what health systems strengthening is and to increase factual knowledge on the interface of disease specific programme and national health systems. It addresses conceptual and methodological concerns of evaluating complex health systems, looking at the potentials and limitations of applying a systems thinking lens to national case studies.

1.1 Definitions of and Approaches to Health Systems

The WHO World Health Report 2000 was the first authoritative document to conceptualize health systems and propose indicators for measuring its performance (WHO 2000). It was also the first major product of a new cluster within the WHO on Evidence and Information for Policy, created by Gro Harlem Brundtland and her vision of placing health at the centre of the development agenda (Frenk 2010). Another key document was the 2007 World Health Report which has become the most widely used conceptual framework for health systems (WHO 2007). This was followed by the World Health Report 2008, which placed people and a primary health care approach at the centre of health systems (WHO 2008b). More recently, de Savigny & Adam showed how the WHO health systems framework and the people centred approach of primary health care could be better integrated, understood, and dynamically evaluated through the application of systems thinking (de Savigny and Adam 2009). The following sections present some of these concepts and frameworks in more detail.

The World Health Report 2000 presents a first comprehensive definition and conceptualization of a health system and a framework for assessing health system architecture in terms of its functions, goals and performance measurements. Functions, as defined by the report, are not limited to service provision but also include the enabling dimensions of stewardship, resource creation, and financing. In addition to better health, goals encompass the dimensions of equity, responsiveness and fairness of financial risk protection (WHO 2000). While the report contributed in an essential way to a broader conceptualization of goals and functions and addressed questions of how to evaluate health system performance, public attention has largely focused on the methodological issues related to constructing aggregate indices for measuring health performance and ranking countries. A WHO 2007 report on health systems describes the basic functions of a health system in terms of six core building blocks, namely governance, financing, human resources, information, medicines and technology, and service delivery (WHO 2007). The framework (Figure 1) has become one of the most used health system frameworks. It has, for example, served as the basis for a toolkit developed by WHO in 2008 to monitor health systems strengthening (HSS), using defined indicators for each of the building blocks (WHO 2008c). The building blocks are sub-systems of the health system that together form a dynamic system. Each building block is made up of a set of sub-systems having diverse interactions with other parts of the system. Importantly, these interactions and relationships determine what kind of system the building blocks will form.

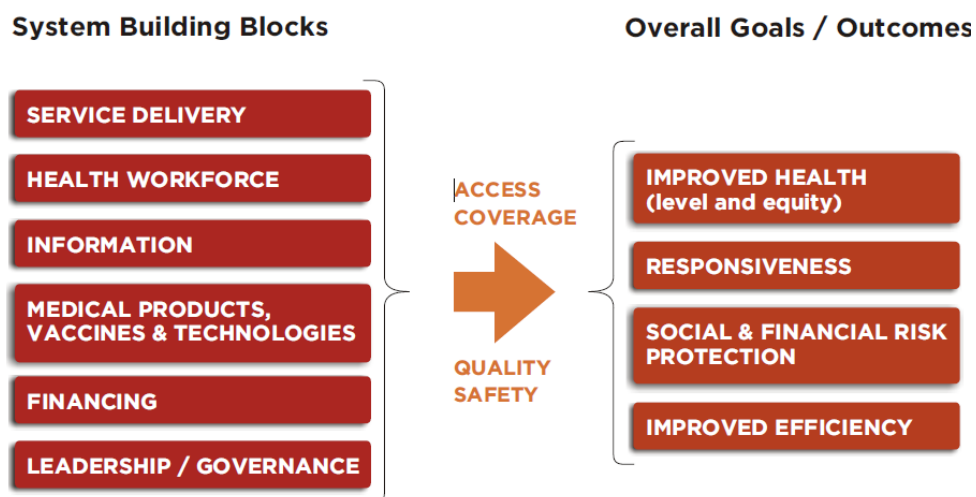


Figure 1: The WHO Health System Framework (de Savigny and Adam 2009)

Mills' and Ranson's health system concept of 2001 distinguishes between four key functions and actors. The four functions are similar to those of the WHO 2000 and 2007 frameworks and include regulation, financing, resource allocation and service provision. Actors are defined as government, population, financing agents and service providers (Mills and Ranson 2001). The framework, however, emphasizes the difference between functions and actors while the World Bank health systems framework distinguishes between health service inputs, service provision, health financing and stewardship (World Bank 2007). Critical health system functions as defined by Atun include stewardship and governance, financing, planning, service delivery, monitoring and evaluation as well as demand generation. The concept is similar to the WHO health systems framework, but includes human resources and technologies within service delivery. Notably, Atun's framework distinguishes between stewardship and governance on one side and planning on the other. Atun's framework was applied to highlight areas and approaches that might serve to better integrate disease specific programme and health systems (Atun et al. 2010a). Handler, Issel and Turnock developed a framework that consists of processes, structural capacity and outcomes. Inputs for structural capacity include information resources, organisational resources, physical resources, human and fiscal resources (Handler et al. 2001). The structural capacity concept largely coincides with the WHO building blocks.

Other conceptual work focuses on potential interventions to improve health systems. The concept of "control knobs" is used to identify areas such as management, power and adjustment mechanisms that have the potential to improve implementation. For Atun, control knobs are defined as stewardship and organisational arrangements, financing, resource allocation, provider payment systems, and service provision (Atun and Menabde 2008). Hsiao

and Saidat define control knobs according to areas where policymakers can have an impact on and measure health system performance. Such areas include financing, macro-organisation, payment, regulation and education (Hsiao 2003; Roberts et al. 2004). Other frameworks such as the one developed by Kutzin and McPake provide guidance for analyzing health system interventions, be it in terms of contextual factors, content or implementation processes (Kutzin and McPake 1997). Frenk proposes a framework for analyzing health reforms that looks at relationships between stakeholder groups and different policy levels ranging from systemic, programmatic, and organisational to instrumental (Frenk 1994).

Some frameworks propose additional perspectives to those mentioned above. Atun, for example highlights the importance of health reforms' context such as demographic, economic, political, legal, epidemiological, socio-demographic and technological dimensions should also be taken into account (Atun and Menabde 2008). Similarly, Hanson suggests public policy and contextual issues be considered, where political context and bureaucracy include civil service rules, remuneration and reform, centralized management system, and political instability among others (Hanson et al. 2003). Hsiao and Saidat show that frameworks can also target sub-systems according to different service delivery modalities from primary to tertiary care, different disease or operational areas such as procurement mechanisms, financial or information management (Hsiao and Saidat 2008).

Table 1 summarizes the main elements of health systems frameworks. It indicates that although the frameworks focus on different functions and areas, they generally follow similar approaches and reach similar conclusions. Most of them conceptualize a health system in terms of its functions, inputs and actors – all of which are covered by the WHO frameworks. They commonly define forms of input generation, resource allocation and management in different areas of a health system, such as governance, financing, human resources, medical technology and service delivery. Another common feature of the frameworks is that they include goals such as equity, efficiency (technical and allocative efficiency), and effectiveness.

Table 1: Elements of Health System Frameworks

	Components	Framework
Functions	Governance Regulation Organisation Integration Planning Financing Demand Generation Resource Creation Resource Allocation Information	(WHO 2000) (Mills and Ranson 2001) (Hsiao 2003;Roberts et al. 2004) (WHO 2007) (World Bank 2007) (Hsiao and Saidat 2008) (Atun and Menabde 2008) (Atun et al. 2010a) (Handler et al. 2001)
Inputs	Commodities Infrastructure	(Handler et al. 2001)
Outputs	Service delivery	(WHO 2000) (WHO 2007) (World Bank 2007)
Values, Goals, Objectives and Outcomes	Equity Efficiency Effectiveness Financial Protection Sustainability Quality Access Coverage Responsiveness	(WHO 2000) (World Bank 2007) (Handler et al. 2001)
Actors	Policy Makers Funding Agencies Service Providers Population	(Mills and Ranson 2001) (Frenk 1994)
Contextual Issues	Demographic Epidemiologic Political Legal Socio-economic Bureaucracy	(Atun and Menabde 2008) (Kutzin and McPace 1997) (Hanson et al. 2003)

Sustainability is a key objective of health systems, yet it receives relatively little attention within health system frameworks. Sustainability refers to the capacity of a system to continue providing output in the future and to adapt to evolving demands as created by, for example, population growth or new diseases. A core element of sustainability is its time dimension as expressed by long-term strategies, for instance pre-service training. Financial sustainability refers to the capacity of the health system to replace funds that they received from donors, which is particularly relevant for low-income countries that have long-term responsibilities such as the need to continue an increasing supply of antiretrovirals (ARVs) (Shediac-Rizkallah and Bone 1998). According to Bossert, sustainability is mainly influenced by economic and political variables, the institutional strengths of implementers, capacity building, participation and integration of activities into existing services and structures (Bossert 1990). The conventional approach to sustainability relies on the notion that donor assistance should make itself redundant. Some donors, however, including the Global Fund, have adopted criteria for sustainability that consider the combination of domestic resources with predictable, open-ended foreign assistance (Ooms et al. 2008).

Integration is a core element of sustainability and, therefore, of health systems strengthening in general. The actual content and structure of integrated approaches, as well as their relative merits in different sub-sections of the health system is still lacking (Atun et al. 2010a). Integration according to these authors describes to what extent activities are bundled between disease-specific programmes and general health service delivery (van Olmen et al. 2010). Atun defines integration as the extent, pattern, and rate of adoption and eventual assimilation of health interventions into critical health system functions. Critical functions include stewardship and governance, financing, planning, service delivery, monitoring and evaluation, as well as demand generation (Atun et al. 2010b). Alignment and harmonization are concepts closely related to integration. They imply that donors should synchronize with government planning and fiscal cycles, use funding modalities that are sustainable and flexible according to national needs, and in general, make use of country systems in the areas of planning, procurement, financing and information systems. The main objective is to reduce the administrative burdens on governments through simplified and common agreements and a clear division of work (Buse et al. 2006). To embrace integrated thinking across the health system building blocks and to identify system dynamics as they relate to integration, de Savigny & Adam highlight the importance of suites or sets of coherent interventions across different sub-systems of the health system providing synergistic potential for better performance (de Savigny and Adam 2009).

There are relatively few examples of applying the above frameworks and concepts to research and programme design in practice. The World Bank has used the control knob framework as a basis for its flagship programme on health system strengthening. The framework developed by Atun was used to develop the Systemic Rapid Assessment (SYSRA) toolkit for examining the context and specific setting of health systems and programmes (Mounier-Jack et al. 2008). WHO developed a toolkit for monitoring health systems strengthening based on its building block framework (WHO 2008c). A more generic applied framework has been developed by the Global Fund to guide the design and analysis of integrated and systems strengthening approaches. It defines health systems strengthening (HSS) interventions as those that have the potential to improve equity, sustainability, quality or cross-cutting dimensions of health services. It combines these four dimensions with the WHO health systems building blocks to define criteria for determining which interventions qualify as health strengthening (GFATM 2009a).

Overall, despite the increasing prominence of and discussions on health systems strengthening, there has been little research that goes beyond looking at individual effects to focus on dynamic processes and linkages among different components of a health system. Neither has there been much attention given to system dynamics and effects that explore the interactions between health systems and health interventions (Atun and Kazatchkine 2009). The conceptual diversity of health system frameworks indicates that it can be challenging to differentiate between interventions that essentially target health systems strengthening and interventions that target single sub-sets of the system.

The WHO health systems framework has played a critical role in conceptualizing health systems and research. This work repeatedly refers to it given its suitability to guide broader analysis of national systems. At the same time it is – as it is the case with most frameworks – relatively generic and open to different interpretations. It provides little guidance on analyzing detailed interactions among different functions, how these relate to health system interventions, or the driving forces that have an impact on performance within health systems, i.e. looking at delayed effects, feedback loops, synergies, or unintended downstream or remote effects that differ in time and place. To understand the specific components of a health system it helps to take a more “bottom up” detailed approach looking at different stakeholder groups and service delivery functions such as different disease areas, levels of providers, modes of delivery and organisation. A number of key questions regard the multitude of factors that affect how implementation proceeds; the feasibility of measuring and modelling these links, and dynamics and probabilistic events within complex systems. The departing point of this work is that given the conceptual broadness of above frameworks it needs a focus on

those perspectives that touch upon the key drivers for better systems performance. As a first step it needs a thorough understanding of national health systems, including links between programmes, dynamics and causal loops as suggested by systems thinking – all case studies compiled in this work aim at this objective. As a next step, it needs a focus on those elements that present potential for change, such as stakeholder motivations, important health systems weaknesses (such as weak ministries, lack of human resources, poor supply chain and information systems), as well as important contextual issues such as donor aid structures and funding flow and speed. Moreover, to guide prominent international discussions on where and how to invest to strengthen health systems, more quantitative evidence is needed, including information on financial allocation and expenditure to different interventions against burden of diseases.

1.2 Definitions and Approaches to Systems Thinking

The limitations of linear frameworks like those described above has renewed interest in systems thinking as a way to address linearity and gain better insight into how the different features of a health system contribute to better outcomes. While a concept like the WHO Health Systems Framework provides a common approach to conceptualizing health systems, systems thinking provides the mindset and strategic approach for navigating the actual functioning of the health system. It considers how complex systems are related to system design, and how the system works, for whom, and under what circumstances (de Savigny and Adam 2009). The potential of systems thinking to “see the whole” and to find ways of joining different elements of a health system so that they perform better is especially critical in cases where complex interventions are shaped by a lack of willingness to deal with complex systems and induce potentially harmful system effects. This work applies systems thinking to assess the complex relationship and dynamics between ART and health systems.

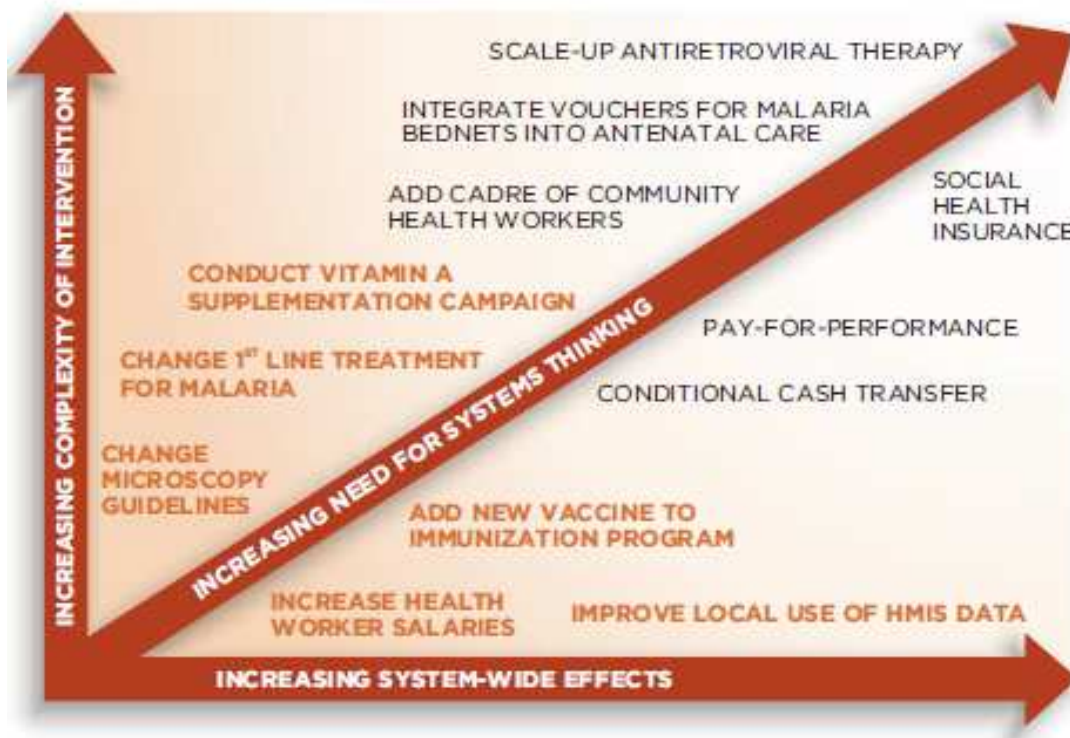


Figure 2: Levels of complexity in interventions and their potential for system-wide effects (de Savigny and Adam 2009)

Systems are constantly changing, self-organizing, non-linear, history dependent and resistant to change. Causality between different elements of a system is an on-going process of interactions that influence one another and impacts behaviours. Relationships, contexts, repeated events and patterns of change, rather than static and isolated events, are key features of systems. These characteristics suggest ways of thinking, designing and implementing that differ in an essential way from traditional approaches that are top-down and have relatively narrow perspectives based on functional project designs, budgeted outputs and contractual arrangements. They tend to become unsustainable if not rooted in the systems, motivation and participation of people. In contrast, systems thinking is based on bottom-up, integrated and demand driven approaches instead of project outputs based on budgets and different external agendas (de Savigny and Adam 2009).

Systems thinking has its origins in other fields, namely engineering and ecology. Within the health sector, it has been applied primarily to complex epidemics and sub-systems, such as obesity (Finegood et al. 2008), tuberculosis (Atun and Menabde 2008) and tobacco control (Best et al. 2007). There is, as yet, relatively little applied work in systems thinking to address the interface of complex health interventions and complex comprehensive health systems. Concepts of systems thinking as they relate to complex global settings have been laid out by

Meadows, who also developed the idea of leverage points as discussed in other parts of this work (Meadows et al. 1982; Meadows 1998; Meadows 2008). Shiell and Hawe use systems thinking to develop concepts related to the nature of complex health systems and complex sub-systems, such as primary care or hospitals. They argue that even standardized interventions such as randomized controlled trials remain complex and unpredictable during implementation (Shiell et al. 2008; Hawe et al. 2004). Leischow highlights the need to use systems thinking to understand and assess public health interventions by looking at connected systems that are “more than the sum of its parts” rather than conventional linear evaluations and problem solving approaches (Leischow and Milstein 2006).

Recent work on systems thinking has helped to better define and conceptualize potential research questions and provides recommendations for evaluation designs that address processes, contexts, effects or costs. Research on processes looks at links of implementation and effects. Context evaluations can target the driving forces and potential bottlenecks of interventions as well as other system effects. Effect evaluations look at intervention outcomes such as coverage, mortality and morbidity, including adverse and distributional effects in terms of equity. Economic evaluations might assess and compare the efficiency of interventions based on associated costs (de Savigny and Adam 2009).

Systems thinking tools include case studies that employ qualitative methods and systems modelling to reveal the underlying relationships and dynamics that drive the system in a certain direction, and have intended and unintended consequences for various sub-systems. The scope of quantitative modelling will depend on available data; models, therefore, usually focus on micro level single interventions – often at clinical level. At a broader contextual level it is often not feasible to quantitatively replicate processes given the large number of steps and variables involved, and the lack of defined processes, probabilities and effects of diverse variables. This implies a trade-off between a quantifiable, specific but narrowly defined scope of work and a more comprehensive assessment to capture whole systems as suggested by systems thinking. Systems thinking addressing system-wide and contextual subjects might fall short on presenting quantitative outcomes. Instead, they often focus on qualitative case study findings to illustrate causal links and gaps between policy and implementation of interventions across individual, organisational, national and global levels (Hudson and Lowe 2004). Accordingly, this work chose to focus on sub-systems and largely qualitative findings. This work in its case studies applies principles of systems thinking by taking a comprehensive view of how sub-systems and functions relate to each other, and by looking at important driving forces such as stakeholder motivations. It examines applicability and pursues analysis within national health systems case studies. More detailed analysis of delivery modes remains

largely uncovered by this work given its objective to cover national systems and the broader links between building blocks.

1.3 Definitions and Approaches to Governance

Governance transcends all elements of a health system as the main driver of performance. It is a multidimensional concept that usually involves actors and institutions. It is, therefore, at the core of any health systems intervention. Definitions presented in this section indicate an overlap between the terms “governance”, “policy making” and “stewardship”. Balabanova, Oliveira-Cruz, and Hanson define governance as having political (how those in authority are elected, appointed, monitored), economic (how public resources are managed and policies implemented), and institutional (how citizens and the state itself relate to the society’s or public institutions) elements (Balabanova et al. 2008). The United Kingdom Department for International Development (DfID) defines governance as how the institutions, rules and systems of the state operate at different levels and relate to individual citizens, civil society and the private sector (Department for International Development 2001). Similarly, the International Institute of Administrative Sciences defines governance as “the structure of institutions and societal norms by which authority is exercised for everyone’s benefit at all levels, from local to global” (GWG IIAS 1996). According to Doherty and Gilson, governance includes roles and responsibilities for three sets of actors, including policy makers, health service providers, and service users (Doherty and Gilson 2006). The World Bank and WHO define governance (or stewardship) as the establishment of policies to govern the health system, which includes institutional frameworks in which actors operate, coordination, and generation of data for decision-making (WHO 2000; World Bank 2007). Another World Bank definition points to the process by which those in authority are selected, monitored and replaced, as well as the capacity of governments to effectively manage resources and implement policies (World Bank 2010b). WHO emphasizes that governance is a core function that affects all other elements in a health system through policy guidance, intelligence and oversight, collaboration and coalition building, regulation and incentives, system design, and accountability to the public (WHO 2007). The Global Fund offers a similar definition of governance functions, including ensuring the existence of strategic policy frameworks, effective oversight, coalition building, providing appropriate regulations and incentives, attention to system design and accountability. Accountability is ensured by improving regulation, instituting regular performance reviews and supporting policy and research on health systems (GFATM 2009b).

Governance in the health sector is a relatively new and undeveloped area of analysis. Consequently, there is little guidance available on how to generate feasible and useful research findings for better outcomes. Existing indexes that assess governance focus on some overall governance issues, such as existence of regulatory bodies, laws and policy documents. One such index is the Country Policy and Institutional Assessment (CPIA), developed by the World Bank, which rates the quality of national policies and institutional frameworks based on expert judgments. It addresses sixteen subcomponents, including one for governance in the health and education sectors (World Bank 2008). The United Nations General Assembly Special Session (UNGASS) National Composite Policy Index (NCPI) is another tool applied at the global level to assess national policies and commitments to HIV/AIDS (UNGASS 2008). Both indexes use a checklist whereby countries can tick whether or not they have certain policies and boards in place. The most common answer of countries within the NCPI is “yes, we have that policy”, a response that provides little information about to what extent countries implement these policies. Important additional information to highlight the insides of governance processes will need to be thought through qualitative case studies as done in the frame of this research.

The motivations of different actors and the external and internal forces that drive them, including health workers, managers and policy-makers, are one of the suggested tipping points (intervention areas that provide potential for improvement) in the area of governance. A systems perspective acknowledges that governance within sub-systems or organisations is shaped by both formal and informal roles, aims, interests and actions of individuals (Frenk 1994). Organisational constructs develop and dissolve depending on the actions of individuals, which consequently become a factor in sustainability of interventions. These do not necessarily overlap with organisational aims and health policies, as would be the case, for example, when poorly paid staff might follow other interests benefiting their own survival (Schneider et al. 2006). These informal relations and underlying interests need to be understood to design integrated approaches (Atkinson 2002; Gilson 2003). WHO also emphasizes the importance of actors in its conceptual work on primary care, placing people at the centre of a health system (WHO 2008b). Approaches to assessing stakeholders in accordance with the principles of systems thinking include looking at the way actors manage policies; the dynamics of developments over time, causalities and underlying behaviours (Richmond and Waltham 2000; de Savigny and Adam 2009). Another means of assessing the forces driving stakeholders is to look at economic principles of risks and incentives (Narayanan and Raman 2004). The approach assumes that stakeholders respond to rewards and risks that shape their willingness to face uncertain events. They will consequently only adjust their actions if they also face consequences (Bernstein 1996; Laffont and Martimort

2002). This works' case study on supply chain management in Tanzania presents an in-depth analysis of these issues.

Accountability constitutes another tipping point with potentially high adverse effects on programme outcomes. It includes governance mechanisms that follow up on policies in practice. Accountability requires providing information and explanations for action and inaction, as well as being liable to sanctions for failure to deliver – all of these issues are closely linked to control. Accountability will depend on the multiplicity of actors upon whom progress depends and on the future dynamics of their activities (Buse et al. 2006). Drug supply is an area particularly affected by lack of accountability. Pharmaceuticals and related supplies tend to be locked and closely tracked, given the risk of leaks. Controlling theft poses a much greater challenge in the absence of information systems that have the ability to control and sanction fluctuating funding, as is usually the case in low-income countries.

Studies show a negative correlation between corruption and effectiveness of public health spending (Gupta et al. 2000; Rajkumar and Swaroop 2002; Wagstaff and Claeson 2004). Work by Wagstaff and Claeson suggests that increased spending in countries that score relatively low on governance performance will not lead to lower child mortality rates (Wagstaff and Claeson 2004). There is, however, relatively little evidence of the above issue due in part to the methodological challenges related to measuring related dimensions and comparing findings between countries. Methodological challenges include uncertainty of the direction of causality and difficulty distinguishing between inefficiency and corruption in many instances (Lewis 2006; Lindelow et al. 2003; McPake et al. 1999).

Lack of accountability can manifest itself in a number of ways, from “big-time corruption” at national level to opportunistic behaviour at all levels (Balabanova et al. 2008). The first can create a downward spiral of poor conduct, encouraging malpractice of street level bureaucrats by reducing the resources available to them as well as means to monitor and enforce conduct (World Bank 2010a). Health workers in Uganda, for example, stated additional income from selling drugs and declared that their greatest source of income is agriculture, implicitly acknowledging a high rate of absenteeism. Effective working hours in most cases were about 70% or less (McPake et al. 2000). These kinds of effects can be triggered by the ubiquitous notion of malpractice that evolves to the point where it is perceived as normal routine (de Sardan 1999). Malpractices are also closely linked to power and enmeshed in contextual issues, such as the interests of a ruling elite to remain in power (Harsch 1993). Such interests are dynamically linked to system weaknesses, as illustrated in this works' case studies. Case studies look at the lack of accountability as potential adverse effects of poorly

integrated disease specific programmes, drawing on secondary sources; further in-depth analysis of accountability issues has not been the focus of this work partly due to the mentioned methodological challenges.

1.4 Definitions and Approaches to Health Policy Analysis

Health systems and health policy analysis are integrally linked given that any health policy action aims at strengthened health systems and needs to be informed by the dynamics of health systems. Health policy analysis seeks to understand how different actors interact in the policy and implementation process, encompassing policies, organisations, programmes, peoples, their actions and what is driving those such as motivations and power issues. It draws on different disciplines to comprehensively assess the interface between health policies and health systems. One of the important aspects of policy analysis is looking at the steps of a policy process. According to Buse, Mays and Walt, health policy analysis draws on political science and public administration perspectives and focuses on understanding the political and social forces working at national and organisational levels as they affect policy development and implementation (Buse et al. 2005). Policy can be defined along various lines, including rhetoric and political speeches, written documents, institutional mechanisms for decision making and implementation, as well as daily interaction of street level bureaucrats (Shore and Wright 1997). Walt has developed a widely used framework, stating that actors, context and processes essentially determine policy processes. Context ranges from issues relevant at a global scale to the relationships, perspectives, and incentives of the various actors at national, district and facility levels (Walt 1994). An important characteristic of the framework is that it recognizes that policy processes are not straightforward and rational, but diffuse, iterative and looped (Walt et al. 2004). Any action or input might have an impact on policy making. Donald, for example, highlights bureaucratic needs as an important driving force of policy defined by the political context of day-do-day work where policy decisions are made in the context of money, power, and precedent (Donald 2001).

This works' case study on governance issues related to ART in Burkina Faso takes a closer look at policy documents are one important manifestation of the early stages of agenda setting and policy formulation. National level policies can apply to laws affecting health, national health policies, and human rights guarantees. Closer to the operational level, policy documents apply to public sector regulations concerning budget allocations, taxes, personnel and infrastructure. At district and service delivery level, they support formal regulations,

medical guidelines, accreditations, standards, and lines of authority. Importantly, these policy documents constitute only “snap-shot” manifestations of policy content, development and implementation. The other and presumably more important part of the picture consists of the informal norms, procedures, authorities and actual medical practices in any area of policy development, programme implementation and service delivery. Policy content, for example, also includes the ways in which stakeholders understand, interpret and implement respective policies (Parsons 1997).

Policy documents serve to generate interest in policy formulation and guide implementation. But a document's content tends to be lost in the process of implementation when a multitude of other issues come into play affecting how strategies are implemented. Policy documents do not accurately reflect implementation for different reasons. First, they are usually short on information and mechanisms that allow follow up on implementation. Secondly, even in the case of sufficiently detailed information on future steps, implementation can not be fully predicted and strategies need to be adapted along the way. Implementation will depend on complex interactions between citizens, the state, and providers, as well as socio-economic and environmental factors that make it difficult to predict the specific processes and costs of implementation as coverage increases. Moreover, interventions imply a complex number of components and steps to achieve success. Some of the steps are likely to fail. National goals, and the more or less enforced decisions by a cadre of planners, have relatively little impact on implementation driven by piecemeal adaptation of those goals by “street-level bureaucrats”, the “how to” of which will only emerge in the process of doing (Gilson 2005).

No universally applicable guidelines exist for assessing policy documents. An evaluation by the Overseas Development Institute (ODI), for example, looks at how far national HIV/AIDS plans contain explicit objectives, budgets, operational plans and are developed in a participatory manner. It concludes that few policies are explicit about priorities, only 60% include budgets, and about half of the policies were translated into operational plans, including a monitoring and evaluation plan. Plans were commonly developed by external consultants with little participation of national stakeholders (Buse et al. 2006). Similar criteria have been developed by the Appraisal of Guidelines, Research and Evaluation in Europe (AGREE) framework - a generally accepted framework for assessing the quality of clinical guidelines according to their scope and purpose, stakeholder involvement, rigor of development, clarity and presentation, as well as applicability (The AGREE Collaboration 2001). Notably, Panos mentions that a common weakness of policy documents is a focus on extensive details and little attention to guidance for setting priorities (Panos 2006). This works'

case study on governance in Burkina Faso further assesses the relevance and applicability of these concepts.

Stakeholders are one, or arguably the key element having an impact on policy making and implementation, its organisational structures and processes. Thus, stakeholder analysis constitutes a common approach to assessing policy making and the implementation of interventions. One approach to stakeholder analysis aims presenting a scale to compare stakeholders according to their position against or in favour of a policy, power, resources and roles (Varvasovszky and Brugha 2000). One limitation of the approach is that it assumes stakeholders take a clear stance either in favour or against a policy and that corresponding dimensions can be translated into a scale. Policies, however, do not necessarily divide stakeholders into supporters and opponents. To use one of the key questions of this research as an example, stakeholders unanimously supported the policy that ART should be used to strengthen health systems. Scaling stakeholders' political and financial power also presents methodological challenges. Budgets are a quantifiable variable, but might not represent actual power. Stakeholders might, for example, have decision-making powers over how to allocate budgets, but decisions over the total amounts of those budgets are made at other levels. Moreover, the approach does not address the diversity of roles and relationships among stakeholders and other system inputs, processes and structures. As a response to these limitations a conventional stakeholder analysis was not followed up in the frame of this research.

Two different conceptual approaches to assessing policy processes can be identified. One takes a more linear and input-output-based approach, while the other attempts to factor in other dimensions of the policy process, including behaviour among individuals and coalitions, the role of stakeholders, power, policy designs and dynamics. The latter approach is in line with systems thinking, as it aims to understand the dynamics of a system with nested levels of interactions and contextual issues. Propagating the concept of a linear stages model, Lasswell is one of the founding fathers of policy analysis. He conceptualizes policy-making in terms of seven stages: intelligence, promotion, prescription, invocation, application, termination and appraisal (Lasswell 1956). Jann and Wegrich in addition highlight the implementation stage as part of the policy cycle (Jann and Wegrich 2003). Policy stage and cycle models have been widely applied by, for example, the Overseas Development Institute (ODI), which distinguishes between stages of a policy process including agenda setting, policy formulation, decision-making, policy implementation and policy evaluation (Court 2004). Some of the most common policy analysis approaches, such as document and stakeholder analysis, take a rather linear and possibly reductionist approach.

A conceptual landmark of policy analysis more in keeping with systems thinking is the work of Sabatier. He looks at the role of belief systems, advocacy and coalitions as they affect policy processes (Sabatier 2007). Kingdon developed another key framework in the systems thinking category; his “multiple stream” model explains how issues find their way onto policy agendas. The problem, policy and politics streams need to coincide, meaning that an issue becomes urgent to address and, therefore, starts to be promoted by different stakeholders, including the community, policy experts and government officials (Kingdon 1995). Kinsman applies this model to the history of HIV policy making in Uganda and shows how the country experienced a joining of the three streams as the problem or need to address HIV was recognized and a viable solution existed that was supported by policy makers (Kinsman 2009).

As stated before, the disciplines applied within policy analysis are diverse dependent on the research focus. Qualitative research plays an important role to assess processes, roles and interests of actors. It covers a range of concepts, research designs and methods including in-depth interviews, observation, focus group discussions, and document analysis (Pope and Mays 2006). Qualitative research has been most widely applied and conceptualized in the area of ethnographic studies, looking at the perceptions and behaviours of service providers and the population. Conceptualizing and applying qualitative methods to assess the context, structures and processes of health services and systems has received relatively little attention within health services research. More of the conceptual and applied work in that area has been developed for programme evaluations and operational research looking at implementation effects (Wholey et al. 1994). Two streams of qualitative social research methods can be identified that take almost opposite approaches. One stream focuses on testing assumptions and analytical frameworks, while the other, based on Grounded Theory (GT), assumes that the process of data collection itself leads to the development of frameworks (Glaser and Strauss 1967). Looking at linear as opposed to adaptive approaches, systems thinking would be categorized as part of the latter.

To conclude, health policy and systems analysis provide a broad set of approaches and tools for understanding the behaviour of complex systems and for assessing potential synergies and weaknesses that need to be addressed in order to strengthen health systems such as by looking at potential bottlenecks within policy stages and sub-systems. The health system frameworks presented above suggest that essentially any aspect of real world settings, any decision or action along with its context and inputs, can be subject to policy analysis, depending on the research interest. It is, therefore, essential to clearly define the purpose of policy analysis and identify the physical inputs and specific elements that will be subject to

analysis, and to focus on those aspects that have the potential to improve outcomes. Another key issue is the recognition that non-linear conceptual frameworks, in line with systems thinking, are a key to assess real world and complex settings. This works' case studies (apart from the budget analysis) therefore apply relatively open and "non-linear" analytical approaches.

1.5 Antiretroviral Treatment in Burkina Faso, Tanzania and Uganda

ART is the most complex health intervention ever taken to scale in low-income countries. It includes diverse and long-term diagnostic, treatment and counselling services. For instance, highly active antiretroviral therapy (HAART) involves monthly (sometimes weekly) visits to healthcare providers and provision of first-line drugs only or first line drugs plus second line drugs when required. Voluntary counselling and testing (VCT) is usually performed at primary care level, using rapid tests. Prevention of mother to child transmission (PMTCT) includes informing women seeking antenatal care of the risks and benefits of nevirapine for prophylaxis, offering pre-test counselling and giving a single dose to the women who accept, as well as a single dose to the child when delivered in a healthcare facility. ART progress is closely related to a range of other health services, including treatment of sexually transmitted infections, tuberculosis and other opportunistic infections. Given its complexity, ART affects all layers and elements of health systems and is itself affected by lack of resources, poor governance and planning, equity issues related to access and - from a clinical perspective - monitoring adherence, resistance and toxicity (Hardon et al. 2006; Bekker et al. 2006; Batz et al. 2006).

Recent years have seen important achievements in scaling up ART; however achievements still fall short of international targets. 36% of people who needed HIV treatment in low- and middle income countries had access to it in 2009 (WHO and UNAIDS 2010). The feasibility of attaining and sustaining targets in the future is a key question where views diverge. A Lancet paper in 2004 estimated that treatment programmes will not be able to cover all people in need and will also become financially unsustainable without a sharp fall in HIV incidence (Gayle & Lange 2004). Hogan et al. suggest potentially high future costs if more people start HIV treatment earlier and especially if they have to switch to 2nd line treatment. Figure 3 shows an expansion path where various interventions to control HIV/AIDS, starting at a low-cost level with mass media interventions (D1) and ending at a high-cost level with ART for 1st

(D12) and 2nd line treatment (D13), are added upon each other based on the average cost effectiveness of the various interventions (Hogan et al. 2005).

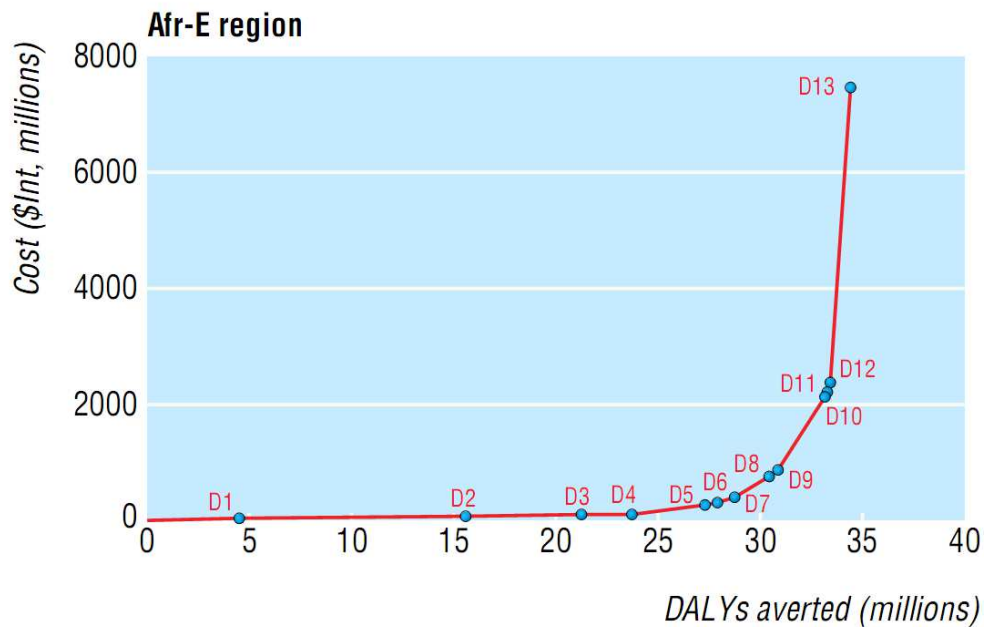


Figure 3: Expansion path for HIV/AIDS control and treatment (Hogan, Baltussen, Hayashi, Lauer, & Salomon 2005).

In Burkina Faso, Tanzania and Uganda, ART has been provided by the public sector since 2005 and on a larger scale since 2007. The years between 2003 and 2005 constituted a preparatory phase, characterized by proposal writing, fundraising, training, establishing coordination bodies and supply and information systems to deliver ART. ART expansion in the three countries has been almost entirely funded by Global Health Initiatives (GHIs). In Uganda, for example, 95% of the national ART is funded by GHIs (WHO 2008d). In Tanzania, GHIs have triggered a eightfold increase of HIV expenditure from USD 33.8 million in 2003 to USD 266.7 million in 2006 (Ministry of Health and Social Welfare 2008c). To a large extent, accelerated access to treatment has been achieved through additional structures set up by GHIs. These structures include procurement through external agencies and clinical services often provided in private clinics, among others. In Uganda for example more than half of ART services is delivered through private facilities (DELIVER and JSI 2007).

In 2009, ART coverage rates in the three countries were between 30-35%. They increased by about 30% between 2008 and 2009 in all three countries (WHO and UNAIDS 2010). The increase in coverage rates is an important achievement, especially as Tanzania and Uganda had relatively high HIV prevalence rates in 2008 of 6.2% and 5.2% respectively. HIV

prevalence in Burkina Faso was lower that year at 1.6% (WHO 2010c). Despite considerable progress in terms of numbers, coverage remains below national targets. In Tanzania, for example, less than half (180,000) of the national target number for patients on ARVs (440 000) was actually met by 2008 (Clinton Foundation 2005; Euro Health Group 2009). Service uptake has also remained low in some settings, such as for PMTCT in Uganda (Government of Uganda 2009; Larsson et al. 2009). Moreover, overall coverage rates mask distributional inequities and quality issues. In Uganda, for example, despite a policy to decentralize ART to health centre clinics run by medical assistants, 83% of ART services were still offered at hospital level in 2007 (Ministry of Health Uganda 2008). These numbers indicate that despite important achievements sustained access to ART will likely remain a challenge and therefore requires assessment of national health systems strengths and weaknesses.

1.6 Health and Health Systems in Burkina Faso, Tanzania and Uganda

A comparison of health system outcomes and related indicators in Burkina Faso, Tanzania and Uganda shows that the three countries share relatively common features and continue to face important gaps in all areas of essential and basic health care services. Despite the general concurrence that ART expansion requires a functioning health system, surprisingly little attention has been given to assessing health systems accordingly. The persisting low coverage rates of much “easier” interventions suggest that important health systems weaknesses exist. Table 2 provides a comparative health system profile for Burkina Faso, Tanzania and Uganda and summarizes some key statistics on health financing and service delivery. All numbers are based on 2010 statistics from WHO unless otherwise indicated.

Table 2: Selected indicators for health expenditure, mortality and health service coverage (WHO 2010c)

	Burkina Faso	Tanzania	Uganda
Gross national incomes per capita (PPP int. USD)	USD1,160	USD1,230	USD1,140
Government expenditure on health as a percentage of total government expenditure, 2007	13.3%	18.4%	9.8%
Private expenditure on health as a percentage of total expenditure, 2007	44%	34%	74%
Proportion of people living on less than a dollar a day (PPP int. USD), 2007	56.5%	88.5%	51.5%
Annual population growth rate, 2008	3.2%	2.7%	3.2%
Density for nurses and midwives per 10 000 people, 2009	7	2	13
Median availability of generic medicines in the public sector, 2008	-	23%	20%
Antenatal care coverage, 2009	18%	62%	47%
DTP3 coverage among one-year-olds, 2008	79%	84%	64%
Unmet need for family planning, 2007	29%	22%	41%
Maternal mortality ratio (per 100 000 live births), 2009	307	578	435
Neonatal mortality rate (per 1000 live births), 2008	36	31	33

Gross annual national incomes per capita – measured in USD purchasing power parity (PPP) - were relatively close in the three countries in 2007, ranging from USD 1,140 in Uganda, to USD 1,160 in Burkina Faso and USD 1,230 in Tanzania. The proportion of people living on

less than a dollar a day (PPP int. USD) in 2007 was lowest in Uganda with 51.5% followed by Burkina Faso with 56.5% and Tanzania with 88.5%. All three countries are characterized by a largely rural population and a significant part of the population being below the poverty line. They have growing populations, with annual growth rates between 2.7% in Tanzania and 3.2% in Burkina Faso and Uganda as of 2008 (WHO 2010c).

The health financing and reform context of the three countries is characterized by decentralization, increasing government expenditure on health, especially in Tanzania, and consistently large proportions of external and private funding. Decentralization of the health system has been a major reform issue in all three countries. In Burkina Faso, the foundations for decentralization were set in 1991 (Bodart et al. 2001). In Tanzania, the current wave of reforms, including efforts to better decentralize, were initiated in 1993 (Semali et al. 2007). Uganda followed suit in 2000 with efforts to decentralize its health system. The relatively late decentralization in Uganda appears to correspond to late efforts to engage in coordination through sector-wide planning which began in 1999 (Oomman et al. 2008).

All three countries have significantly increased government expenditures on health as a percentage of total government expenditures between 2002 and 2007. Expenditure doubled from 9.1% to 18.4% in Tanzania, increased from 8.9% to 13.3% in Burkina Faso and only modestly rose from 7.3% to 9.8% in Uganda. A significant proportion of national health expenditures is externally funded; half of it in Tanzania, and a third of it in Burkina Faso and Uganda. Notably, private expenditure on health as a percentage of total expenditure on health between 2000 and 2007 remained almost constant in Uganda, at a high level of 74%. In contrast, Burkina Faso and Tanzania have seen considerable reductions during these years from 60% to 44% and from 57% to 34%, respectively.

Important gaps persist in human resources and other essential health system inputs, such as essential medicines. Tanzania faces an especially low number of health staff per capita. The density of nurses and midwives per 10,000 people ranges from 2 in Tanzania, 7 in Burkina Faso to 13 in Uganda as of 2009. These differences are even higher for physicians with 0.07 physicians per 10,000 people in Tanzania and 1.03 per 10 000 people in Uganda as of 2009. Numbers are similar for pharmaceutical personnel. The median availability of generic medicines in 2008 was about one fourth in the public health sector in Tanzania (23%) and Uganda (20 %). It was much higher in the private sector in Uganda (80%) compared to the private sector in Tanzania (48%). These figures are based on surveys conducted using WHO and Health Action International (HAI) standard methods, between 2001 and 2008 (WHO 2010c).

Indicators of health service coverage show both gaps as well as differences between the three countries. Antenatal care coverage defined in terms of at least four visits during pregnancy was 18% in Burkina Faso, 47% in Uganda and 62% in Tanzania in 2009. DTP3 coverage among one-year-olds in 2000 and 2008 increased in all countries, from 49% to 79% in Burkina Faso, 56% to 64% in Tanzania and 79% to 84% in Uganda. The unmet need for family planning remains high in all three countries with 22% in Tanzania, 29% in Burkina Faso and 41% in Uganda in 2007. The percentage of children under five with fever who received treatment with any antimalarial was around 50-60% in all three countries in 2008. Indicators for maternal and newborn health remain relatively poor in all three countries. All three countries have experienced decreasing under-five mortality rates per 1000 live births between 2000 and 2008. The reduction was most dramatic in Tanzania, falling from 139 to 81 (National Bureau of Statistics 2010). It fell from 188 to 169 in Burkina Faso and 154 to 130 in Uganda (CME 2011). These numbers, however, are based on five-year averages. Looking at disaggregated estimates, the decline of annual point rates for Tanzania is more pronounced, suggesting a reduction from 128 to 59 between 2000 and 2007 (Masanja et al. 2008). Maternal mortality is relatively high in all countries; the ratio per 1 000 live births as reported by the countries is 4.4 in Uganda, 3.1 in Burkina Faso, and 5.8 in Tanzania.

Altogether, these health service and outcome indicators show that important gaps remain in the area of essential and basic care delivery in the three countries. They relate to services that are relatively simple to manage in low-income health systems. The feasibility of a complex intervention such as ART needs to be assessed in light of both health system constraints as well as persisting poor outcomes. If the constraints and poor outcomes relate to relatively straightforward and cost-effective interventions - and many of the measures to improve mother and child health can be characterized as such - more complex interventions such as ART are likely to be even more affected. It is also notable that these persisting gaps are in areas where integrated approaches are required, while greater success in terms of immunization coverage, for example, has been achieved with vertical interventions that are less dependent on the functional integration of all elements of a health system. It means that there is a need to assess and address the range of health system weaknesses and their linkages as they continue to affect health outcomes, including coverage and quality of ART. To this end, case studies in this work take a systems thinking approach to assess and link national health systems (including existing constraints) to respective sub-sectors (i.e. supply chain management) and disease-specific programmes (ART). In addition, the work on budget allocation according to interventions and burden of diseases regards justification for ART compared to other disease areas for burden against costs.

1.7 New Paradigms and International Initiatives for ART

Expansion of ART has been almost entirely funded and driven by powerful new paradigms, international initiatives and global targets. The Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) was initially inspired by United Nations (UN) Secretary General, Kofi Annan and started work in January 2002. The launch of the United States (US) President's Emergency Plan for AIDS relief (PEPFAR) was announced by GW Bush in January 2003 (Avert 2009). These initiatives coincide with significant amounts of funding that often surpass previous funding mechanisms (Hanefeld 2008). The Global Fund, for example, has become more important in financing control of Tuberculosis (TB), Malaria and HIV than the World Bank (Radelet and Caines 2005).

There has been considerable discussion and writing on the merits and potential pitfalls of GHIs. Views remain polarized. GHIs are likely to remain attractive due to their capacity to manage large amounts of development funds with relatively few technical staff (Lele et al. 2005). Potential benefits are increased financial resources, fast-tracked initiatives and higher political attention to global health priorities. Concerns regard increased fragmentation of global players and national health systems, a focus on short-term targets, a lack of integration with countries' overall health programmes and additional burdens on constrained national systems (Segall 2003; Harmer 2005; Caines 2004). Vertical approaches can be easier and quicker to implement, but are often duplicative, less sustainable and risk undermining overall capacity (Brown 2001). Of note, part of the original rationale for GHIs was to support areas of perceived neglect and to simplify the aid architecture. GHIs' adverse effects are entangled with a complex mix of system constraints and diverse interests and therefore difficult to mitigate as will be shown elsewhere in this work.

Despite certain commonalities, the modalities between GHIs differ. PEPFAR, for example, mainly works with international nongovernmental organisations (INGOs) headquartered in the US and operating in other countries. It uses parallel structures for staffing, procurement, distributions and reporting. It is bound by the US congressional budgetary cycle and, therefore, makes relatively short funding commitments. Unlike the Global Fund and the World Bank, who disburse funds prior to programme activities, the timing of PEPFAR disbursements varies by agreement (Bernstein and Sessions 2007). The World Bank Multi-Country AIDS Programme (MAP) has a policy of using government structures, but modalities differ in practice. MAP in Uganda, for example, partly bypassed national structures by directly working with district and facility level structures (Zikusooka et al. 2009). Both MAP and PEPFAR require parallel funding and reporting procedures (Oomman et al. 2007). The Global Fund

generally uses government structures, but the specific procedures differ between countries. In Uganda, for example, funding was initially channelled through project modules, but was included as part of the national health budget.

Recent years have seen an increased awareness of GHIs towards health systems strengthening in general, as well as harmonization and alignment issues (Brugha 2005; Lele et al. 2005). The budget of the Global Alliance for Vaccines and Immunization (GAVI) for health systems strengthening has substantially increased from USD 500 to 800 million since 2008 (Dickinson 2008). The World Bank's allocation to healthcare reforms rose from USD 316 million in 2001 to USD 739 million in 2007 (World Bank 2010c). The same year, both the World Bank and DFID revised their health strategies, giving high priority to health systems strengthening (World Bank 2007; Department for International Development 2007). The GAVI Alliance, in 2008, developed a new funding and technical support strategy for health systems strengthening (GAVI 2009; HLSP 2009). In 2009, the Global Fund, the GAVI Alliance and the World Bank consulted on how to align and jointly programme their health systems strengthening funding frameworks. PEPFAR revised its HIV strategy in 2009, giving higher priority to health systems strengthening (Pepfar 2009). The G8 developed a framework for health systems strengthening and adapted its funding commitments accordingly. It also set up a special taskforce in 2008 to innovate international funding for health systems (International Health Partnership 2008). There is, however, a general lack of conceptual clarity and common understanding of what constitutes "health systems strengthening", as further explained in other parts of this work. The label "health systems strengthening" is consequently attached to a diverse mix of initiatives, which may hardly classify as such.

The Paris Declaration was endorsed in 2005 with an international agreement for and commitment to better alignment of aid (High Level Forum 2005). The "Three Ones" were launched by the Joint United Nations Programme on HIV and AIDS (UNAIDS) to ensure that all national level initiatives for HIV/AIDS adhere to one national framework, organisational structure and monitoring and evaluation system (UNAIDS 2005). However, focusing only on integrating national initiatives in the area of HIV, instead of health sectors as a whole could be classified as partial integration, if not fragmentation. Overall, despite increasing visibility at international level, evidence of impacts at country level remains limited. Some initiatives such as the Global Fund and GAVI have increased the visibility of their efforts to better integrate. The Global Fund for example, in its efforts to explicitly support and fund health systems strengthening, has developed criteria for defining the degree of integration of disease specific programmes (GFATM 2011b). The Global Fund was said to be relatively well integrated into national plans and priorities in Benin, Ethiopia, and Malawi (Mtonya and Chizimbi 2006). It has

shown increasing flexibility and willingness to channel funds through existing budgetary mechanisms, as in Mozambique, where it started to channel funds through a not yet well functioning Sector-Wide Approach (SWAp), causing the World Bank to follow suit – an integration that, according to national representatives, significantly reduced transaction costs and lead to an overall improvement of accounting rules and monitoring systems (Radelet and Caines 2005; Dickinson et al. 2007).

In countries where GHIs encourage health systems strengthening, there is a lack of capacity to design comprehensive strategies, likely due to missing political support as well as technical and conceptual resources. Since round five, the Global Fund has explicitly encouraged countries to apply for funding to address system-wide aspects. Country proposals have usually taken a narrow approach to health systems strengthening; common initiatives include purchasing new equipment, infrastructure and training. Only three of the 30 countries that submitted proposals in round five mentioned, for example, the need to strengthen drug procurement, supply, or distribution systems. Only one proposal included human resource approaches other than training, such as assessing overall human resource capacity needs, or addressing worker retention, attitudes and motivation (Lele et al. 2005). Less than half of the funding the Global Fund made available for health systems was actually disbursed in round seven and eight, due to a lack of quality proposals, among other things (GFATM 2008b; GFATM 2007b; GFATM 2008a). An analysis of Global Fund round 8 grants against defined criteria suggests that 37% of resources were allocated to health systems strengthening. Of that proportion only 39% of funds went to system-level, the remaining to disease-specific interventions (Warren 2011).

ART expansion has been driven by and measured through attainment of international targets. The main targets included the United Nations MDGs or the “3 by 5” (providing HIV treatment to 3 million by 2005) WHO campaign formally launched in September 2003 by the Director-General Lee Jong-Wook, as a personal initiative (WHO et al. 2009). As mentioned before, progress toward targets like the MDGs has been slower than anticipated (Travis et al. 2004). One explanation is that targets were set too high; another is that the challenges were underestimated when targets were defined.

Potential limitations of targets regard the quality of their forecasting (the data this is based on) as well as inherent limitations. Targets focus on a limited number of quantitative indicators and, therefore, mask many performance issues that relate to the quality of processes. In addition, targets can create the wrong incentives for helping and motivating stakeholders at international and national level. The UNGASS Declaration of Commitment, for example, was

judged useful as an international advocacy tool but not as a tool to directly support national responses (Panos 2006). International targets often appear more useful for promoting international advocacy than for facilitating and guiding implementation at national level. If programmes are driven by international targets, potential adverse effects include pressure on countries to focus on easy targets and high profile campaigns instead of other national priorities. Another risk is that non-attainment of targets may reduce international funding and induce donor fatigue. Preker argues that non-attainability may also induce discouragement at national level. Unrealistic targets may turn successes into perceptions of failure, and thus undermine future constituencies for donor funding and national progress (Preker 2005). To address these potential pitfalls, a more cautious approach would be to regard goals as reminders of the stark contrast between aspiration and reality, as well as the need to accelerate efforts (Clemens et al. 2004). Given these limitations, the case studies refer to performance indicators but focus on other health systems assessments complemented by qualitative findings.

1.8 Health System Effects and ART

Given the scale and complexity of ART, its effects on health systems are potentially large, important and unpredictable. Reviews on ART health system effects show mixed results, with additional funding and technical inputs on one side and drained systems' capacity, fragmentation, and resources diverted from other essential health interventions on the other (Stillman and Bennett 2005; Yu et al. 2008; Biesma et al. 2009; Samb et al. 2009).

Overall, findings remain vague, showing dispersed impacts and little quantitative evidence. In many instances, effects might not have been caused by GHIs but have only become more visible due to increased attention to these issues. ART programmes are still relatively young and evaluations so far have been cross-sectional instead of prospective (Atun et al. 2010a; Biesma et al. 2009). The lack of evidence regarding the effects of GHIs is also due to conceptual and methodological challenges of disentangling and quantifying relevant variables and the effects of developments elsewhere in the system. There is usually a lack of baseline data on health service coverage to measure and attribute effects. Time trends of health system effects have only been followed up by a few studies (Brugha 2005; Oomman et al. 2008; Piot et al. 2009). Also, given continuous programme developments, study findings that seek to attribute programme outcomes to programme designs quickly become out dated.

1.8.1 Governance and ART

Governance is a particularly complex area in terms of measuring effects and causalities to create quantifiable evidence. There are few examples where the same variables or indexes are used across countries to increase comparability. UNGASS is the main initiative for promoting international reporting standards on the above issues. One of its reviews concludes that national HIV responses remain largely donor-driven and lack country involvement (Panos 2006). Similarly, a UNAIDS report found that, in many countries, the Global Fund coordinating mechanisms are not rationalized with national structures, approximately 40% of national HIV/AIDS strategies do not serve as a framework for donor contributions, and in around 50% of the countries international partners get low or moderate scores for their inclination to share monitoring results (UNAIDS 2006a).

Governance issues are, however, the most often and prominently described effects in terms of qualitative data. Case studies unanimously report adverse effects in the area of governance, with parallel bureaucracies that increase transaction costs due to different planning cycles, reporting requirements, and parallel coordination bodies. A general lack of aid coordination and integration into national systems further complicates donor harmonization efforts at national and global levels (African Union 2005; Buse and Walt 1996; Panos 2006; Waddington 2004; Gbangbadthore et al. 2006; Caines 2005; McKinsey and Company 2005; Biesma et al. 2009; Bill & Melinda Gates Foundation and McKinsey & Company 2005; Brugha et al. 2004; Brugha 2005; Grace 2009; Stillman and Bennett 2005; Wilkinson et al. 2006). Evaluations of GHIs commonly cite national systems that have been affected by donor driven priorities and systems, cumbersome procedures, uncoordinated donor practices, negotiations with different donors, excessive demands on time, different funding mechanisms and reporting expectations, as well as delays in disbursements (OECD 2003; Operations Evaluation Department 2005; US Government Accountability Office 2005). To give some examples, national priorities in Rwanda were disregarded. While the government had identified seven major health strategies, donor funding did not focus on any of these, making it difficult for the government to balance investments across the health sector (UNAIDS 2006b). In Ethiopia and Malawi, failure to engage policy makers was reported as one of the main obstacles to timely Global Fund disbursements (Brugha 2005).

Limited GHI specific quantitative evidence exists regarding effects on accountability. Findings from the health sector and other sectors, however, suggest their likelihood. According to a World Bank study, non-salary budget leaks were about 40% in Tanzania and 80% in Ghana. Leaks were measured in terms of the difference between stipulated resource flows and the

actual amounts received (Lewis 2005; Gauthier 2006). Another study looked at the level of government corruption as perceived by the population. 34% of people in the Philippines and 71% of people in Uganda perceived malpractices to be common. Notably, these percentages were lower for district and local level governments, at 25% and 61% respectively (Azfar and Gurgur 2001). Case studies in this work were able to draw upon the relatively extensive body of grey literature on health systems effects of ART due to governance issues. The budget analysis also hypothesised that public expenditure tracking to assess the pass-through of budgets from national to district level provides quantitative findings with relevance to governance (in terms of “budget leaks”). However, such assumptions were framed more carefully given that we did not perform public expenditure tracking but focused on a comparison of national to district level expenditure.

1.8.2 Financing and ART

International funding for ART remains unpredictable, falls short of needs, and is poorly integrated into national systems. Potential risks from funding failure are high given the need to sustain individual treatment levels with imported expensive drugs and qualified human resources that tend to be in short supply. Predictability, budgetary projections are particularly acute in the health sector, given the high proportion of long-term recurrent costs (World Bank 2006b; Lewis 2005). Human resource investments are, for example, difficult to downsize in the event of reduced funding and subject to inflexible public sector labour markets (Over and Rao 2004). Reduced international funding for ART might further increase out-of-pocket expenditures, which already constitute 51% to 90% of the private health expenditure in 14 African countries (WHO 2005).

Funding data is limited due to diverse data sources, use of different definitions and information systems, lack of clarity whether data concerns budgets or expenditures, as well as non-available and fragmented data from donors (Bernstein and Sessions 2007; Atim 2006). National health accounts (NHA) and sub-accounts have been promoted as a way to improve information on sectoral funding from different sources at national level. In Rwanda, for example, a national AIDS sub-account shows high out-of-pocket expenditure, which consequently increased donor assistance in that sector (Pearson 2004). Given the resources needed to compile NHAs, they are usually not available on a yearly basis or across all health sectors, thus limiting the assessment of sectoral allocation and development trends over time.

The World Bank estimates that achieving the health MDGs will cost USD 20-25 billion per year, which would require a tripling of the Official Development Assistance (ODA) disbursed in

2003. The UNAIDS estimate for global funding needs for a comprehensive HIV response is between USD 14 -19 billion per year, which would also require a tripling of 2004 levels of global spending on HIV - half of which was externally funded (OECD and The World Bank 2005).

While future funding estimates to reach targets such as the MDGs vary, they all conclude that future gaps are important and will need to be covered by external support. Countries will continue to depend on external funding for HIV as well as for healthcare in general (World Bank 2006b; Brugha et al. 2004; Atim 2006). Even if the Abuja target of 15 % of GDP for health were reached, half of the African countries would not have raised the estimated amount of resources needed to attain the MDGs. Country efforts to increase their resources to meet, for example, the Abuja target may not suffice either. Earlier estimations in 2000 of the Commission for Macroeconomics and Health (CMH) were that USD 34 per capita spending on health would be needed to fund an essential package for health (Sachs and Brundtland 2001). In 2005 28 out of 40 African countries had not met that level of spending (Atim 2006). Updated estimates are that it would need around 50-70% more than assumed in 2000.

There is inconclusive evidence of the extent that funding for HIV has decreased allocations to other sectors. There are different ways to define additionality and the concept is generally not well defined. Donors usually require funds to be additional, but this is difficult to track and funds can still indirectly divert resources from other areas. In Benin and Ethiopia, the perception was that external funding has decreased or ceased due to support from the Global Fund, but these perceptions were difficult to substantiate (Brugha and et al. 2003). The general view in Ethiopia was that resources from GHIs have been additional, without causing decreases in other sectors (Banteyerga et al. 2006). In Benin, perceptions of the extent to which funding has been reduced in some areas due to increased funding were contradictory. One example given was that Global Fund moneys caused another funding partner that had existed for twenty years to cease its contributions (Gbangbadthore et al. 2006). Gaps between donor commitments and actual disbursements continue to be important (Foster 2005b; Bernstein and Sessions 2007).

Between 2005 and 2006, international commitments to HIV rose by 28% while disbursements rose only by 11%. 70% of total commitments were actually disbursed in 2006 (Kates et al. 2007; Mtonya and Chizimbi 2006). Unpredictability of donor funding affects policy making at national level. Country case studies reveal instances where policymakers are reluctant to act due to uncertain future funding. In Ethiopia for example, government officials hesitated to upscale services, doubting that international funding would be sustained (Brugha et al. 2004).

Overall, only about 20% of all health aid is given as general budgetary or sectoral support. An estimated 50% of health aid is off-budget (Foster 2005c). Where GHIs have given budget support, it was perceived as improving financial management in terms of sub-sector allocations, donor commitments and government spending (Mtonya and Chizimbi 2006).

Funding for HIV has seen substantially higher increases compared to funding for health in general. Global funding for HIV increased more than fourfold in just five years, from an estimated USD 2.1 billion in 2001 to USD 8.9 billion in 2006 (UNAIDS 2006b). Global funding for health tripled in fifteen years, from 4.6% of ODA in 1990 to close to 13% in 2005 (Dodd et al. 2007). GHIs such as the Global Fund, GAVI, Roll Back Malaria, and PEPFAR accounted for about 20% of total donor aid in 2003. In 2004, the Global Fund budget for HIV was approximately the same as all bilateral funding for HIV (Atim 2006). In many low-income countries, while funding for HIV has increased, health budgets have changed little and in the cases of Mozambique and Zambia they have actually declined. In Uganda and Zambia, funds for HIV in 2004 exceeded all public health spending by almost 185% (Lewis 2005). In Uganda and Ethiopia, funding from three GHIs in 2005 exceeded the governments' 2003 budget for the entire health sector (Bernstein and Sessions 2007).

There are many examples to suggest that countries do face constraints related to absorptive capacity. A range of countries report low absorption capacity and ability to spend as a major constraint (Brugha et al. 2003). In Uganda, only 26% of a Global Fund grant had been spent after twenty months. The main reasons for this included a weak procurement system, as well as mismanagement eventually causing a temporary suspension of funds in 2005 (Brugha 2005; Bernstein and Sessions 2007). Global Fund resources were only partly used in Malawi. Funding for HIV was poorly implemented in Ethiopia and Bangladesh mainly due to a lack of absorptive capacity within government structures (Serieux 2007). Global Fund disbursements in Ethiopia were constrained by bureaucratic obstacles; procurement was consequently outsourced to United Nations International Children's Emergency Fund (UNICEF) (Bernstein and Sessions 2007). Most of these examples concern lack of absorptive capacity at national level –suggesting that important bottlenecks may exist at national level, and not necessarily at district level. As one district representative puts it: "If districts know what resources they have, it's easy for them to put money in the gaps ... There are structures out there to absorb all of it!" (Brugha et al. 2003). Evidence for absorptive capacities remains scarce, as expenditures are not tracked to reveal bottlenecks at different levels of the health system. The budget analysis of this work comparing national to district level allocation to different interventions against burden of diseases addresses this gap.

1.8.3 Human Resources and ART

Human resources, particularly in the public sector, are one of the most challenging and least addressed constraints to scaling up ART. To meet the shortfall in human resources for ART by 2015, the cost of training is estimated to be USD 92 billion, with a minimum of USD 39 billion per year required thereafter to pay additional salaries (WHO 2006). At the same time, external funding is usually not used to fund public staff salaries. There are very few examples, such as in Malawi, where international funding for HIV has been used for public salaries (Mtonya and Chizimbi 2006). The International Monetary Fund (IMF) does not stretch ceilings on wage bills, as bilateral funds remain unpredictable. Bilateral donors, however, require flexible ceilings to fund salaries. Using institutions such as the Global Fund for longer term funding mechanisms has been subject to debate (Feachem and Sabot 2006; Wagstaff and Claeson 2004; Ooms et al. 2007).

Findings showing how GHIs affect human resource capacities at clinical level remain mixed. A facility survey in Benin shows no significant additional workload attributable to ART (Gbangbadthore et al. 2006). Several studies suggest that increased workloads are primarily related to increased reporting requirements and trainings. Findings from Africa suggest that managers spent 65-80% of their time on externally funded programmes (f.e. for planning, reporting, training (WHO 2007). The most prominent example of GHIs effects on human resources appears to be the distorting effects of non-integrated training efforts and higher salaries. Many countries, including those studied for this thesis report, experience significant wage differences between the public and the private sectors (Morris et al. 2009; Samb et al. 2009a; Stringer et al. 2006; Stillman and Bennett 2005; Banteyerga et al. 2006). In Zambia, for example, salaries for physicians in the private sector were more than double those of physicians in the public sector; salaries for midwives were almost one third higher and salaries for laboratory technicians three times higher (McCoy et al. 2008). The literature presents few exceptions to that trend. One example is Benin, where wages provided by GHIs did not differ from public wages and no significant human resource shifts were observed (Gbangbadthore et al. 2006). There is, however, limited substantiated data on the scale of brain drain from the public to the private sector although it is widely reported to exist (Makombe et al. 2007; McCoy et al. 2008; Schott et al. 2005; Sepulveda et al. 2007; Hanefeld and Musheke 2009).

International funding for human resources development has primarily invested in single trainings, while support to address important systems deficiencies such as motivation and retention has been negligible. Only a few countries, such as Ethiopia, Mozambique and

Zambia, report international investments from ART funding in pre-service trainings (Makombe et al. 2007; Renggli et al. 2008). In addition, countries themselves often lack comprehensive human resource policies (Brugha and et al. 2003) and have shown limited efforts to apply for funding to address long-run human resource capacities (Drager et al. 2006). Based on these findings, case studies of this work investigated above issues as part of their health systems analysis; this was done referring to secondary sources as the issue of human resources was not a research focus.

1.8.4 Health Information Systems and ART

National health information systems (HIS) have been visibly affected by GHIs. Additional and non-integrated reporting requirements have taxed already constrained capacities for reporting, as well as weak national HIS in low-income countries (Brugha and et al. 2003; Banteyerga et al. 2006). Most countries subject to GHI- surveys, such as Ethiopia, Rwanda, Bangladesh, Mozambique and Pakistan, report that new HIV information systems tend to be donor-focused, under-resourced, and not integrated into other national health information systems. Though GHIs have increased attention to the shortcomings of weak information systems, investments have largely been directed towards disease-specific information systems, creating stand-alone information systems that generate additional transaction costs and do not strengthen national health information systems (Panos 2006; Bill & Melinda Gates Foundation and McKinsey & Company 2005; Brugha et al. 2004; Oomman et al. 2008; Stillman and Bennett 2005; Wilkinson et al. 2006).

Within constrained systems, additional requirements compete with countries' own needs to collect and apply health data. Information on these effects, however, remains vague and is rarely quantified. Only a few studies present more specific information. One cross-country study, for example, estimates that district managers often spend up to a third of their time writing reports to satisfy different agencies (Bill & Melinda Gates Foundation and McKinsey & Company 2005).

There are few examples of countries that have started to address these issues. Priority initiatives have been to align the information requirements of GHIs with national indicators and jointly develop related monitoring and evaluation frameworks (Brugha 2005; Lim et al. 2008; Onta et al. 1998; Ronveaux et al. 2005; Bill & Melinda Gates Foundation and McKinsey & Company 2005; Stillman and Bennett 2005). No examples of GHIs investing in strengthening overall national HIS were documented, however. Essential conceptual work on integrated national HIS has been laid out in a framework of the Health Metrics Network (HMN). The

framework is a key example of how systems thinking can be applied to the area of HIS - indicating the need for and usefulness of applying systems thinking to national sub-systems (Health Metrics Network 2008).

1.8.5 Health Technologies and ART

The capacity of national supply chain management (SCM) systems to deliver ARVs is controversial. In most countries, GHIs have relied on parallel structures supported by external agencies to ensure that costly commodities can be purchased and distributed in a timely and efficient manner. This is most visible in the area of procurement. In-country distribution usually uses national structures, but nevertheless requires special procedures, different fees, schedules and reporting accountability as required by the funding agency. The combination of parallel structures and reliance on national distribution channels has put a double squeeze on national medical stores departments; their core business remains weak, while other, usually badly paid tasks increase. In Benin and Malawi for example, UNICEF manages pharmaceutical procurement and distribution for Global Fund programmes. In Malawi, World Bank procurement guidelines were used, despite being seen as cumbersome (Mtonya and Chizimbi 2006). A lack of government capacity building, to gain skills for negotiating with pharmaceutical firms for example, was reported in Benin and other countries (Gbangbadthore et al. 2006).

GHIs justify the establishment of parallel systems by citing the risk of poor drug delivery due to malfunctions and drug leakage. Cohen et al. document malpractices related to supply chain management at different levels (Cohen et al. 2007). In Ghana, interviews with officials and the public suggest that 21% of procurements in government hospitals involve malpractices, and 18% of the value of contracts was required as bribes to public officials (World Bank 2000). The average leakage rate for drugs across ten public health facilities in Uganda was estimated at 73%, with the lowest availability of high demand drugs, such as those to treat malaria (McPake et al. 1999). A later health facility survey in Uganda shows even higher gaps in drug availability and distribution (Lindelov et al. 2003).

Lack of quality assurance is another issue that may affect ARV supply. A study in six Sub-Saharan African countries found that 35% of anti-malarial, artesunate-based products sold on the market contained a lower-than-standard quantity of active ingredient (Bate et al. 2008). Akunyili found that during the 1990s, counterfeit drugs in Nigeria accounted for more than 50% of all drugs sold in drugstores (Akunyili 2005).

While GHIs often state their intention to build up national capacities and transfer responsibilities at a later stage, there are no examples of where this has actually happened. Ethiopia is one example showing how reliance on national structures can yield positive results in the mid-term, despite initial weaknesses. In Ethiopia, responsibility for Global Fund procurements was given to the national Pharmaceutical Administration and Supply Service (PASS). While PASS first appeared to be understaffed and constrained by the quantity and complexity of Global Fund procurements, it managed to increase its capacities to administer the national drug supply chain management system, and improve its organisational units and policies. It eventually took over responsibility for the overall national drug supply, which was covered in part by NGOs (Brugha et al. 2003; Banteyerga et al. 2006). There have been some international initiatives for capacity building, such as assessment and reporting systems piloted by the World Bank and the Global Fund, as well as the Global Joint Problem Solving and Implementation Support Team (GIST) established by UNAIDS and the Global Fund. Honduras, for example, requested a GIST for technical support and facilitation for dealing with challenges related to delayed Global Fund grants and subsequent lack of guidance (Buse et al. 2006). Two of the case studies in this compilation focus on the application of above concepts and methods to supply chain management. The choice is based on SCM being a key function of national health systems as well as an area where GHIs have often opted for disease-specific as opposed to integrated approaches.

1.8.6 Service Delivery and ART

ART integration into routine health services has been at the core of international debates on global health. Adverse effects of poor integration include additional work loads and distraction from routine services. If existing health care systems are already organized along vertical lines, funding for ART is likely to further “verticalise” the structure and detract from the core health care system. In this case, district and programme managers have more funds to manage, and more providers to deal with. They may face increased responsibilities from decentralized services on one side and centralized procedures of disease specific programmes on the other side. Vertical and centrally organized interventions can also increase inequity if, for example, ART is mainly provided at a hospital level that tends to serve a more affluent population. There has also been a tendency to create stand-alone services such as HIV VCT sites and care and treatment clinics. Few studies, however, specifically target or assess these issues and evidence of the extent of the problem remains unclear. Additional inputs at service delivery level, such as drugs, equipment, and infrastructure, are the most commonly cited positive health system effects of GHIs. In to the frameworks

presented above, however, these inputs do not qualify as health systems strengthening, as they do not cover the criteria of promoting quality, equity, and sustainability.

A major concern has been that ART might reduce priority of other health services. Previous sections presented some findings regarding sectoral funding flows and while there is some evidence suggesting that other health services have received less attention due to ART, it remains inconclusive. There are many higher burden problems that remain neglected by GHIs, such as childhood pneumonia and maternal mortality, which appear to be particularly affected by lack of attention and funding (WHO 2010b; WHO and UNAIDS 2010). Country level evidence remains limited to the general perceptions of survey respondents. Respondents in Ethiopia stated that the additional workload due to ART demands has adversely affected antenatal and primary care (Banteyerga et al. 2006). Staff absences disrupted health service delivery in Mali and most facilities reported being overburdened by additional requirements from vertical programmes. Similar findings have been documented for other countries (Bill & Melinda Gates Foundation and McKinsey & Company 2005). Yet, in Haiti and Rwanda, ART was associated with improvements in primary care and antenatal care respectively, likely because programmes were integrated from the outset to generate better outcomes (Price et al. 2009; Walton et al. 2004). Service delivery outcomes as assessed in health surveys were integrated in this work's case studies, but other specific assessments of service delivery pertained to other research components of "arvmac", the research project of which this work is part.

2 Rationale, Goals and Objectives

“It has never been put so explicitly that countries really need to invest in “thinking” and “thinkers” (rather than the usual focus on tool development) so that they can assess and adapt to their particular context and challenges.” - Joe Kutzin, WHO EURO

The interconnectedness between disease-specific programmes and health systems has become one of the most prominent issues within global health debates. It has led to increased attention to conceptual issues as well as international efforts to promote integrated efforts. As a first step, it needs a common conceptual understanding, of what health systems are and how different interventions (including disease-specific) operate within them. This includes an understanding on key interventions and functions needed to strengthen health systems including disease specific programmes that operate within them. This works' introduction and review addresses these points. It concludes that important sub-systems such as supply chain managements deserve special attention and that health systems and health policy research needs to be designed in a way to capture the different dimensions and dynamics of complex health systems - to this end this research focuses on principles and approaches in line with systems thinking. These are especially important when looking at the long-term efficiency and effectiveness of ART being the largest, costliest and most complex therapeutic public health initiative ever undertaken in low income countries. Critically, it requires systems thinking to capture the different dimensions and dynamics of complex health systems and their interfaces with disease-specific programmes, as outlined in this works' introduction. This works' approach of combining the widely accepted WHO health systems framework with systems thinking and related analytical concepts shows opportunities as well as limitations of addressing emerging questions:

What are the dynamics and links between ART and national health systems?

What is the role and relation of the various driving forces for (non)integrated ART, including contextual issues, health (sub)systems, its actors and motivations?

An increasing body of literature looks at health system effects of disease-specific programmes as presented in this works' review. Findings however remain vague and at a general level, showing dispersed impacts and little quantitative evidence. Existing studies usually either focus on the district or health facility, national or global level. In contrast, within this work we link different data sources and findings from national to district and health facility level. To

address the gap of more specific country level findings, this research looks at specific sub-systems as they affect all other parts of the health system. The aim is to allow for a comprehensive, yet specific, follow up of system effects as linked to a set of defined processes and actors. To address the gap of quantitative findings and factual knowledge on the balance of efforts to disease-specific programmes vs. health systems, we look at budget allocations to different interventions and against burden of diseases. The concern for these issues has been postulated as large financial influxes potentially increase the scope for inefficiencies and malpractices.

The literature review in chapter 1 identifies governance as a key and neglected dimension that is often assessed based on limited manifestations of governance such as policy documents, indexes and targets. There is relatively little understanding of how policy manifestations have played out in practice and how they relate to different health system dimensions. Stakeholder analysis is one of the key methods for assessing related governance issues, but has traditionally paid little attention to system dynamics as, for example, induced by the motivations and incentives driving stakeholder behaviour. To address these gaps, the present work uses concepts in line with systems thinking to capture the dynamics of implementation, trace causal pathways and illuminate critical processes, as well as some driving forces such as stakeholder incentives.

Above principles are followed up in this works' studies on how ART expansion affects supply chain management (Chapter 4 and 5), governance (Chapter 6) and financing (Chapter 7). Two case studies use a health system sub-system - the supply chain management in the medicines and technologies system - that is emblematic of the complexity of a health system, its diverse financial and information flows, stakeholders and complex governance. All case studies follow principles of systems thinking and attribute special attention to the role of governance issues. They comprehensively picture the range of health systems functions as transversal issues, according to health systems concepts and systems thinking rationales. The budget analysis addresses an important information gap regarding budget allocation to different interventions and against burden of diseases at implementation level (represented by the district level).

Goal:

The overall goal of this work is to add factual knowledge on the interface between disease-specific programmes and health systems which is relevant to identify what needs to be done to strengthen health systems, especially in terms of addressing current areas of neglect.

Objectives:

To assess the interface between disease-specific programmes and national health systems in three diverse African countries, identifying differences and commonalities that presumably apply to other countries.

To use supply chain management as a tracer to assess the effects of GHIs on health systems from global to patient level.

To look at national and district budget allocations to HIV and other interventions in 2004 and 2007 and in three countries, for an assessment of funding trends to different interventions and against burden of diseases during the early years of ART scale up.

To assess governance effects of ART scale up in a country (Burkina Faso) with a relatively low HIV prevalence compared to other Sub-Saharan countries.

3 Methods

“Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots.” - Peter Senge, The Fifth Discipline

A key strategy for approaching complex phenomena is to employ and combine frameworks that help to explain such complexity. Systems thinking provides the methods for understanding what works how in a given context, the range of effects and potential synergies that are crucial for complex, new and externally driven interventions, such as the expansion for ART. Systems thinking combines different approaches: process evaluation for adequacy, context evaluation for transferability, effects evaluation to assess the effects of an intervention across relevant sub-systems and an economic evaluation that determines value for money (de Savigny and Adam 2009; WHO 2007). The present work combined the first three methods. Case studies applied process evaluation, i.e. looking at the links between processes and changes, assessing reasons for why events have proceeded the way they have by considering all relevant causes and consequences within and across different health sub-systems. Key areas for assessing the context of interventions included looking at structures and institutions in relation to stakeholder incentives, as was done in this study's research on incentive structures in Tanzania. Furthermore, case studies integrated effects evaluation by referring to a range of outcomes at service delivery level.

The case studies compiled in this thesis applied and combined different frameworks for policy, cost analysis, and systems thinking. Frameworks were selected according to their potential to address the issues and processes targeted by the research questions. Additional criteria for choosing from existing frameworks included comprehensiveness, clarity, usefulness, and measurability. The key elements to be assessed by the case studies were selected based on the potential of those elements to lead to better outcomes. Risks (bottlenecks within the system), incentives (motivations of stakeholders) and decision points (functions with potential for change) are examples of such elements. The choice and application of frameworks in this manner presented a range of methodological and conceptual challenges as explained in this work's discussion.

Qualitative case studies combine an open approach (without predefined hypothesis as suggested by Grounded Theory with pre-defined frameworks to guide the analysis. The former is applied to allow for the unpredictability of findings and to avoid preconceptions about

what will be found. Variables investigated included the processes and the details of what is going on, changes as they relate to interventions, the role of actors, institutions and events, as well as contextual issues. Interview themes were broadly defined prior to starting the research but, then, continuously adapted during the interview process. This strategy allowed for greater flexibility and permitted respondents to raise new issues depending on their point of view (Glaser and Strauss 1967; Weiss 1994; Marshall and Rossman 1995). In a subsequent stage, the research applied analytical frameworks to support the analysis and presentation of findings. Broad frameworks were used to guide the analysis, while at the same time leaving an open space to “re-construct” the reality of processes and structures and allow for emerging details.

Key experts to be interviewed were often only identified in the process of investigating. Interviews were conducted in the local language and in close cooperation with a local research team, in order to ground findings in the local setting. Accessibility was facilitated by the research being placed in the context of a larger research project and in close cooperation with national research institutions. The research used triangulation of methods to counterbalance different results produced by different tools, and to compare findings from different interviews and findings from different literature sources. This included reinterpreting results and searching for new evidence, as suggested by Rychetnik (Rychetnik et al. 2004), until more coherent overall conclusions could be reached.

The research combined qualitative methods with quantitative methods based on data from secondary sources and data collected by partners in the larger research project. Outcomes were measured as effectiveness, defined in terms of efforts being fit for purpose; efficiency in terms of technical, allocative and dynamic considerations that maximize value of resources; and equity in terms of improved health status for disadvantaged people. Additional outcome measures, including mortality and morbidity, quality and responsiveness were used to represent effectiveness. The research on supply chain management (SCM), for example, used data on drug availability and stock outs both from secondary sources as well as from partners within the research project. Secondary sources included surveying availability and quality of sets of tracer items in a sample of facilities at a time point or period. Other potential outcome measures for SCM could include inventory loss as a percentage of average inventory value, as well as transportation and storage costs, with a potential benchmark being their comparison to private sector costs. Available audits and reports however did not provide this information and it was beyond the scope of this study to collect that data.

Quantitative health system effects, as they relate to ART, were discovered through a literature review using standard filters and databases. The literature review followed an iterative

approach, searching the references within documents, approaching experts and institutions for further information and searching the documents of organisations working in the respective areas, such as the Centre for Global Development and Health Systems 20/20. A systematic search was limited as most of the findings were drawn from grey literature, including evaluation reports and surveys. Moreover, a systematic search on qualitative findings was both limited and, arguably, not necessary, given that qualitative research usually aims to describe themes; after reaching a “saturation point” in terms of details about these themes it becomes more important to identify “disconfirming cases”. It follows that less importance is attributed to systematically identifying all available evidence as recommended in quantitative research (Dixon-Woods et al. 2005).

Chapters 4 and 5 present results from studies on supply chain management in Uganda and Tanzania. The studies applied systems thinking and the WHO health systems framework to assess the links between disease-specific programmes and a national health system; looking at supply chain management from the perspectives of service delivery, human resources, information, medical supplies and technologies, financing and governance. Study variables included the institutional context of implementation, the dynamics of processes, and the characteristics and strategies of stakeholders in the processes. The case study of Tanzania looked at incentive structures and stakeholder motivations as they relate to health outcomes by applying economic principles of risks and incentives (Narayanan and Raman 2004).

To quantify the effect of ART on national priorities, we assessed funding for HIV/AIDS and other interventions at district and national level referring to 2004 and 2007 as reference years before and after the initiation of national ART programmes (Chapter 6). District plans and budgets served as a primary source to assess district budget allocations. In addition, we collected cost items not included in annual district budgets such as the vertical programme deliverables including vaccines, antimalarials and antiretrovirals or salaries not included in one of the countries’ districts plans. All data entered a modified version of a district health accounts tool (de Savigny et al. 2001; Ministry of Health and Social Welfare 2011). Burden of disease profiles were those provided by the respective sentinel district demographic surveillance sites (DSS) in each district (Indepth 2011). For national total health expenditure (THE) we used figures from NHAs as published by WHO (WHO 2010a). Given that NHAs do not provide detailed information on funding for HIV/AIDS compared to other health interventions we used the creditor reporting system (CRS) compiled by the OECD (OECD 2011).

The case study on governance issues in Burkina Faso (Chapter 7) compared the organisational units in different sectors, assessing how ART policy-making scores better or

worse when compared to policy-making in other health sectors. It combined elements of governance as defined by WHO with conceptual work developed by Grindle and Thomas targeting driving forces for policy making (Travis et al. 2002a; Siddiqi et al. 2009; Grindle and Thomas 1998b). It focused on the first three steps of the ODI framework, namely agenda setting, policy formulation, decision-making (Court 2004). It looked at organisational structures and processes to assess governments' capacity for policy development looking at organisational structures, coordination and the development and use of policy documents. It referred to governance as defined by WHO for the generation of intelligence; formulating strategic policy direction, ensuring tools for implementation, building coalition and partnership and ensuring a fit between policy objectives, organisational structure and accountability (Travis et al. 2002a; Siddiqi et al. 2009). To assess policy documents, it used an adapted version of the AGREE framework designed to assess clinical guidelines (The AGREE Collaboration 2001).

4 Scaling up antiretroviral therapy in Uganda: using supply chain management to appraise health systems strengthening

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4.1 Abstract

Background: Strengthened national health systems are necessary for effective and sustained expansion of ART. ART and its supply chain management in Uganda are largely based on parallel and externally supported efforts. The question arises whether systems are being strengthened to sustain access to ART. This study applies systems thinking to assess supply chain management, the role of external support and whether investments create the needed synergies to strengthen health systems.

Methods: This study uses the WHO health systems framework and examines the issues of governance, financing, information, human resources and service delivery in relation to supply chain management of medicines and the technologies. It looks at links and causal chains between supply chain management for ART and the national supply system for essential drugs. It combines data from the literature and key informant interviews with observations at health service delivery level in a study district.

Results: Current drug supply chain management in Uganda is characterized by parallel processes and information systems that result in poor quality and inefficiencies. Less than expected health system performance, stock outs and other shortages affect ART and primary care in general. Poor performance of supply chain management is amplified by weak conditions at all levels of the health system, including the areas of financing, governance, human resources and information. Governance issues include the lack to follow up initial policy intentions and a focus on narrow, short-term approaches.

Conclusion: The opportunity and need to use ART investments for an essential supply chain management and strengthened health system has not been exploited. By applying a systems perspective this work indicates the seriousness of missing system prerequisites. The findings suggest that root causes and capacities across the system have to be addressed synergistically to enable systems that can match and accommodate investments in disease-specific interventions. The multiplicity and complexity of existing challenges require a long-term and systems perspective essentially in contrast to the current short term and programme-specific nature of external assistance.

4.2 Background

The scaling up of ART in Uganda gathered momentum with three major GHIs: the Multi-Country HIV/AIDS Programme (MAP) in 2002; PEPfar and the Global Fund in 2004. Free antiretroviral drugs (ARVs) have been provided in the public governmental since 2003, when the first national ART strategy and treatment guidelines were developed (Uganda AIDS Commission 2003; Ministry of Health Uganda 2003b; Ministry of Health Uganda 2003). Fig 1 illustrates the main events in Uganda as they concern the expansion of ART.

By the end of 2009, 200,400 people were receiving antiretroviral therapy and coverage of those in need based on the new 2010 WHO thresholds had reached 39% (WHO et al. 2010). In terms of numbers the country has consequently come relatively close to its targets of 240,000 and 342,200 people on treatment by 2012 and 2020. However 95% of that national response to ART is currently covered by donor funds (WHO 2008d). Uganda, as it is estimated for other low-income countries, will continue to depend largely on external support for its disease-specific programmes (World Bank 2006b; Brugha et al. 2004; Atim 2006).

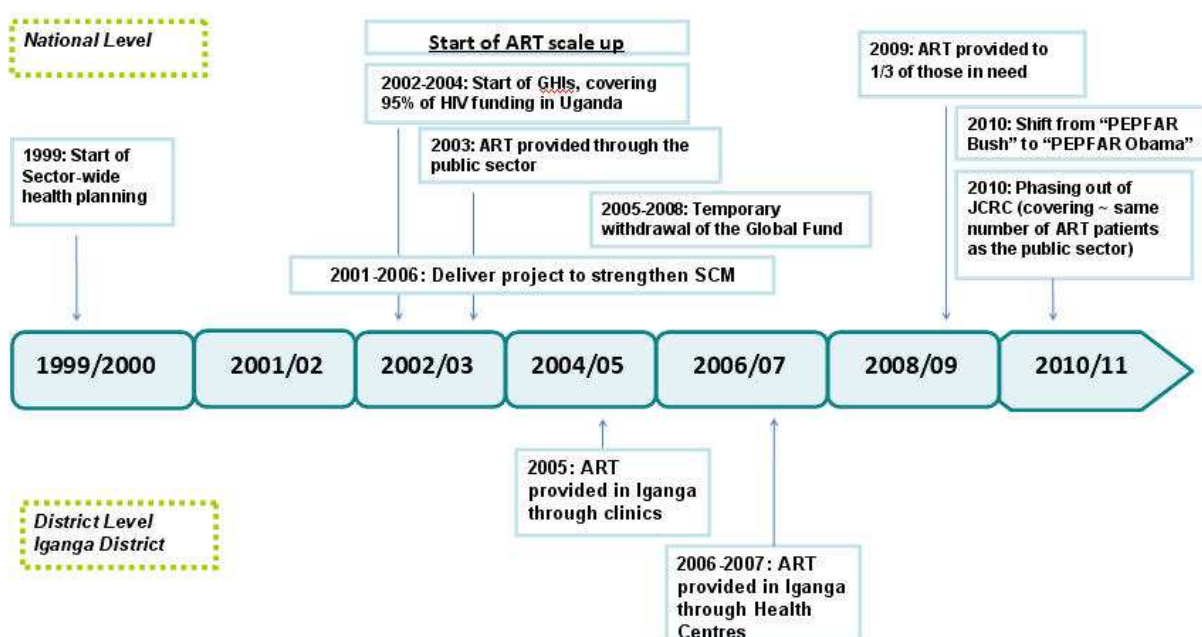


Figure 4: Major Events during antiretroviral scale-up in Uganda

Given that ART and its supply chain management in Uganda are today mainly based on parallel and externally supported efforts, the question arises for how to sustain these once government is required to take over. Uganda is starting to face that reality in the transition of

PEPFAR from the Bush to the Obama administration and plans (Ssengooba 2010). Sustained access to ART will essentially depend on the strength of health systems. Looking at some core indicators, the country's skilled birth-attendance rate is 42%, its measles immunization rate for 1-year-old children is 68% and malaria-treatment access within 24 hours of fever for children under 5 is 35.7% (Ministry of Health Uganda 2010; Uganda Bureau of Statistics 2007). As is the case in other low-income countries, supply chain management is an especially weak part of the national health system. The essential drug programme lacks more than 50% of the funding it would need for the constant supply of the minimum care package (DELIVER 2007b). Only 27% of hospitals and about 40% of other health facilities report receiving the requested quantities of essential drugs ordered through the National Medical Store (NMS) (DELIVER 2007a). Likewise and despite its relatively high external support antiretroviral drug supply experiences both over and undersupply (Ministry of Health Uganda 2006). Weak health systems appear to constrain absorption of external funding. Only 26% of a Global Fund grant in Uganda had been spent after twenty months (Brugha 2005; Bernstein and Sessions 2007).

Extensive literature reviews have summarized findings about the effects of GHIs on health systems (Biesma et al. 2009; Samb et al. 2009a; Yu et al. 2008). Research has, however, focused on single effects and paid little attention to the interactions among health system building blocks and interventions or the role of contextual and governance issues (de Savigny and Adam 2009; Atun and Kazatchkine 2009; WHO 2007; Best et al. 2007; Meadows 1998). Systems thinking is a key approach to illuminate what works, in what way and for whom, in a given context. It also serves to explore the range of effects and potential synergies, causal chains and linkages between complex interventions such as ART and health systems (de Savigny and Adam 2009).

To address these issues, we apply systems thinking to the case of supply chain management for ART in Uganda. We use the WHO health systems framework and examine dimensions of governance, financing, information, human resources and service delivery in relation to supply chain management for ARVs and essential drugs. This paper takes the viewpoint of a close examination of consequences at district levels, and traces their causes within the governance and other building blocks of health systems.

4.3 Methods

This work uses findings from document and literature review, health facility surveys, and key-informant interviews at district and national levels. A literature review was conducted covering both peer-reviewed and grey literature, including the media. Sources included PubMed, Web of Science, Eldis, Google and Google Scholar. Grey literature such as audit reports, evaluations and tracking studies were a main source of information. National level assessments were based on principles of Grounded Theory implying that the process of data collection and emerging findings continuously shape research approaches (Glaser and Strauss 1967; Weiss 1994; Marshall and Rossman 1995). A first question guide focused on information gaps which resulted from the review. National partners performed key-informant interviews, based on a few guiding questions which allowed respondents to flexibly raise new issues and hypotheses. To ensure consistency of interpretation, interviews were conducted by the investigators themselves. Responses were validated in subsequent interviews with other stakeholders. We triangulated the different sources for validation by following up findings from the literature review and within interviews and relating findings at district and facility level with views from national stakeholders.

Observations at health service delivery level took place in Iganga District in the Eastern Region of Uganda. The study site Iganga was chosen as it is also the study site of a larger research project studying the effects of antiretroviral treatment on maternal and child health. Iganga is one of 95 districts in Uganda and it covers a mainly rural area with a population of around 650,000 out of the national population of 32.4 million (Health district Iganga 2009). Four health centres (HCs) at level IV and III and one district hospital provide ART services. HC-IVs are structurally small clinics with 1-2 clinicians, an obstetric theatre and laboratories. HC-IIIs also provide some laboratory services. The district hospital started to provide ART in 2005 followed by gradual provision through HCs in 2006 and 2007. By September 2009 a total of 1,171 people in the district had been started on ARVs. To evaluate the performance of ART at the service-delivery level in Iganga District, two onsite surveys were conducted at all ART-providing HCs in June 2008 and September 2009. They included a complete document review of registers, logbooks, drug stocks, patient files and observed practices, and staff and patient interviews in 72 health facilities. Semi-structured interviews were conducted with 17 health staff and 273 patients. The detailed results will be published in a separate paper currently in process.

4.4 Results

Essential drug supply in Uganda uses a mixed “push” and “pull” system. Upper-level health facilities order drugs based on estimated need forecasts and a resource envelope. Lower-level health facilities receive a fixed set of drugs. The essential drug list includes 96 drugs for districts to order from the National Medical Store (NMS), which processes almost 1,000 individual orders per month. When ART started, supply chain management systems for essential drugs had just started to be built to reach national coverage through a pull system. Drug delivery to districts can take about double the time foreseen (Integrated Regional Information Networks 8 A.D.). One of the bottlenecks was that the NMS only delivered to district headquarters. Since 2009 the NMS also delivers to HC IV and III level (Njoroge and Lister 2009). Faith-based and non-governmental organisations (FBOs and NGOs) which account for 20-30% of the health facilities in Uganda are served through a cash-and-carry system of the Joint Medical Store (JMS). The NMS procures and manages an increasing number of ARV drugs and supplies, 46 different ARV drugs and drug combinations were registered in 2003 (Logistics Subcommittee of the ARV Task Force 2003). ARV procurement and supply runs through standard NMS processes such as the bimonthly essential drug delivery as well as on parallel processes specifically set up for ARVs. The latter generally works better due to more funding and smaller volumes (Oomman et al. 2008).

At Iganga District ARV shortages affected all ART-providing facilities with considerable fluctuations regarding capacities to take up new patients as illustrated in Figure 5. ARVs were available at 83%, diagnostic kits at 70% and paediatric ARVs at less than half of the health facilities surveyed. Stock-outs also occurred for antibiotics, including amoxicillin and cotrimoxazole dispensed as prophylaxis for opportunistic infections in HIV-positive patients. Effects included problems in patient follow-up and in the provision of ART. Patients were advised to buy missing drugs in private pharmacies. Switches to more complex and different drug regimens were frequent to avoid treatment interruptions. Strategies to cope with stock-outs included lending and borrowing among facilities, dual therapy, late initiation of ART for new patients and treatment interruption. ARV regimens from ten different manufacturers were found. Health workers reported insufficient knowledge regarding safe drug substitution and a general lack of guidance to deal with shortages of ARVs. They faced difficulties in forecasting needs given the lack of data. District medical officers (DMO) were bypassed as facilities communicated directly with the NMS. Lack of feedback from the NMS on placed orders further reduced their capacity to address potential bottlenecks.

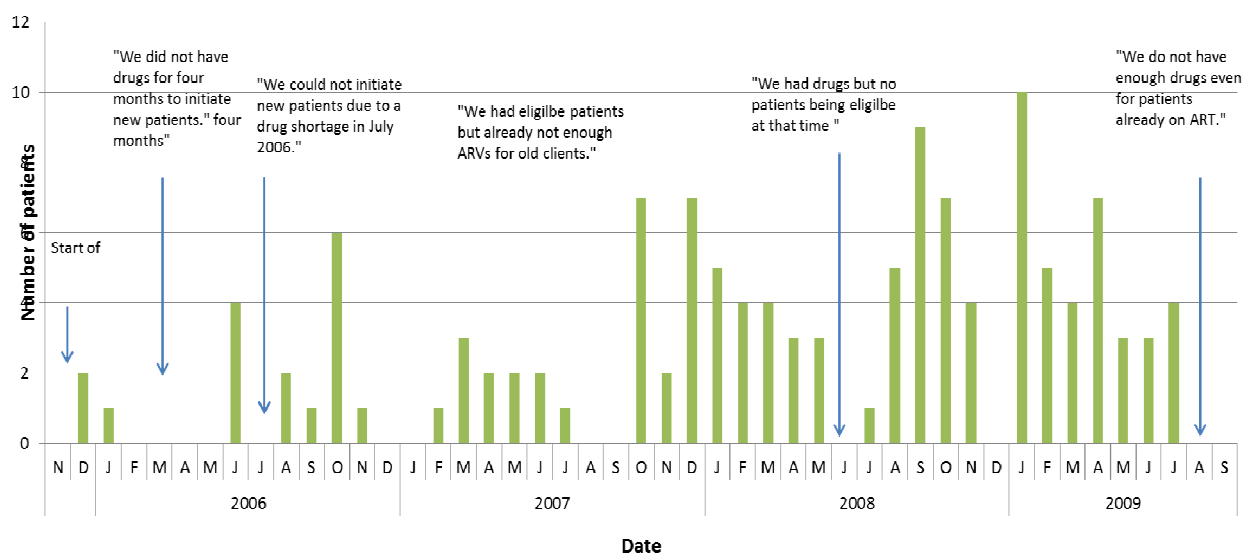


Figure 5: Fluctuations of number of new patients on ART and their causes

National level surveys substantiate that provision of ARVs suffers from both over and undersupply. According to findings from 2007 only a quarter of facilities receive ARVs on a monthly basis, which is the required frequency for consumption reporting (HEPS 2008). At the same time USD 0.5 million of ARVs are reported to have expired in 2005 (Ministry of Health Uganda 2006). In 2008 the estimated expired value was in the range of USD 1.3 - 2 million (Integrated Regional Information Networks 2009). 58% of government facilities reported holding expired ARVs, compared to 29% of NGO facilities (HEPS 2008). Test kits, prophylactic treatment and paediatric ARVs are especially affected by short supply. According to a health facility survey in 2005 fewer than 25% of facilities were maintaining adequate stock levels on nevirapine, HIV test kits, and antibiotics to treat opportunistic infections (OI) and sexually transmitted infections (STIs) (Ministry of Health Uganda 2006). Health facilities on average reported 1 month of stock-outs of testing kits per year in 2005 (Ministry of Health Uganda 2006). Undersupply of test kits was mainly caused by unexpected supply disruptions from two donors and resulted in rationing with a focus on preventing mother-to-child transmission clients instead of the general population. Findings from 2008 suggest that some facilities faced shortages over several months. Only about 15% of patients in need could be tested as a consequence (Gaughran 2009). A 2004 national laboratory assessment indicated that due to a lack of reagents, half of the regional hospitals could not perform confirmatory diagnostics for OI and 20-30% of district hospitals could not perform basic STI and OI diagnostic tests (Diallo and Techlemariam 2004).

For essential drugs, despite a four-fold increase in the value of drugs distributed, less than half the money needed for the basic minimum care package is available. This means that most drugs will always be stocked out because of insufficient funds as opposed to supply chain problems (DELIVER 2007b). Only 27% of hospitals and about 40% of other facilities reported receiving the quantities of essential drugs they ordered through the NMS (DELIVER 2007a). Improvements in some areas exist such as an increase of available drugs for STIs from 8% in 2002 to 24% in 2006 (Ministry of Health Uganda 2006).

Figure 6 shows the number of largely externally supported systems to supply ARVs. It illustrates procurement, storage and distribution systems for ARVs in the country with nine different lines of procurement and supply for these drugs alone. PEPFAR, for example, requires the US Food and Drug Administration approval of ARVs instead of the WHO prequalification commonly used by other donors and countries (Sepulveda et al. 2007). It also specifies selected ARV manufacturers and therefore constrains use of local ARV production which Uganda started in 2008 (Integrated Regional Information Networks 8 A.D.). Most GHIs use the national governmental system for drug storage and distribution. NGOs funded by PEPFAR, however, follow their own storage and distribution systems. Overall, external support focuses on narrow, short-term and parallel approaches. PEPFAR initiatives largely target the Non-governmental and Faith-Based Organisation sector with only some indirect support to the MoH, mainly providing training and laboratory equipment (Gaughran 2009). All GHIs support warehouse capacity and short-term training. The Global Fund has to some extent taken a more systems-based approach by increasing human resource capacity through the funding of procurement officers (Oomman et al. 2008).

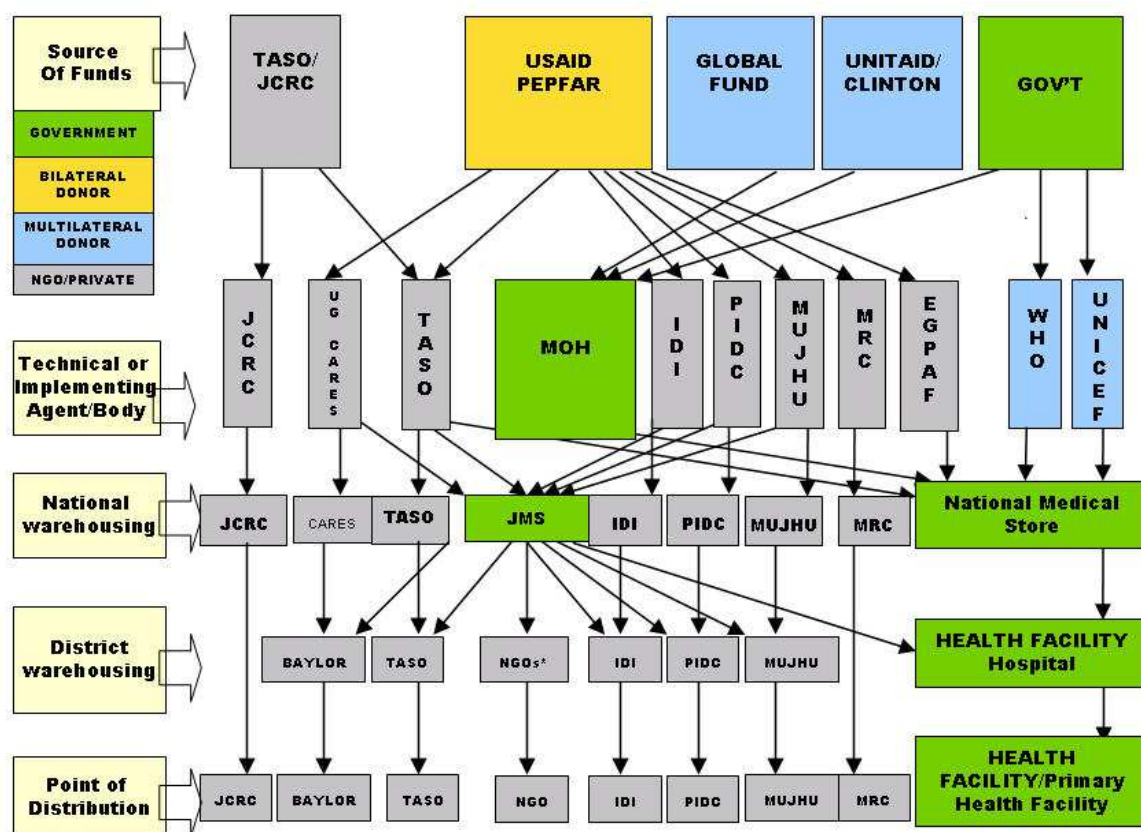


Figure 6: Antiretroviral supply systems in Uganda. 2010.

IDI Infectious Diseases Institute. JCRC Joint Clinical Research Centre. JMS Joint Medical Store. MRC Medical Research Council. MUJHU Makerere & John Hopkins University Research Collaboration. PIDC Paediatric Infectious Diseases Clinic. TASO The AIDS Support Organisation. * Some NGOs also deliver to government health facilities.

An initial policy intention existed to assimilate ARVs with the essential drug supply system. Procurement was meant to be aligned; ARVs were meant to be included in the essential drug list; and a logistics management information system (LMIS) for ARVs was intended to be put in place (Logistics Subcommittee of the ARV Task Force 2003). However, as existing supply systems were considered too weak to support the national ART programme, separate systems were set up with the objective to integrate them later at an unspecified date (DELIVER 2007b). Parallel supply chains have gained additional leeway due to free choice of private facilities to choose logistic providers and similar options for public facilities sectors if the NMS does not deliver. These parallel options were justified on the grounds of a need to initially strengthen the NMS (Ministry of Health Uganda 2003). A main initiative to support NMS' capacities was the DELIVER project from 2001-2006. DELIVER however at the end of the day also supported parallel supply chain management systems of NGOs such as the Joint Clinical Research Center (JCRC), a PEPFAR-funded NGO which covered almost half of the patients on ARVs in Uganda until it started to phase out in 2009. Another policy intention to address inefficient ARV supply was issued in 2008 when the government expressed a target

of reducing yearly expiration of unused drugs to a maximum of USD 1000 annually by, for example, denying superfluous or non-aligned external funding as well as improving the information system for drug supplies (Integrated Regional Information Networks 2009). No progress on these initiatives was documented at the time of this study.

Governance

External actors very much shape current governance of ARV supply chains. In Iganga District 15 NGOs were found to work in the area of HIV; two of them being directly involved in ART. Perceptions at district level are that there is generally little cooperation between NGOs themselves and the health district. Usually no joint planning efforts take place. District health managers often lack information on projects and links of NGOs. At national level, integrative efforts were already lacking prior to ART as sector-wide planning in the health sector only started in 1999. Surveys of the country coordination mechanism (CCM) of the Global Fund, for example, present a relatively large and inefficient committee, whose role partly covers that of the Ugandan AIDS Commission (UAC). PEPFAR has a policy to mainly support NGOs, the majority of which are based in the capital Kampala and relatively distant to district levels. In some measure they were found to be part of the problems related to poor accountability which lead to the temporary suspension of Global Fund grants in 2005 (Oomman et al. 2007).

Poor accountability and mismanagement is another governance issue for drug supply. At district level funding for essential drugs is not always used according to guidelines. Districts often do not include the purchase of lab supplies in their budgets as required (Logistics Subcommittee of the ARV Task Force 2003). Health centres are often not aware of how much funding for drugs is credited to their accounts. In one district almost half of the budget for essential drug purchase was not utilized and two thirds of unused funds could not be accounted for in the fiscal year (FY) 2004/05 and 2005/06. In the FY 2000/01 USD1.75 million remained unspent in district health accounts (Ministry of Health Uganda 2006). The average leakage rate for drugs across ten public health facilities in Uganda was estimated at 73%, with lowest availability of high demand drugs, such as those to treat malaria (McPake et al. 1999). Some physicians are alleged to reroute essential drugs to private clinics and pharmacies and then send public patients to these outlets to purchase their medication. They may also under-procure drugs to cause a shortage which is then covered by the private market. Mechanisms to regulate are made dysfunctional as the district planning teams responsible for monitoring are sometimes involved in these diversions for private health care (Njoroge and Lister 2009).

Parallel to ART scale up an increasing number of national frauds or mismanagements occurred. USD 190,300 earmarked for drugs was for example used for travel abroad for government officials in 2006 (Uganda Health News 2009). In another case three former health ministers and other ministry staff were charged with alleged misappropriation between 2006 and 2007 (PlusNews 2007). The Global Fund suspension in 2005 resulted in some initiatives to correct for non-compliance but disbursements did not resume until 2008. That year encountered another case of poor accountability resulting in a Global Fund disbursement gap of USD 12 million (Kelly 2008). The government mobilized USD 30 million to fill the most severe shortfalls, but could not completely avoid service delivery effects such as stock-outs of antimalarials (Zikusooka et al. 2009).

Financing

Bypassing, inadequate funding and dependency on external donors were identified as main constraints to better performance of the NMS (Integrated Regional Information Networks 2009). Reimbursement modalities were not defined when the NMS received the logistics mandate for ARVs in 2003. The NMS usually requires 6-10% ordered to cover storage, handling and distribution. While programmes usually pay 10%, MAP, for example, only paid 6.5% arguing that the lower percentage is justified given the high value of ARVs. Another issue is that being a public agency, the NMS deals with relatively long lead times in procurement, which is one of the reasons why donors have opted for other procurement channels (Logistics Subcommittee of the ARV Task Force 2003).

External funding will continue to affect access to ART. Funding for ART has increased considerably, but remains unstable and unpredictable. Global Fund moneys for HIV increased by 45% between 2004 and 2005 and then dropped by 18% following its temporary suspension in 2005 (Lake and Mwijuka 2006). PEPFAR's share of HIV funding in Uganda increased from 26% in 2003 to 85% in 2006 (Bernstein and Sessions 2007). Predictions envisage decreasing funding due to expressions of the US government to scale PEPFAR down and hand over responsibilities to national governments (Ssengooba 2010).

Human Resources

National level data confirms a severe lack of human resources in the area of supply chain management. While the public sector in Uganda has about 350 qualified pharmacists, it is estimated that at least 14,000 are needed (Integrated Regional Information Networks 2010). One of the reasons is a high turnover of pharmacists, who go abroad or work in the private

sector. A perception at national level is, for example, that PEPFAR recipients have attracted the best health workers from the government systems, especially doctors and higher cadre nurses (Oomman et al. 2007). Salaries are much higher within externally funded projects. Salaries of nurses and doctors working for PEPFAR-funded programmes for example are more than twice as high as those in the public sector (Oomman et al. 2007).

Information Systems

Figure 6 shows the number of supply chain management programmes and their information systems. Our Iganga District assessment revealed a range of parallel information processes due to external initiatives. JCRC for example, despite its policy to use Ministry of Health (MoH) forms, was using separate forms. Obstacles resulted when patients transferred to the public system in 2009. Different coding systems and discontinued files also contributed to misinterpretation of drug consumption rates needed to inform the drug orders. Instructions on new patient files and documentation remained poorly communicated to succeeding programmes. The Iganga surveys also showed poor local compliance with information requirements. Three out of five sites handled the filing of patient cards poorly. Files were not kept in a way that allows easy retrieval and had to be sorted before assessment. The district as a consequence misses the data needed for its supply forecasts, including numbers lost to follow-up.

National level surveys corroborate these findings. One highlights a general lack of stationery, outdated forms, superfluous and duplicated reporting requirements, incoherence in indicators as well as inconsistency between systems that rely partly on computers, partly on manual filing. Effects are weak processes, incomplete record, file-keeping and reporting, the loss of data as it is being aggregated from district to national level, and non-use of composed information (Oomman et al. 2008). Another survey specifies weak inventory management of laboratory commodities, half of the facilities did not use any report forms and only about a quarter used stock cards (Diallo and Techlemariam 2004). Other research shows distorting effects such as oversupply in cases where MoH and PEPFAR-funded NGO projects deliver drugs to the same facilities and patients (Oomman et al. 2008).

The national policy in 2003 was to merge the HIS for ART with the national LMIS and the overall national HIS (Ministry of Health Uganda 2003). A first barrier was that national ART programmes were at the outset based on parallel LMISs. In 2004 three major systems existed: One for the MoH free provision of ARVs and two for JCRC that distinguished between free and sold ARVs. The LMIS and HIS for essential medicines are yet not integrated. One of the

reasons is that clinical care and drug logistics are managed by different committees that would need to coordinate efforts (Logistics Subcommittee of the ARV Task Force 2003). This lack of well developed and integrated national HIS has triggered further development of parallel HIS for ARVs (Muwonge 2004). The disadvantages of that trend were recognized, but perceived as necessary to reduce the risks associated with the high costs of ARVs. So far only a few isolated efforts to centralize information on logistics have materialized, such as incorporating ARV logistic forms into the national HIS (DELIVER 2007b). The need for an LMIS system covering all essential drugs continues to be on the agenda but has not received adequate funding and political support (Logistics Subcommittee of the ARV Task Force 2003).

Service delivery

Stock outs at the point of service delivery are critical indicators of poor quality services from the client perspective. Not all stock outs are supply chain management related per se. Previous sections covered these manifestations of service delivery as they directly relate to supply chain management. Many other elements of service delivery may result in lack of drugs and supplies which are not directly related to supply chain management, including for example adequacy of infrastructure and human resources in general. Important shortages exist in areas such as laboratory equipment and reagents. A 2006 health facility survey found most health facilities lack essential laboratory equipment (Ministry of Health Uganda 2006). According to another survey only 17% of the HC counselling rooms for HIV complied with national guidelines. While all health centres providing PMTCT and VCT have laboratories for testing, technicians were not always available (Ministry of Health Uganda 2006). Condoms were the least available contraceptive assessed during a health facility survey in 2006, resulting in a stagnating contraceptive coverage at 23% (Ministry of Health Uganda 2006). Shortages were fuelled by a MoH policy to withdraw condoms from facility level in order to introduce quality assurance for all incoming condoms which caused supply disruptions for 1.5 years (Copeland et al. 2004). Between 2002 and 2006 family planning methods have only increased from 24% to 35% (Ministry of Health Uganda 2006).

4.5 Discussion

Our assessment of the supply chain management at Iganga District indicates important bottlenecks and system failures. We examine these through a systems thinking approach linking dynamics and causes across different sub-systems at district, national and international level. Poor performance of supply chain management is being reinforced by poor conditions at

all levels of the health system, including the areas of financing, governance, human resources and information. Table 3 summarizes the range of systems features as they relate to different building blocks. Systems weaknesses are the main reasons why – despite initial policy intentions to opt for integrated approaches – parallel systems are being built that increase complexity and trigger inefficiencies. Poor performance results in less than satisfactory delivery not only for ART but for health service delivery in general. Shortages are particularly apparent for drugs and supplies other than ARVs. In Iganga the supply of cotrimoxazole for example did not match the needs generated by ART expansion. Essential drugs and supplies shortages also show how, at a time of complex endeavours to deliver ART, many other essential and more affordable and cost-effective health services still fall short of supply. Many higher burden problems remain neglected by GHIs such as childhood pneumonia and maternal mortality which appear to be particularly affected by relatively little attention and funding (WHO 2010b; WHO and UNAIDS 2010).

Table 3: System effects of ART expansion in Uganda

System Outcomes	Description of System Causes and Effects	Primary Sub-system affected
More people on ART	The country has rapidly expanded ART with a 50% coverage of those in need by the end of 2009. Effects include creation of demands that require the systems to sustain an appropriate level of care.	Service delivery, with knock-on effects on all other sub-systems
Supply shortages (essential drugs) and expiry (ARVs)	Little investments in strengthening supply systems for essential drugs, lack of qualified staff leading. Effects include poor health outcomes, inefficiencies, financial and credibility losses.	Technologies, with knock-on effects on all other sub-systems
New supply chain management systems and governance structures for ART	Interest for short-term targets easier achieved through parallel systems. New structures and interests difficult to readjust later on. Effects include poor outcomes, vicious circles between weak systems and vertical approaches.	Governance, Technologies, Information, as well as the other sub-systems
ART program related mismanagement	Partly due to lack of absorptive capacity for rapid and large funding. Effects include misappropriation, withdrawal of funding, inefficiencies.	Governance, with knock-on effects on all other sub-systems
Brain drain, lack of qualified and motivated staff	Focus on short-term trainings, lack of training, higher salaries and other incentives within disease-specific programs compared to the public sector	Human Resources, knock-on effects on all sub-systems
Lack of appropriate data	Parallel, partly inefficient as well as unfeasible programme specific information systems. Effects include failure to focus on one national information system that meets quality standards, inefficiencies, superfluous tasks at facility level.	Information, knock-on effects on all sub-systems

Findings from other countries substantiate the trends seen in this research. A study in six Sub-Saharan African countries shows that counterfeits and sub-standard drugs are becoming commonplace (Bate et al. 2008). Surveys on health system effects of disease-specific programmes unanimously report adverse effects in the area of governance with parallel bureaucracies, a general lack of aid coordination and integration to national systems (African Union 2005; Buse and Walt 1996; Panos 2006; Waddington 2004; Gbangbadthore et al. 2006; Caines 2005; McKinsey and Company 2005; Biesma et al. 2009; Bill & Melinda Gates Foundation and McKinsey & Company 2005; Brugha et al. 2004; Brugha 2005; Grace 2009; Stillman and Bennett 2005; Wilkinson et al. 2006). Common themes related to supply chain management include donor driven priorities and systems, unwieldy procedures, uncoordinated practices, negotiations with different donors, excessive demands on time, different funding mechanisms and reporting expectations as well as delays in disbursements (OECD 2003; Operations Evaluation Department 2005; US Government Accountability Office 2005). In Malawi procurement guidelines of the World Bank were used despite being perceived as cumbersome (Mtonya and Chizimbi 2006). In Benin and other countries little attention has been paid in strengthening government procurement capacities (Gbangbadthore et al. 2006).

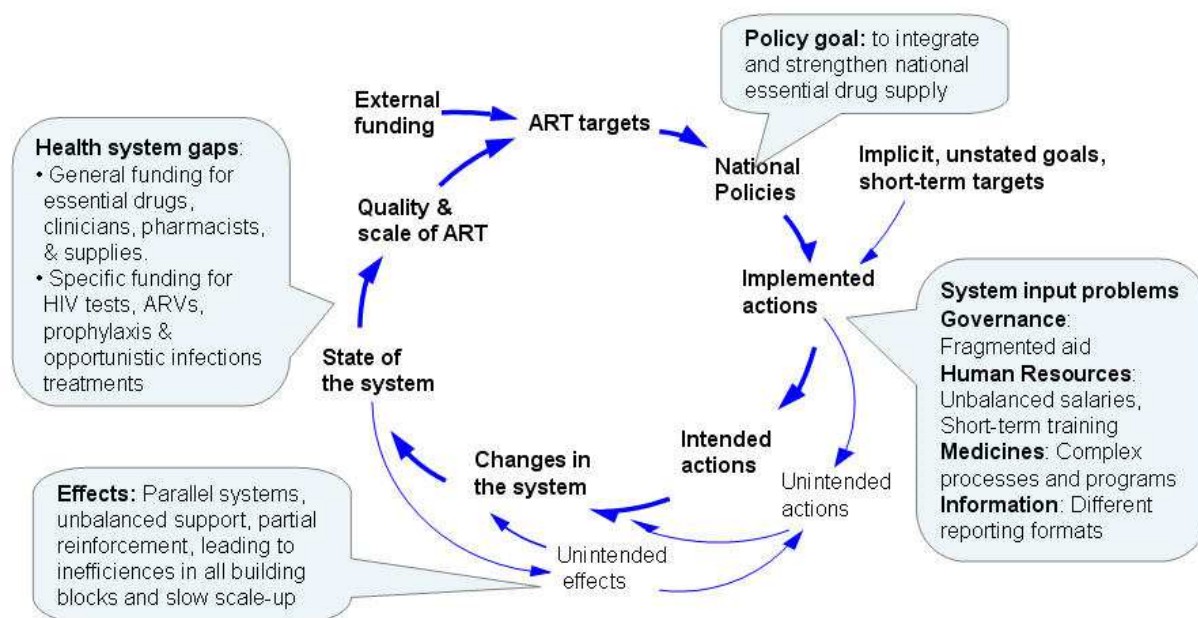


Figure 7: System dynamics of supply chain management for ART

Governance of drug supply chains appears as a key driver of systems performance. This research highlights important gaps between stated intentions, policies and implementation. Figure 7 illustrates the dynamic relationships between external inputs, intended and

unintended actions at different dimensions of the health system as conceptualized by systems thinking (Best et al. 2007). External actors follow their own agendas, set up parallel processes and follow short-term approaches. External initiatives focus on “easy” bottlenecks, such as clinical knowledge and warehouse capacity and avoid the more complex issues of systems strengthening (Ministry of Health Uganda 2005). As a MAP official put it: “We somehow strengthened the supply chain but it was temporary; no efforts continued after the project closed” (Oomman et al. 2008). Exceptions such as the DELIVER project exist but remain inhibited by system constraints. Government lacks administrative capacities, regulatory structures, information and incentives needed to monitor and ensure quality standards. These system constraints constitute common weaknesses in low-income countries (Tangcharoensathien et al. 2008; Bennett et al. 2005). Poor accountability affects external funding and consequently reliable drug supply. A vicious spiral emerges when bypassing weak systems with parallel systems causing further weakening of the primary system.

Despite the intention to integrate ARV supply chains with essential drug systems at a later stage, five years into ART such efforts have not matured. This confirms the general axiom that approaches initially designed as disease and programme-specific are not easily joined into sector-wide systems (Mills 2005). Systems issues rooted in weak governance and disconnected processes are difficult to remedy. Given the nature of reinforcing effects, the dynamics that create adverse effects will accelerate as scale-up, the number of disease-specific interventions, structures and external actors increase. Moreover, new systems become resistant to change as actors develop competing interests, such as remaining employed by new programmes. Dynamics thus need to be anticipated and mitigated at early stages. Systems thinking is a way to account for multiple, reinforcing and unpredicted ways in which ART supply chains interact with other health system components. As highlighted by WHO, “a system’s failure requires a system’s solution - not a temporary remedy” (WHO 2008b). At the moment, the term “system strengthening” is being largely misused for interventions that continue to have fragmenting effects. Crucially, systems approaches need to tackle the diverse bottlenecks this study has described across building blocks. Important elements include better integration of donors with national structures, long term sustainable funding or improving links between different elements of the health system through regulatory and appropriate feedback systems.

Countries themselves so far have made little use of available funding for health system strengthening (GFATM 2009c). One reason is likely a lack of capacities to develop health system programmes with more complex designs as compared to disease-specific interventions. Systems thinking helps countries to assess and appreciate the system effects of

interventions and adapt plans accordingly. It helps identify synergistic effects of multiple interventions across the majority of the health system building blocks, with attention to system based monitoring and careful steering of dynamic and interrelated processes. National ownership that allows for continuous follow-up and adaptation as well as the rooting of responses within national institutions therefore constitutes a vital part of any external support.

4.6 Conclusion

This study presents a synthesis of the current way of managing ARV supply in Uganda. It uses the vantage point of a systems thinking lens and a research project which investigates front line provider realities and links them to national developments. It does this through closely examining systems prerequisites in the area of governance, financing, human resource, information and service delivery in general. Its findings identify serious system failures, and dangerous and potentially irreversible dynamics due to the flourishing of disease-specific-intervention and their general focus on short term targets and failure to address current systems bottlenecks. Results are unsatisfactory outcomes not only for HIV but for health in general. The opportunity and need to use ART investments for an essential supply chain management has not been exploited. External aid approaches fail to sustainably strengthen health systems and national responses to disease-specific programmes. Shifting to a deeper understanding through systems thinking to shape and continuously follow up interventions that bear potential for system-wide improvements will give better insights to strengthen systems. Key approaches such as long-term funding and targets, evidence-based priority setting and national ownership are largely known. What appears to be missing is the sense of exigency and awareness regarding the risks of not only poor outcomes but system distortions and their hindrance to sustainable progress.

5 Systems analysis and health system effects of scaling up anti-retroviral supply in Tanzania

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5.1 Abstract

Background: ART expansion requires functioning health systems including supply chain management systems. Essential services in these areas continue to be weak in low-income countries. As it is the case in most high prevalence low-income countries ART is almost entirely externally funded in Tanzania. The willingness of international stakeholders to support integrated ART approaches is a vital prerequisite that is likely affected by motivations and designs of external aid. Both willingness and capacities of national stakeholders to support systems strengthening are equally important and enmeshed in complex systems.

Methods: We examine how stakeholders face incentives, disincentives or neither to promote integrative approaches to supply chain management for antiretroviral therapy. We use analytical concepts in line with systems thinking to study the interactions among stakeholders and the reinforcing effects of different components of the health system. Data are drawn from a wide range of documents including evaluations, audit reports and drug tracking studies, complemented through key informant interviews with international, national, district and health facility level stakeholders.

Results: International stakeholders have an incentive to support programmes' short term targets as they reduce obstructions from weak national systems. Effects include parallel structures and a focus on short-term targets that do not strengthen health systems. Disease-specific programmes have largely failed to address important root causes of systems. National stakeholders especially at health facility level are more directly affected by poor health outcomes compared to national and international level staff. Those closest to the needs at facility level have least power and worse working conditions. They might be motivated to improve work conditions through systems strengthening, but this effect is partly offset by a lack of power and systems weaknesses as they deteriorate work conditions.

Conclusion: The paper illustrates how barriers to systems strengthening relate to stakeholders' motivation, including short-term and narrow development-aid programmes, weak systems capacities such as poor work condition and lack of power of national stakeholders. To further assess and address these issues, it needs a stronger focus on system dynamics and driving forces as they impact on the sustainability and integration of disease-specific interventions. Interventions themselves need to be conceptualized to address and improve these driving forces to promote health systems strengthening.

5.2 Background

Progress towards scaling up ART has been slower than anticipated. Compared to the aspiration of 80% universal coverage levels for ART by 2010, the actual coverage achieved was around 36% (WHO and UNAIDS 2010; United Nations 2009). Antiretroviral treatment in low income countries is predominantly based on external funding through GHIs (Lele et al. 2005). In Tanzania four GHIs began to support large-scale access to ART in 2003 and 2004: The Global Fund, PEPFAR, WHO 3 by 5, and the Clinton Foundation. Total HIV expenditure increased almost tenfold between 2003 and 2006, from USD 33.8 million to USD 266.7 million (Ministry of Health and Social Welfare 2008c). It almost doubled again in the following years reaching USD 481.7 million in 2009 (Tanzania Commission for AIDS 2010). In 2008 12% (180,000) of 1.5 million Tanzanians in need of it received ART (Euro Health Group 2009b).

A general consensus exists today that GHIs need to integrate and coordinate efforts if health systems are to be strengthened and ART sustained. GHIs are increasingly being criticized for their lack of integration, focusing on short-term targets and disregarding national systems (Segall 2003; Harmer 2005; Caines 2004). The capacity of national supply chain management (SCM) systems to deliver ARVs has been discussed as one of the main bottleneck for better health outcomes. It is also an area where GHIs have commonly relied on parallel structures supported by external agencies to ensure that costly commodities can be procured and distributed in a timely and efficient manner. In-country distribution usually uses national structures but nevertheless requires special infrastructure, procedures, different fees, schedules and reporting as required by the funding agency.

Regenerated interest in integration is most noticeable at conceptual level. Olmen et al. define integration in terms of how far activities are bundled between disease-specific programmes and general health service delivery (van Olmen et al. 2010). Atun defines integration as the extent, pattern, and rate of adoption and eventual assimilation of health interventions into critical health system functions, such as stewardship and governance, financing, planning, service delivery, monitoring and evaluation (Atun et al. 2010b). Conceptual work has started to translate into programmes, the Global Fund for example, in the frame of its efforts to explicitly support and fund health systems strengthening, has developed criteria to define the degree of integration of disease specific programmes (GFATM 2011b). Alignment and harmonization are concepts closely related to integration, entailing synchronization and flexibility in accordance with national cycles and modalities, as well as the use of country systems to reduce administrative burdens on governments through simplified and common agreements and clear division of work (Buse et al. 2006). International initiatives to address these were the Paris

Declaration endorsed in 2005 with an international commitment for better alignment of aid (High Level Forum 2005) or the “Three Ones” aiming at the use of one national framework, organisational structure, monitoring and evaluation system for HIV responses (UNAIDS 2005).

Health systems strengthening has received increased attention in recent years (Brugha 2005; Lele et al. 2005). The budget of the Global Alliance for Vaccines and Immunization (GAVI) for HSS has substantially increased from USD 500 to 800 million since 2008 (Dickinson 2008). The World Bank's allocation to healthcare reforms rose from USD 316 million in 2001 to USD 739 million in 2007 (World Bank 2010c). The same year both the World Bank and the UK Department for International Development (DFID) revised their health strategy attributing high priority to health systems strengthening (World Bank 2007; Department for International Development 2007). The GAVI Alliance in 2008 developed a new funding and technical support strategy for HSS (GAVI 2009; HLSP 2009). In 2009 the Global Fund, the GAVI Alliance and the World Bank consulted on how to align and jointly programme their HSS funding frameworks. PEPFAR in 2009 revised its HIV strategy attributing higher priority to health systems strengthening (Pepfar 2009). The G8 developed a framework for HSS and adapted its funding commitments. It set up a taskforce in 2008 to innovate international funding for health systems (International Health Partnership 2008).

Despite these efforts the actual content and structure of integrated approaches for health systems strengthening continues to be short of conceptual clarity and evidence (Atun et al. 2010a). Reviews have summarized the effects of GHIs on health systems, but hardly according to above concepts (Biesma et al. 2009; Samb et al. 2009b; Yu et al. 2008). Likewise, existing definitions and indexes take little account of the dynamic and underlying cause-effect relationships and potential synergies between complex disease specific interventions and national health system, its context and diverse sub-systems as conceptualized by systems thinking (de Savigny and Adam 2009; Atun and Menabde 2009; WHO 2007; Best et al. 2007; Meadows 1998). There is generally relatively little understanding of how integrative vs. non-integrative measures have played out in practice and how they relate to different health systems dimensions. De Savigny and Adam highlight the importance of suites of coherent interventions across different sub-systems that provide synergistic potential, adding dimensions of complex systems related to system design, and to how the system works, for whom, and under what circumstances (de Savigny and Adam 2009).

Essentially, integrated approaches require the support of stakeholders, each having its own risk and reward profile as an important driving force (Narayanan and Raman 2004; Bernstein 1996; Laffont and Martimort 2002). The motivations and forces that drive different actors,

external and internal, including health workers, managers and policy-makers can constitute essential drivers to performance (Atkinson 2002; Gilson 2003). They are also a crucial element for sustainability given that organisational constructs develop and dissolve depending on the actions of individuals. These may work against organisational aims and health policies if other incentives such as additional income for poorly paid staff interfere (Schneider et al. 2006). Research has largely focused on the effects of financial incentives. This work applies a broader concept of incentives, referred to as anything that motivates effort, including also work mandates and conditions, capacities and power. Risk is a closely related concept as it implies the assessment of future implications, the potential of an action leading to a certain outcome and the influence somebody has on that outcome.

Incentives interact with health sub-systems such as supply chain management, information systems, administrative and human resource capacities – areas that tend to perform poorly in low-income countries (Tangcharoensathien et al. 2008; Bennett et al. 2005b). The motivation of stakeholders is driven by system constraints, such as they persist in the Tanzanian health system as indicated by poor coverage rates of basic health services. Antenatal care coverage defined in terms of at least four visits during pregnancy in Tanzania was 62% in 2009, the percentage of children under five with fever who received treatment with any antimalarial was around 50-60% in 2008 (WHO 2010c). Altogether, these health service and outcome indicators show that important gaps remain in the area of essential and basic care delivery. If these relate to relatively straightforward and cost-effective interventions - and many of the measures to improve mother and child health can be characterized as such - more complex interventions such as ART are likely to be even more affected.

The rationale of this work is therefore to look at incentives as a key driving force and to take a systems perspective looking at the effects across the building blocks of a health system. It uses an open approach based on systems thinking and related analytical concepts as opposed to a linear input-output or stages approach.

5.3 Methods

This work's systems thinking approach combines economic principles of risks and incentives with the World Health Organisation (WHO) Health Systems framework (WHO 2008a; Bernstein 1996; Laffont and Martimort 2002). It uses an open adaptive approach based on Grounded Theory implying that the process of data collection itself leads to the development of frameworks (Glaser and Strauss 1967). Figure 8 outlines its assessment criteria. It focuses

on the interactions and reinforcing effects between stakeholders and different components of the health system, including the elements of governance, financing, information, human resources, medicines and technologies, and service delivery (WHO 2008a). It looks at the extent to which stakeholders face an incentive, a disincentive or neither to promote integrative approaches to supply chain management of ART. The analytical framework is applied to major stakeholders at international, national and district level, including GHIs such as PEPFAR and the Global Fund, the Ministry of Health and Social Welfare (MOHSW) and its Pharmaceutical Supplies Unit (PSU), the Medical Stores Department (MSD), district health management teams and health workers.

We performed a literature search covering both peer-reviewed and grey literature such as audit reports and evaluations. We conducted key-informant interviews at national and district levels to address information gaps and validate findings from the literature. An open approach with a few guiding questions addressing recent developments to address reform needs and support for integrated approaches allowed respondents to flexibly bring up new issues and views (Glaser and Strauss 1967; Weiss 1994; Marshall and Rossman 1995). To ensure the consistency of interpretation, interviews were conducted by the investigators themselves. Responses were validated in subsequent interviews with other stakeholders. We triangulated the different sources for validation by following up findings from the literature review in interviews and ensuring the consistency of findings from national to district level. Interviews took place in two rounds during 2008 and 2009 with stakeholders from all organisational units as referred to in this analysis. The literature review focused on the time span 2002 - 2010, to assess the developments since the initiation of ART.

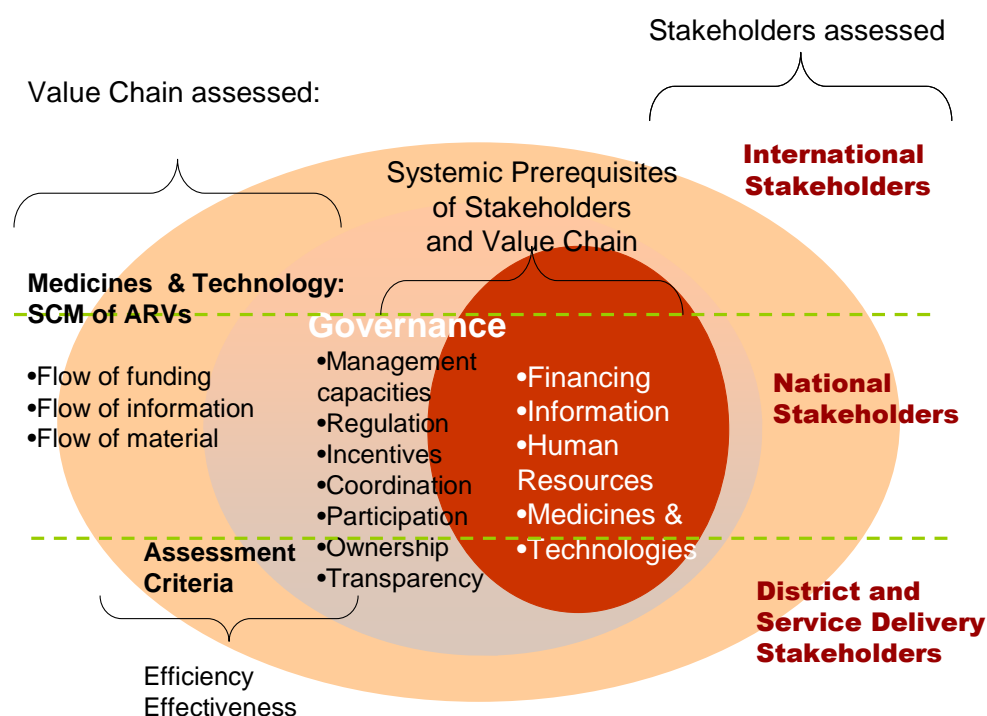


Figure 8: Analytical framework, analysis of supply chain management in Tanzania

5.4 Results

MSD, a semi-autonomous agency of the MOHSW, manages the national programme modalities for essential medicines, disease-specific programmes and special deliveries. It stocks 200 essential medicines and 310 medical supplies. It prepares procurement plans which are submitted to the MOHSW and funded by the Ministry of Finance (MoF). The PSU within the MOHSW subsequently allocates funds to the district and health facility accounts based on an allocation formula followed by quarterly disbursements. District medical officers (DMOs) order commodities from MSD according to budgets and based on information received from health facilities and district pharmacists. Districts also order from private wholesalers who procure from international and local supplies and distribute to pharmacies and hospitals. The number of private wholesalers doubled between 2000 and 2006 and reached close to 200 in 2009 (Department of Policy and Planning 2008). Procurement of ARVs is largely done by external agencies, i.e. the Global Fund for TB medicines or, for vaccines, the United Nations Children's Fund (UNICEF). For these commodities, the MSD is usually responsible for clearance from ports of entry, quality assurance, storage and distribution (Euro Health Group 2009b). Figure 9 illustrates the supply chain management for

ARVs indicating the number of additional channels and stakeholders compared to the national system.

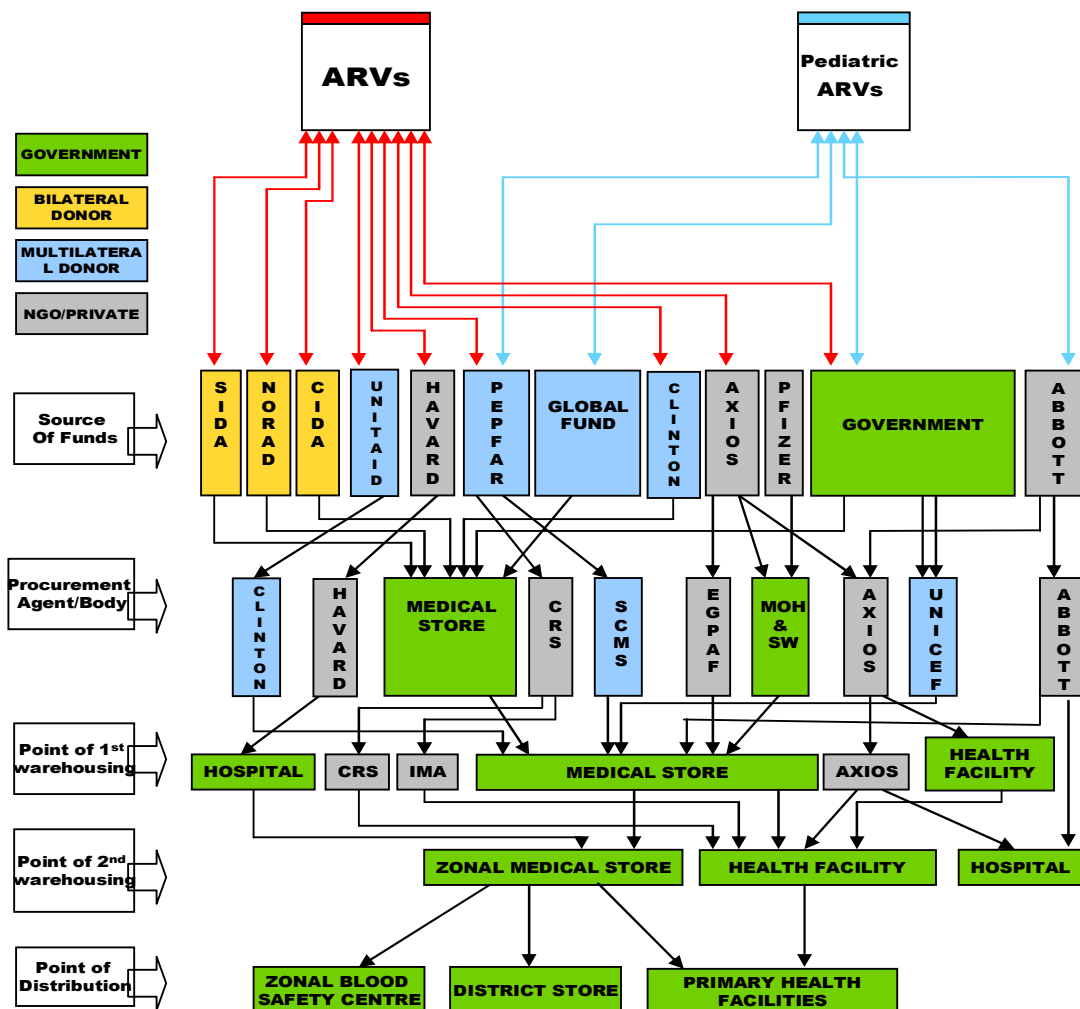


Figure 9: ARV Drug supply chain management in Tanzania, 2007 (Ministry of Health and Social Welfare 2008b)

Essential drug supply is relatively poorly resourced compared to the drug supply of disease-specific programmes. Pharmaceutical expenditure in Tanzania in 2000 accounted for 10% of total expenditure on health. This compares with 37% in Zambia, 22% in Malawi and 19% in Mozambique that year (Euro Health Group 2009). In 2007 the MOHSW implemented 90% of its total budget but only 64% of the essential-drug budget, shifting the remaining funds to other health sector priorities (Euro Health Group 2009). Funding for essential medicines in 2005 was USD 25.7 million which accounts for 9.5 % of government expenditure on health. Medicines funded by disease-specific programmes have reached a similar level compared to the essential drug programme. USD per capita drug expenditure was 0.77 for disease specific

programmes compared to 0.70 for essential medicines in 2005 (Department of Policy and Planning 2008). Another expenditure tracking study found that in 2006 21% of all expenditure on medicines and supplies was for essential medicines compared to 18% and 17% for ARVs and antimalarials respectively (Ministry of Health and Social Welfare 2008b). Almost the entire essential drug budget is funded by the government. Only the Danish International Development Agency (DANIDA) supports funding of essential medicines by about USD 1 million per year (Euro Health Group 2007b). Availability of essential medicines as tracked between 2005 and 2007 ranged from an average of 74.6% at hospital level to 52.8% at primary health care level (Euro Health Group 2007b; Justin-Temu and et al. 2004). A 2010 survey based on 20 tracer medicines in one district found an average stock out of 41% with shortages ranging widely from 5% to 75% (Wiedenmayer 2011). MSD's compliance to deliver according to health facilities' orders has been 41% (Ministry of Health and Social Welfare 2008a). The supply through disease-specific programmes generally works better due to external support but also faces shortcomings in terms of both oversupply and stock-outs (Euro Health Group 2007b; The Office of the Inspector General 2009). Another potential misbalance relates to different payment modalities, while ARVs are provided free of charge other medicines usually require user charges. Almost half of the patients (44.4%) interviewed in a survey stated that they had paid for medicines other than ARVs (Euro Health Group 2007b).

Incentives and system effects of International Donors

Donors are likely to have an incentive for short term targets and easily manageable programme structures as project support usually covers a limited number of years. In a context of weak health systems it is often easier to set up own structures instead of integrating and strengthening existing systems. In the case of disease-specific drug supply in Tanzania these incentives become distinct through parallel efforts and contribute to wide-spread disintegration. By 2007 there were 36 different sources of funding and procurement lines for ARVs. This compares with three lines for the essential drug programme. Funding for ARVs has almost reached the same level as funding for all essential medicines accounting for 18% versus 21% of national health expenditure in 2006. Fourteen donor partners use the MSD for drug procurement compared to seven donor partners and eight national government organisations (NGOs) who do not use it. 61% of the donors use MSD for storage and distribution, 29% use their own storage facilities and 10% sent supplies directly to health facilities (Ministry of Health and Social Welfare 2008b).

Table 4: Comparison of modalities between supply chain management for ARVs and essential drugs, Tanzania

	SCM ARVs	SCM Essential drug
Sources of funding	36	3
Funding as a % of THE	18%	21%
% of donors using MSD for storage and distribution	61%	100%

Incentives as described above have had notable effects on governance. A request by WHO 3 by 5 to re-cost the National Care and Treatment Plan (NCTP), for example, was perceived as a power play between international players (Starling et al. 2005). According to interviewees in a survey the early Global Fund proposals contained few inputs from the MOHSW. In a Country Coordinating Mechanism (CCM) meeting in 2003 for example, almost all technical interventions came from donors. MOHSW representatives provided some answers, the civil and private sector did not substantially contribute, and more than 60% of the attendees did not say anything at all. The perception of national representatives according to that survey was that power was in the hands of a few and meetings large and ineffective. Decision making was generally described as top-down. The multisectoral approach of the CCM was not particularly welcomed by government structures, and line ministries other than health did not consider HIV as their priority. Consequently these ministries sent low-level staff to meetings who did not speak out. There were also concerns that efforts to reform the CCM might not be worthwhile given the unpredictability of continued funding (Starling et al. 2005). Since these early years both the Global Fund and the CCM have evolved according to lessons learnt at country level. Initiatives include CCM Websites or CCM dashboards to provide a visual and strategic summary of key financial, programmatic, and management performance indicators (GFATM 2011a). These are embedded in broader efforts to strengthen capacities of CCMs (Aidspan 2010). Interviewees generally stated that awareness and willingness to improve coordination and integration of external support has improved. The following sections take a closer look at how far this has translated into actions and aligned processes.

Disease-specific programmes have caused poor governance due to parallel structures that lack integration and coordination. The government in Tanzania initially intended to integrate supply chain management for ART and essential medicines. According to an assessment in 2003, it envisaged integrative measures such as coordinating procurement and strengthening existing essential drug systems (Allers et al. 2003). Instead, externally funded programmes

largely opted for parallel processes, their argument being that the existing national logistics and information systems were too weak and would not guard against the risk of stock-outs and the pilferage of medicines (The Office of the Inspector General 2009). The Tanzania Commission for AIDS (TACAIDS) was originally the coordinator of national HIV response. The National AIDS Control Programme (NACP) was established in 1988 to address the new focus on ART. It took on responsibilities that had been TACAIDS', whose role became less clear (Starling et al. 2005). Effects included a general lack of work plans, attention to the details of medical issues, and smooth disbursements. Pressure to implement rapidly on a large scale partly inhibited testing phases and more progressive approaches. As one example, the suggestion to first test the Global Fund Round 3 plans in two districts was superseded by the 3 by 5 Initiative. These early years of ART showed relatively few efforts to better align, such as the integration of the Global Fund Round 3 proposal, the Clinton Foundation and Pefar into the NCTP (Starling et al. 2005). Interviewees have stated that as a general impression coordination has improved in recent years, there is however little substantiation of that in terms of specific examples. Findings in the following sections indicate that there is a general lack of visibility in terms of effective alignment at programme level.

International funding for ART in Tanzania remains fragmented, suffers from poor performance, lack of timeliness and sustainability of disbursements. All major GHIs bypass the Sector-Wide Approach (SWAP) funding mechanism. In addition, the Global Fund initially bypassed Tanzania's MoF by channelling funds through the MOHSW with the intention to speed up disbursement processes (Starling et al. 2005). Moreover, speed and quantity of international funds have presumably contributed to poor accountability, as detailed in other sections of this paper. A mixed picture with polarized views however emerges. According to one audit, disbursements by development partners in the area of SCM have been largely on time and within budget (Boex 2008).

Disease-specific programmes have largely failed to integrate with national health information systems (Tanzania Commission for AIDS 2006; Tanzania Commission for AIDS 2008). Expensive information systems for ART were set up in parallel to national systems that are still performing poorly. One of two new systems is the Tanzania Output Monitoring System for non-medical HIV and AIDS interventions (TOMSHA), which was set up at a cost of USD 8.5 million. It reached a compliance of 20% for report submissions from district level in 2009 (The Office of the Inspector General 2009).

Incentives and System Effects of the Ministry of Health

The MOHSW has the mandate and therefore, theoretically, an incentive to strengthen national health systems, including SCM for essential medicines and ART. It may also have an incentive to improve health systems to decrease workloads in the future. Decision making processes are however fragmented and individual programme managers also face other and partly competing incentives. Governments in low-income countries for example have a financial incentive to focus on areas that receive international support. Their own interests and agendas may be superseded by donor interests due to funding prospects. Priority setting is being shaped by power issues, international pressure or other non-epidemiology criteria.

MOHSW and PSU capacities relate to various systems weaknesses, including human resource capacities, funding, poor governance and information flow. Low and not performance-based salaries present disincentives to increase efforts as a contribution to systems strengthening. They are linked to contextual and governance issues typical for low income countries such as slow progress of civil service reforms and changing environments due to high staff turnovers. The scarcity of qualified staff in ministerial positions is exacerbated by public sector staff moving to development-project positions, a brain drain that is especially visible in the area of HIV (DELIVER 2007b). Weaknesses in the area of information concern a lack of strategic and continuous interaction to manage and monitor SCM between the PSU, the MSD and district-level stakeholders (Euro Health Group 2009b). In addition to PSU's operational weaknesses including undefined plans, poor communication and lack of feedback from the MOHSW, views of outside stakeholders were that the PSO could perform better if staff members were more pro-active. Recent years have seen efforts to strengthen PSU's internal operations. Respective support from DANIDA in 2008 and 2009 increased availability of the essential medicines list, reviewed roles and functions within the PSU team and assessed options to increase national supply of pharmaceutical personnel (Hera Health Research For Action 2009). The overall view of respondents was however that efforts to increase capacities of the PSU has never reached satisfying outcomes. Weaknesses in the area of governance concern relatively low priority and funding within the MOHSW to national supply systems for medicines. Gaps between policy intentions and implementation remain important. The National Drug Policy (1991) and Pharmaceutical Master Plan (1992-2002) are generally judged to be outdated and to not address current challenges (Euro Health Group 2007b). The national essential medicines list was updated in 2006 and does not reflect contemporary opportunities or needs. Guidelines to certify HIV facilities are only partly implemented, of six facilities that had started certification none had developed an improvement plan as prescribed by the guidelines. ART has also created parallel policies and

processes. For example, Fluconazole and Cotrimoxazole are provided through different channels, free of charge to HIV patients but on a cost-recovery basis to other patients. Such parallel demands have caused a predominant sense of confusion at health facility level (The Office of the Inspector General 2009). Existing systems weaknesses are also evident in the area of financing. Disbursements between the MOF and the MOHSW as well as between the MOHSW and MSD's health facility accounts are poor, varying and slow. In 2007 they amounted to 40% of agreed levels with lead times varying from 32 to 132 days (Euro Health Group 2009b). The MSD is consequently forced to grant credits to health facilities on the basis of later MOHSW disbursements that do not fully occur. Domino effects include cash flow problems, increased inventory time and related costs. Effects at health facility and district levels include stock-outs, difficulties to plan and budget (Euro Health Group 2007a).

Incentives and System Effects of the National Medical Stores Department

The MSD faces similar incentives, risks and system constraints compared to the MOHSW, including external pressure to adjust, public sector constraints related to civil sector reforms, weak financial processes and poor human resource capacities. It depends on funding from both the MOHSW and international donors and therefore presumably has an incentive to subsume its interests under theirs. This is reflected in its low involvement in national policy making; for example it was hardly involved in the development of SCM strategies (Starling et al. 2005). As a public agency it is restricted to short-term contracts and is therefore treated with less responsiveness compared to private procurers. It also misses the benefits of more accurate short term orders as put forward by private agencies. It furthermore has to adhere to fixed price ceilings and therefore lacks flexibility to respond as quickly as needed in the case of emergency procurement, for example. Accordingly less than 50% of procured items arrive on time at the MSD and its lead time for procurement amounts to 6-12 months compared to 1-4 months for private wholesalers (Euro Health Group 2007b).

Effects in the area of financing are that the MSD faces squeezes caused by the mismatch between resources and additional demands (Euro Health Group 2007a). Causes relate to bureaucratic obstacles with cumbersome flow of funds from government entities as described above as well as relatively poorly paid demands from external agencies. MSD has a standard mark-up to cover handling fees of 17.4%. This is relatively low compared with other countries in the region. The Central Medical Store in Uganda, for example, operates with a 32% mark-up while dealing with a similar donor landscape and much easier geographic conditions in terms of distribution (Euro Health Group 2007b). The mark-ups MSD actually applies to different programmes however vary and lack clear agreements. The Global Fund, for

example, has negotiated a handling fee of 14%. The MOHSW contributes almost half of that fee but often does not cover its share. The overall estimate is that the MSD is not paid for 50% of what it invoices to disease-specific programmes. On balance, the result is a cross-subsidization of disease-specific programmes through the core essential drug programme (Euro Health Group 2009b). Overall, MSDs' turnover for disease-specific programmes has increased at an accelerating rate between 1999 and 2009, without parallel growth in income. Its net income in 2009 was a third of what it was in 2006 and it faced an outstanding debt of USD 14 million (Euro Health Group 2009b). In addition, MSD faces future investments such as USD 20 million for vehicles that need to be replaced (Euro Health Group 2007b).

Weak information systems fundamentally affect supply system capacities. The MSD's information system was set up in 2001 and not designed to handle the number of different service modalities of today (Euro Health Group 2007a). It suffers from frequent down times, poor updating, untraced record deletion and patchy information of new programmes, which makes it difficult to track expenditure for vertical programmes (The Office of the Inspector General 2009). In 2007 USD 133,000 worth of medicines remained unaccounted for. Internal management constraints intertwine with the human resource constrictions of a public civil service context as described before. Externally supported efforts to address these issues included revising job descriptions and introducing performance-based contracts for the 14% of the staff on temporary contracts. The Global Fund in 2007 spent USD 2.4 million for capacity building of the MSD's providing storage, equipment, training and an upgrade to its management information system (The Office of the Inspector General 2009). Major constraints in the area of human resources nonetheless remain unaddressed including cumbersome recruitment processes and a lack of performance-based incentives for most of the staff (Euro Health Group 2007a).

Incentives and System Effects at District and Health Facility Level

District level stakeholders in principle have a relatively high incentive to improve health systems being more closely impinged by poor outcomes and additional workloads caused by a poorly managed SCM. At the same time, they generally have relatively little power to change processes. DMOs and other staff involved in drug management and ordering also face few incentives to perform better, they may instead have an interest to reduce efforts if workloads are high. A survey in Tanzania for example found that health facilities do little to claim their rights for essential medicines. Escape strategies such as to refer patients in the case of stock-outs have instead become routine (Euro Health Group 2009b). In the absence of financial

incentives, stakeholders need to bring up intrinsic motivations to perform better. The latter is likely to be reduced by system constraints as illustrated in the following paragraphs.

Governance constraints include lack of regulated interactions with the MSD or the PSU, missing lines of control to ensure drug ordering performance, and low participation at national policy level by district planners (Euro Health Group 2009b). According to a survey good practices in the area of SCM are limited, and drug needs are estimated based on visual inspection and guessing. The zonal level frequently lacks compliance with good storage practices. By the time of the survey in 2009 six out of 27 facilities had developed procurement and supply-management plans. Seven out of 28 (25%) health facilities had adequate means of transporting medicines and 33% disposed of adequate storage space (The Office of the Inspector General 2009).

Vis-à-vis Human Resources, pharmacists are of short supply and often replaced by pharmaceutical technicians or nurses. A survey in Dodoma found that for a total of 247 health facilities 12 trained pharmaceutical staff were available, six of them being pharmacists (Wiedenmayer 2011). Initiatives to increase the numbers of pharmaceutical technicians exist but not to the extent that would solve the staffing problem (Ministry of Health and Social Welfare 2008a). Relatively low pay and poor work conditions in due course increase staff shortages. A survey found that 51% of the pharmacists considered moving from their workplaces to other sectors. As many as 74 % of those working at the MOHSW considered moving to private facilities and NGOs (Ministry of Health and Social Welfare 2009). Moreover, other health sector human resource constraints affect the supply chain management as the majority of staff involved are non-pharmaceutical workers such as nurses.

Concerning information systems surveys report weak stock recording and monitoring practices at all levels. A 2010 survey in Dodoma found that documentation of medicines supply to be weak, rarely monitored, and never audited (Wiedenmayer 2011). To order medicines, health facilities fill in so-called “report and request forms”. This is often done inadequately, not based on needs and/or simply copied from previous periods. Reasons include lack of capacities both in terms of knowledge and time, according to a survey in Dodoma filling in of forms can take up to one week of work. Forms are hardly reviewed also due to negligence of district pharmacists (Wiedenmayer 2011). Health facilities have the tools for record keeping but do not use them systematically. Stock-outs are measured by 40% of health facilities and there is a 58% mismatch between what is recorded in ledger books and actual stocks. Support, control and enforcement mechanisms are weak, jeopardizing the tracking of medicines to avoid pilferage and leakage. Information on actual case loads, consumption and needs as a

prerequisite for planning is missing. Health facilities do not receive the medicines they order for different reasons, including temporary drug stock-outs at MSD level, late delivery, limited budgets or poor ordering by DMOs. Health facilities remain unaware of these reasons as they do not receive corresponding explanations (Euro Health Group 2007b; Ministry of Health and Social Welfare 2008a).

5.5 Discussion

This works' assessment along the lines of systems thinking highlights the lack of incentives for stakeholders to support systems strengthening. Table 5 summarizes respective incentives and system effects at different levels. International donors have an incentive to achieve short-term targets and reduce managerial complexity of programmes. In the context of weak systems, these are usually more easily achieved by setting up separate programme structures and targets. Vicious circles surface between bypassing and weakening health systems. International partners are influenced by the interests of international agendas and headquarters, which may not correspond to national interests. The introduction of performance based funding based on targets such as number of people on ARVs exacerbates these developments. What is more, international partners do not directly bear the risks and consequences of poor outcomes at health facility level. These are important forces as donors decide on funding priorities including support to disease-specific programmes with potential domino-effects as illustrated in this case study.

National stakeholders including the MOHSW and the MSD theoretically have an incentive at organisational level to improve health systems given their mandate. At the same time they face non-performance based work conditions and are working in a context of systems constraints, fragmented programmes with different agendas and external demands. National-level stakeholders lack the power to improve their systems as new loads override the need to address systems weaknesses first. Stakeholders at district and health facility level face a similar incentive structure. Health facility staff has a potentially higher incentive to work towards better health outcomes as these more directly affect their work. This potential interest is, however, offset by higher constraints in terms of poor pay, higher work loads and unsatisfactory working conditions imposed by weak systems. Decision-making power decreases from national to health facility level whereas health system constraints increase.

Yadav et al. (Yadav et al. 2007) assess patterns of risks and incentives along what they call the value chain of Artemisinin-based combination therapy (ACT). They come to similar

conclusions in terms of misaligned incentives and risk structures that cause poor performance. One of their main recommendations is that risks should be redistributed among stakeholders. Our systems thinking approach shows that incentives are related to a complex net of systems constraints intertwined the public sector and development aid context that reduce the likelihood and feasibility of such redistributions. Importantly, incentives are only one part of the picture; other important constraints result from multiple system weaknesses that dynamically interact with poor incentive structures.

Designing more functional systems and creating better working conditions as well as redirecting parallel donor demands emerge as core issues from this works' assessment. GHIs will continue to set up parallel procedures as long as existing systems perform poorly. Addressing the most important system constraints is a long-term task related to the past and ongoing efforts of civil sector reforms, decentralization and other health systems efforts. Most of the existing information gaps this paper has described could, for example, be addressed by a well functioning health information system and logistics management information system (Chovitz et al. 2009). In a country such as Tanzania, which spans 131 districts, any of these efforts present important challenges. Initiatives to strengthen one sub-system will be constrained by weaknesses in other sub-systems. With these challenges in mind, it needs ways to increase motivations and capacities for health systems strengthening at all levels, addressing joint and integrative efforts, conceptual clarity and evidence related to system effects. It not only needs international partners to align and harmonize, it also needs a Ministry of Health with motivated staff that prioritizes health system efforts disregarding the carrots of international funding. It needs a well supported and motivated MSD capable of financially and strategically managing its portfolio at an acceptable level of quality. It also needs health staff with the resources and information at hand for needs-based drug ordering.

5.6 Conclusion

This study follows a systems thinking approach that goes beyond the description and listing of separate health system effects by including and connecting different dimensions and seeking an explanation for what is causing and reinforcing dynamic system effects at different stakeholder levels. The work illustrates the range of system constraints that have and will affect supply of ARVs. Important root causes include misaligned risk and incentive structures that cause vicious cycles between the weakening of health systems and bypassing them. Such incentive structures are inherent to the contemporary development aid and public sector context of low income countries and therefore difficult to remedy. To address them, it needs

increasing awareness and capacities at all levels to fundamentally strengthen and sustain systems.

Table 5: Incentives and system effects, supply chain management in Tanzania

Actor	Incentives and Risks	Risks	Related internal systems constraints	Related external systems constrains
International Partners	Easily managed programmes to: Deliver visible short-term results likely to be: Non-aligned with national and district level incentives	No risks caused by poor health outcomes (focus on targets. No risk of concerning sustainability)	Inefficient parallel organisational structures and funding, unclear roles and responsibilities, little attention to implementation, parallel information requirements	Poor existing national systems that further motivate new and parallel structures and processes
MOHSW	Organisational level: Incentive to work towards better health Individual level: Poor incentives given public sector work conditions	Indirect risks caused by poor health outcomes due to increased future work	Contributing and participating in donor-induced parallel structures Reducing quality of processes, i.e. poor disbursements	Public sector context Need to align to external support Systems constraints at lower levels that inhibit policy implementation
MSD	Same as MOHSW	More visible indirect risks caused by poor health outcomes due to increased work	Same as MOHSW, plus: Poor management, control, and information system, not designed to handle today's complexity	Same as MOHSW, but more directly affected by limited public sector Procurement, low funding through handling fees, parallel demands and procedures

6 HIV treatment and reproductive health in the health system in Burkina Faso: resource allocation and the need for integration

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6.1 Abstract

Organizational changes, increased funding and the demands of HIV antiretroviral (ARV) treatment create particular challenges for governance in the health sector. We assess resource allocation, policy making and integration of the national responses to ARV provision and reproductive health in Burkina Faso, using national and district budgets related to disease burden, policy documents, organizational structures, and coordination and implementation processes. ARV provision represents the concept of a “crisis scenario”, in which reforms are pushed due to a perception of urgent need, whereas the national reproductive health programme, which is older and more integrated, represents a “politics-as-usual scenario”. Findings show that the early years of the national response to HIV and AIDS were characterized by new institutions with overlapping functions, and failure to integrate with and strengthen existing structures. National and district budget allocations for HIV compared to other interventions were disproportionately high when assessed against burden of disease. Strategic documents for ARV provision were relatively less developed and referred to, compared to those of the Ministry of Health Directorates for HIV and for Family Health and district health planning teams for reproductive health services. Imbalances and new structures potentially trigger important adverse effects which are difficult to remedy and likely to increase due to the dynamics they create. It therefore becomes crucial, from the outset, to integrate HIV/AIDS funding and responses into health systems.

6.2 Background

Providing integrated services of comprehensive reproductive health programmes was a central theme of the 1994 Cairo International Conference on Population and Development (ICPD) (UNDP 2008). Global debates on the need to integrate HIV/AIDS into reproductive health have been ongoing. The MDGs incorporated the goal of universal access to reproductive health with maternal health while combating HIV remained a separate goal with malaria and tuberculosis (Germain et al. 2009). We carried out research on how these international policies have (or have not) translated into integration of HIV antiretroviral (ARV) treatment at policy making level in Burkina Faso. The national ARV scale-up has seen considerable progress: ARV coverage rose from 7% in 2004 to 35% in 2007. In 2006, 12,842 people living with HIV received ARVs; in 2009, this number had increased to 26,448 (Conseil National de lutte contre le SIDA et les IST 2011). HIV prevalence in Burkina Faso was 1.6 percent in 2008, which is relatively low compared to other Sub-Saharan countries (WHO 2010c).

National indicators show important resource constraints, poor outcomes and gaps of essential health services. Burkina Faso is one of the world's poorest countries, 46.4% of the population live below the poverty line on less than 1 dollar per day (UNDP 2008). In the early 1990s, the country initiated health sector reforms, focusing on decentralization, cost recovery, and increasing the supply of essential drugs, among others (Haddad et al. 2006). Government expenditure as a percentage of total government expenditure between 2002 and 2007 increased from 8.9% to 13.3%. Private expenditure on health as a percentage of total expenditure on health during these years decreased from 60% to 44%. About a third of national health expenditure is externally funded. Total national expenditure on health per capita, excluding private expenditure, was USD 19.38 in 2007 (WHO 2011a). National expenditure on HIV/AIDS has been almost entirely donor funded; disbursements in 2007 amounted to USD 1.58 per capita for HIV/AIDS (OECD 2011). The country in 2008 had a population of about 16 million and an annual population growth rate of 3.1%, a high total fertility rate of 6.34 children per woman, an infant mortality rate of 86.02 deaths per 1,000 population, and a life expectancy of 52.55 years (WHO 2010c).

Health outcomes and coverage indicators suggest that despite reform efforts and increased funding, important shortages still persist with regard to essential health services. A survey showed that five out of 53 districts had the number of physicians defined as the needed minimum. 57% of physicians were working in the cities Ouagadougou and Bobo-Dioulasso,

which account for 16% of the population. Physician absenteeism was reported to be 37%. Two out of 14 centres encountered shortages in the range of 30 days per year of high-use medicines. 17 of the 53 district hospitals had the capacity to do caesarean sections (Bodart et al. 2001). Access to health services is further constrained by Burkina Faso being one of the countries in the region where common generic drugs are most expensive. A study showed that about 35% of people who did not seek health care stated that this was due to inability to pay. Two-thirds of people accessing care said they had difficulties meeting health expenses (Haddad et al. 2006). Altogether, these data show that important gaps remain in the delivery of essential and basic services that are relatively simple to manage compared to ARV treatment. In the context of scarce resources, such gaps increase the need to set priorities according to burden of disease and to aim for efficiency gains through integrated approaches that will improve accessibility, user-friendliness and efficiency of service delivery through sharing of resources and avoidance of duplication in planning, management and administration.

HIV treatment programmes constitute the largest, most costly and most complex therapeutic public health intervention ever undertaken in low-income countries. They are characterised by a relatively high international and national political profile, high levels of funding and relatively short-term and ambitious targets. Organizational changes and other consequences of increased levels of funding, demands and expectations create particular challenges for governance in the health sector. However, despite an increasing focus on HIV programmes and the governance they require, the demands made on policy making and implementation are rarely examined in detail at national level, and less so at district level (Gilson and Raphaely 2008). Existing reviews of evidence on the effects of ARV treatment expansion on health systems, including on the governance of health systems, (Biesma et al. 2009; Case and Paxson 2009; Marchal et al. 2009; Ooms 2009; Yu et al. 2008; Samb et al. 2009) generally conclude that disease-specific programmes have led to the creation of parallel structures with short-term targets, motivated by a sense of urgency or crisis. The creation of national AIDS Commissions has been a policy promoted by UNAIDS and the Global Fund and implemented in most low-income countries. Merits and drawbacks of these have been subject to global debates, but research has not specifically targeted their role in relation to integrated responses.

Grindle and Thomas refer to a “crisis scenario” if reforms are pushed due to a perception of urgent need, as opposed to “politics-as-usual scenarios” representing incremental health systems strengthening efforts (Grindle and Thomas 1998). They find important differences in the two types of initiatives as regards how decisions are taken, how bureaucratic agencies

engage, and other process characteristics, and with timing and incrementalism, among others (Grindle and Thomas 1998). We use these concepts to illustrate the difference between ART and older essential health interventions and structures, exemplified by the national programme for reproductive health and district health planning structures.

Governance in the health sector is a relatively new and undeveloped analytical area with consequently little guidance on how to generate feasible and useful research questions. It is a multidimensional concept which commonly involves the elements of actors and institutions and is therefore at the core of any process within a health system and a main driver of performance. A WHO framework defines governance as generating intelligence; formulating strategic policy direction; ensuring tools for implementation through powers, incentives and sanctions; building coalition and partnership; ensuring a fit between policy objectives and organisational structure, and ensuring accountability. (Travis et al. 2002b; Siddiqi et al. 2009) Policy is a closely related concept; it commonly refers to rhetoric and political speeches, written documents, institutional mechanisms as well as daily interaction of street level bureaucrats (Shore and Wright 1997). Policy analysis looks at the elements of a policy process, the political and social forces as they affect implementation through drawing on political science and public administration perspectives (Buse et al. 2005).

Given the encompassing nature of both governance and policy analysis, it needs a focus on specific dimensions judged to be both relevant and feasible to assess manifestations of governance. One way is to consider governance dimensions closely linked to implementation. Organisational structures, the development and use of strategic documents as manifestations of agenda setting and policy formulation qualify as such. Measurability is another criterion, it requires clearly defined units and policy documents qualify as such. No universally applicable guidelines exist to assess policy documents. An evaluation by the Overseas Development Institute (ODI) for example looks at how far national HIV strategies contain explicit objectives, budgets, operational plans and are developed in a participatory manner. It concludes that few policies are explicit about priorities, only 60% include budgets, and about half of the policies were translated into operational plans including a monitoring and evaluation plan. Plans were commonly developed by external consultants with little participation of national stakeholders (Buse et al. 2006). Similar criteria are contained in the Appraisal of Guidelines, Research and Evaluation in Europe (AGREE) instrument - a generally accepted framework to assess the quality of clinical guidelines (The AGREE Collaboration 2001). Using these models, we examine the governance of Burkina Faso's national ARV treatment programme in relation to its reproductive health programmes, with a focus on integration and progress at policy level. We compare their budgets' and the form of health policy making for both, based

on a qualitative assessment of organizational structures, extent of cooperation, and development and use of strategic documents.

6.3 Methods

This policy analysis was part of a multi-centre research project “Effects of antiretrovirals for HIV on African health systems, maternal and child health (ARVMAC)”, between 2007 and 2010, which looked at the effects of HIV antiretroviral treatment programmes on African health systems, including maternal and child health programmes. It was carried out in three health and demographic surveillance sites: Iganga-Mayuge in Uganda, Nouna in Burkina Faso and Rufiji in Tanzania. It complemented other ARVMAC studies on health performance, human resources, access to health services and health outcomes.

To assess district budget allocation compared to burden of diseases we use district plans and budgets and in addition collected cost items not included in annual district budgets. All data entered a modified version of a district health accounts tool first introduced through the Tanzania Ministry of Health’s Essential Health Interventions Programme (TEHIP) (de Savigny et al. 2001; Ministry of Health and Social Welfare 2011). It tabulates 52 health interventions which form six disease areas. It then maps budgets against intervention addressable burden of disease profiles. Burden of disease profiles are those provided by the respective sentinel district demographic surveillance sites (DSS) in each district (Indepth 2011). For information on national donor funding for HIV/AIDS compared to other health interventions, we also drew on the creditor reporting system (CRS) compiled by the Organisation for Economic Co-operation and Development (OECD). The database reports bilateral funding from the 22 OECD member states, and since 2007 16 multilateral donors have also been included, e.g. the the World Bank and the Global Fund (OECD 2011).

Organizational structures assessed within the “crisis-scenario” include the national AIDS Commission and the Ministry of Health (MoH) Directorate for HIV, both with their respective units at decentralized level. Organizational structures assessed within the “politics-as-usual scenario” include the MoH Directorate for Family Health and district health planning teams. Primary data sources were informant interviews and policy documents. Interviews took place in Ouagadougou, the capital of Burkina Faso, the city of Nouna, Nouna district and its regional capital Dedougou. Nouna district was chosen because it was the research site of the larger research project. Key informant interviews were conducted in French by the principal investigator and in close cooperation with a local research team, who are co-authors on this

paper. Three representatives from the national AIDS Commission, one or two representatives each from the MoH Directorates (Reproductive Health, HIV, Malaria, TB, Human Resources), one representative each from WHO, the national sector development programme, the UN support programme for non-governmental organisations (NGOs), the French and Dutch bilateral agencies, and four NGOs were interviewed. Regional level interviews included the head of the regional AIDS Commission as well as the head of the regional health planning team. At district level we interviewed the district health officer as well as other members of the district planning team, the district pharmacist, physicians at the district hospital and local NGOs. Interviews took place in 2007 and again in 2008 to follow up developments. The first round of interviews included 27 interviews at national level, four interviews at district level and two interviews at regional level. The second round included 12 interviews at national level and two interviews at district level. Topics during interviewing included concerns of participants, challenges and progress of interventions, the role of different stakeholders, institutions and events, as well as contextual issues. Specific questions included details of how policy documents were developed and who participated in the process, and how far these documents were being used for planning and implementation.

We used triangulation of methods, comparing findings from different interviews and findings from the literature. This included reinterpretation of results and search for new evidence until more coherent overall conclusions could be reached as suggested by Rychetnik (Rychetnik et al. 2004). We used an open approach based on grounded theory implying that the process of data collection itself leads to the development of frameworks (Glaser and Strauss 1967). The objective was to allow for the unpredictability of findings and to avoid preconceptions about what to find. Interview themes were broadly defined prior to research but then continuously adapted during the process of interviewing. This permitted respondents to bring up new issues according to their point of view (Glaser and Strauss 1967; Weiss 1994; Marshall and Rossman 1995). Findings were transcribed and assessed after interviews to filter out points still unclear and requiring further probing and discussion with the study team and in further interviews. With all interviewees we sought informed consent and assured confidentiality of responses. Overall ethical approval was obtained by the ARVMAC project in each partner country prior to the start of work.

We reviewed key strategic and planning documents produced between 2004 and 2007 according to pre-defined criteria, including: the national HIV/AIDS strategies, national health strategy, and annual plans of the national AIDS Commission, MoH Directorates for HIV and Family Health, as well as Nouna district annual plans and budgets. We assessed corresponding units at national, regional and district level. To assess policy documents, we

worked from the AGREE instrument, (The AGREE Collaboration 2001) and derived criteria relevant to the documents being assessed, such as how far the documents were based on evidence for priority setting, how far they presented specific and relevant information, defined targets, activities and budgets, and involved relevant stakeholders during their development.

6.4 Results

The national response to reproductive health and HIV/AIDS

Since Cairo, the national reproductive health policy in Burkina Faso, initially including only family planning, has evolved into a broad concept, including STI/ HIV control, women's rights, sexual education and maternal and child health. Abortion remains legally restricted with exceptions. The MoH Directorate of Family Health (DSF) develops, plans, and follows up programmes for maternal and child health. Both the National Population Council (CONAPO) and the MoH Directorate for Family Health (DSF) are responsible for coordinating reproductive health policies.

The HIV epidemic started to be portrayed as a “crisis” that needed a major effort in the early 2000s. Burkina Faso in 2001 hosted the Africa conference on AIDS and Sexually Transmitted Diseases. Two new public structures were set up that year: the national AIDS Commission, which since 2002 has also led the Country Coordinating Mechanism of the Global Fund, and the MoH Directorate for HIV. Prevention of mother-to-child transmission of HIV (PMTCT) is under the mandate of the MoH Directorate for Family Health, while HIV treatment (including for women who received PMTCT) is under the mandate of the MoH Directorate for HIV. Intervention areas of the MoH Directorate for Family Health include family planning, neonatal and obstetric care, integrated management of childhood illness (IMCI), PMTCT and reproductive health for youth. Figure 10 presents an overview of organisational units assessed in this study at national and district level.

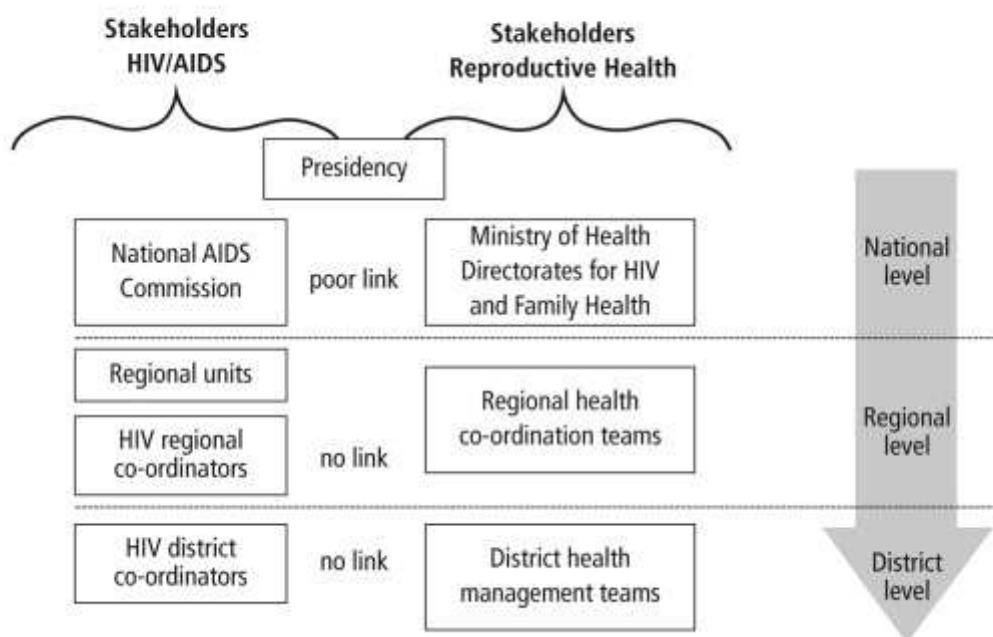


Figure 10: National and district level stakeholders for ARV treatment and reproductive health

Implementation of the national reproductive health policy has been mixed and dependent on funding. Antenatal care coverage defined in terms of at least four visits during pregnancy was 18% in 2008, the unmet need for family planning 29% (WHO 2010c). Important weaknesses as identified by the DSF 2007 annual plan included insufficiencies with regard to IMCI, poor funding and stock outs of family planning methods, interruptions at entry level of PMTCT, poor integration of PMTCT within pre-service training, and poor funding to strengthen district capacities in the area of maternal health. Little integration of PMTCT within district plans was identified as a main reason for its relatively slow expansion (DSF 2007b). Given these persisting challenges, it is vital to aim at a needs-based resource allocation as well as potential efficiency gains through integrated approaches.

Resource allocation to HIV compared to reproductive health

Our Nouna district 2007 assessment of budgets for different interventions against burden of disease indicated a disproportionately high budget for HIV/AIDS and a disproportionately low budget for integrated management of childhood illness and maternal health, among others (Figure 2). At national level, 30% of OECD donor funds for health in Burkina Faso were disbursed for HIV/AIDS in 2007, compared to 6% for maternal health and 1% for malaria.

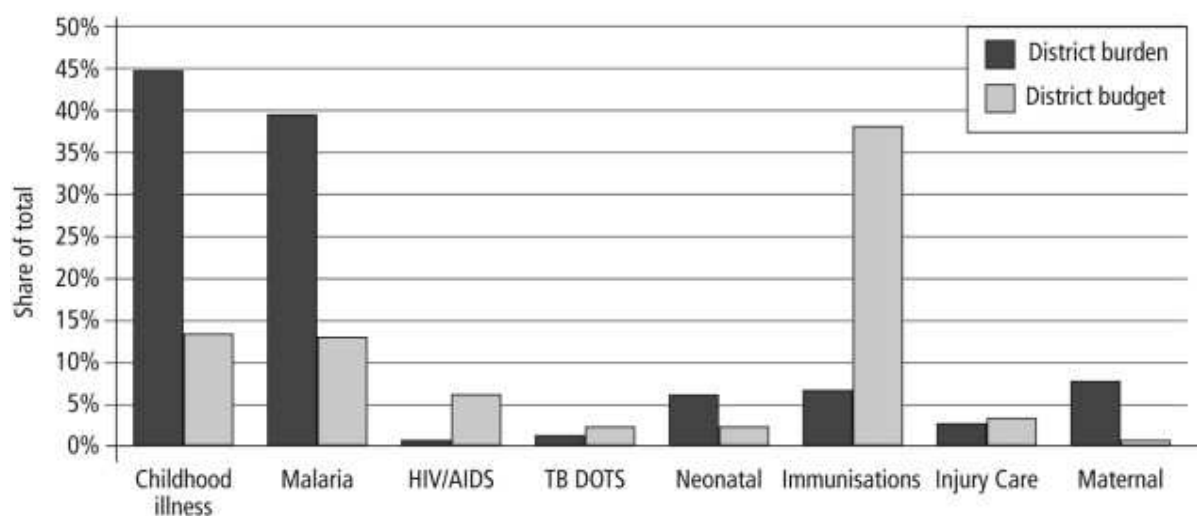


Figure 11: Proportional district disease burden vs. share of expenditure by essential intervention strategy, Nouna district, Burkina Faso, 2007

We investigated number of staff to assess balance of allocation of resources. In 2008 the national AIDS Commission had four times as many staff as the Directorate for Family Health and more than eight times as many staff as the Directorate for HIV (Table 6). In 2007 the budget of the AIDS Commission was USD 46.75 Million, that of the MoH Directorate of Family Health 3.45 Million (CNLS 2011; DSF 2007).

Table 6: Number of staff: AIDS Commission and MoH Directorates for HIV and Reproductive Health, Burkina Faso, 2008

	MoH Directorate for Family Health (DSF)	MoH Directorate for HIV (CMLS)	National AIDS Commission (SP/CNLS)
Total staff	25	15	115
Senior staff	7	7	50

About two-thirds of the ARV treatment programme staff in 2008 were employed by donor-funded project units and received salaries that were 7-10 times higher than public health sector salaries. Interviewees confirmed these imbalances. There were no comprehensive data on salary scales, but estimates from interviewees were that physicians working for NGOs in HIV/AIDS programmes earned approximately double what physicians earned in the public sector.

According to regional and district health planners interviewed, vertical programmes increased the amount of work for reporting and monitoring. The national programmes for TB and HIV especially required resource-intensive quarterly reporting. Monitoring of TB required data from health facility level, monitoring of ARV treatment required data from hospital level. The national immunisation and reproductive health programmes were considered to be better integrated, and their supervision and reporting procedures were part of the standard health information system. A regional health planner estimated that integration of TB into standard procedures could save 24 supervision days, and integration of ARV treatment another 12 days per year.

Policy making for HIV and reproductive health

“We needed a multisectoral and visible national response to HIV” was a repeatedly heard statement, justifying the AIDS Commission's existence in the first place. One respondent, however, opined that the AIDS Commission did not really have “a reason to be” but that rather, an integrated HIV response should have been manifested by integrating the national HIV programme institutionally within the MoH Directorate for Family Health. Views of respondents were less unanimous as regards the planning capacity of the national AIDS Commission:

“It is as if the last three years investing in institutional strengthening have been for nothing; initiatives are not traceable. Usually it is the same people who participate in the training. There is a high number of employees but this does not reflect efficient work capacity.” (Donor)

“When I participated in an annual planning I had the impression that they basically took the five-year plan and divided it by five.” (Donor)

Respondents frequently voiced the view that the AIDS Commission had a relatively centralized operation. Our 2007 interviews at regional level showed that six years after the setting up of the AIDS Commission, only two of 13 regional units had been set up and had only slowly started to disburse funds, in spite of the relatively high number of staff. Critical views were also expressed regarding the quality of policy making and planning of the MoH Directorate for HIV. An MoH respondent described its planning as “a shopping list approach”, largely dependent on preferences of programme managers and lacking the leadership to filter and divide departmental tasks. A more positive view was expressed when looking at the AIDS Commission's role as such, disregarding its integration into the national health system and comparing it to HIV programmes in other countries:

*“Many countries are coming to visit the AIDS Commission for their inspiration.”
(HIV officer, WHO Burkina Faso)*

Respondents' views were generally more positive with regard to the planning capacities of the MoH Directorate for Family Health:

“The Directorate for Family Health manages well considering its high workload of different programmes; it has to respond to a large number of different demands, including requests from donor agencies...” (MoH staff)

While the MoH provides strategic direction, actual annual planning for interventions takes place at district level. The predominant view of national respondents was that the health sector in Burkina Faso was relatively well decentralized. District planning teams decided resource allocations and were generally judged to have good planning capacities. The perception at district level was that HIV receives undue attention compared to malaria and maternal and child health, as reflected in the disproportionate budget allocations presented above.

“We are facing the same challenges as we did before HIV, overall low funding, poor infrastructure of the district hospital, and [lack of] essential drugs, especially anti-malarials, for example. It is mainly at national level that everybody talks about HIV/AIDS.” (District level respondents)

A lack of joint reporting and planning both at national and district level was perceived as inhibiting coordination and integration of the AIDS Commission and the respective MoH Directorates. One MoH representative said: *“The annual strategy of the national AIDS Commission is supposed to guide our annual planning, but different planning cycles do not allow this.”* Communication and coordination were described as taking place mainly on an *ad hoc* basis, not systematically. Work relations between the two MoH Directorates were considered satisfactory, however, including coordination efforts such as joint supervision missions and planning sessions during the year.

A 2007 evaluation of the national AIDS Commission undertaken by the Global Fund had similar findings. It found a disproportionate focus on HIV at the cost of other health sector responses as well as a general absence of national health system strengthening. It also highlighted the creation of new, unbalanced and uncoordinated structures, undefined roles and lack of efforts to align administrative and financial structures: *“There is a national committee for every disease. Talk and focus is completely dominated by HIV... no one speaks*

for malaria.” It also noted inefficiencies, such as large meetings of 80–90 people with little potential for decision-making (GFATM 2007a).

Analysis of policy documents

The following assessment presents how policy documents were developed, updated, based on an analysis of needs relevant to planners, for example in terms of giving specific recommendations, and predicated on other national and international strategies. Documents referred to for analysis were:

- National health strategy 2001-2010 (Ministère de la santé 2005)
- National HIV/AIDS strategy and operational plan of the AIDS Commission 2005-2010 (SP/CNLS-IST 2005; SP/CNLS-IST 2008)
- National ART strategy of the MoH Directorate for HIV (CMLS 2005b)
- Annual plan of national AIDS Commission (SP/CNLS-IST 2007)
- Annual plans of the MoH Directorate for Family Health 2004-2008 (DSF 2003; DSF 2004; DSF 2005; DSF 2006; DSF 2007b)
- Annual plans of the MoH Directorate for HIV 2004-2007 (CMLS 2004; CMLS 2005a; CMLS 2006; CMLS 2007)
- Annual plans of Nouna Health District 2004-2008 (ECD 2005; ECD 2006; ECD 2007; ECD 2008)

Development of documents

The AIDS Commission’s strategy was developed over an intensive planning period of four months by bringing together different actors including MoH Directorates and NGOs. The National health strategy was developed through a one-year process involving stakeholders from the different MoH Directorates, bilateral and multilateral agencies. The process included an extensive revision which took four to six months. District planning teams participated in the development of the national health strategy. Annual district planning in Nouna is a one-month process that involves 15 planning team members at times for several hours per day added to their other duties. Implementation of the annual plan was followed up through weekly meetings during the year. Similar but far less extensive processes to develop strategies and annual plans were described by the MoH Directorates.

Content of documents

The AIDS Commission's strategy was based on an evaluation of the previous (2001–2005) phase. It took a relatively descriptive rather than analytical approach. It refers to the national development strategy and the MDGs. The current phase of the national health strategy (2006–2011) was also based on an evaluation of the first phase (2001–2005). A mid-term evaluation took place and was used to revise the strategy. It took a strategic approach, highlighting key intervention areas. It is predicated on the national development strategy. The national AIDS strategy of the MoH Directorate for HIV also took a strategic approach in terms of linking up analysis with recommendations. It referred to the national health strategy. Content-wise it contained considerable overlap with the strategy of the national AIDS Commission.

The annual plans of the national AIDS Commission included extensive descriptive details with relatively little analytical interpretation. Activities were not budgeted. It did not refer to the plans of the MoH Directorate for HIV. Little progress and difference existed between plans from one year to the next. The annual plans of the MoH Directorate for HIV included few details regarding planned activities and no analysis apart from a modest situation analysis of the 2008 plan. The AIDS Commission's plans were not referred to. Compared to previous years, the situation analysis of the 2008 plan presented more analytical depth. The other plans showed little progress from one year to the next. The plans of the MoH Directorate for Family Health included a more extensive analysis based on previous years' progress. They provided clearly formulated strategic directions, including for example a summary of strengths and weaknesses or operational issues, such as the need to improve managerial capacities. The plans of Nouna health district contained a relatively detailed reflection of priorities and what was to be implemented during the year. They matched resource allocation to the respective burden of disease profiles.

Application of documents

The national health strategy is used as a key reference for priority setting by MoH Directorates and district planning teams. The strategy and operational plan 2005-2010 of the national AIDS Commission was not referred to as a key reference documents by interviewees of the MoH Directorates for HIV and Family Health. Another national ART strategy had been developed by the MoH Directorate for HIV; respondents said it was not used as a reference document or for planning. Districts use their annual plans as a key resource for planning and follow-up throughout the year. They are archived and used for further analysis at national level.

6.5 Discussion

Our findings show an imbalance in resource allocation to HIV/AIDS compared to reproductive health, in terms of national and district health budgets assessed against burden of disease, and in staff, budget levels and salaries of the national AIDS Commission compared to the MoH Directorate for Family Health. In general, the HIV response appeared to have a considerably higher political profile at national as compared to district level. One explanation is that national priorities are being shaped by a sense of urgency that is promoted by international events, powerful actors and policies instead of being based on epidemiological evidence and country needs, as expressed at district level.

These findings show that highly funded and rapidly established institutions with a high level of highly paid staff at national level do not necessarily result in a high quality policy response or sufficient levels of disbursement at district level. The higher salaries of the AIDS Commission's staff likely cause a drain of qualified people from the public to donor-funded employment. The MoH Directorate for Family Health appeared to suffer less from these weaknesses and be more efficient in terms of number of staff in relation to workload, cooperation among each other and the quality of strategic planning. Our assessment of strategic documents substantiates these findings. In accordance to these findings Panos finds that a common weakness of policy documents is a focus on extensive details and little attention for guidance to set priorities (Panos 2006). Our findings add a different dimension to the largely positive effects Grindle and Thomas state can be caused by a perception of crisis including the promotion of policy change, innovation and bolder decisions (Grindle and Thomas 1998).

Duplication of roles, new institutions and actors can fragment policy making. New institutions develop their own dynamics and interests, not least staying employed. Parallel structures do not necessarily work towards one health systems agenda, but also compete for funds and activities. Using already integrated, decentralized and existing structures may avoid such inefficiencies caused by additional structures. The "politics-as-usual scenario" is based more on incrementally working within established systems. Decision making tends to remain at lower hierarchical levels and better engages with technical experience and mid-level managers (Grindle and Thomas 1998). They are therefore more likely to promote decentralization, local ownerships and needs-based priority setting. Taking a more incremental approach recognizes that health services are complex adaptive systems as opposed to mechanical systems; that capacity building is a dynamic, continuous, and long term process, including major personal, organisational, and institutional change. "Crisis scenarios" based on the need for quick solutions not only lack sustainability but may also have

significant unintended and possibly irreversible adverse effects on health systems. New structures need time to become efficient and integrated. The Global Fund, for example, has shown a learning curve in its own work, adapting its approaches based on experiences at country level. There is, however, a risk that structures once set up may later be difficult to change, especially due to organizational inertia caused by the self-interest of people who want to remain in their positions.

It became apparent during interviews that stakeholders agreed on the importance of integration and were aware of current weaknesses in this regard. Some of the causes appeared to be difficult to address, such as separate funding and budgets, and the existence of parallel national institutions to deliver services. To improve integration within the current context, interviewees suggested improvements in lines of communication, joint planning, and coordination of planning cycles between the MoH Directorates and the national AIDS Commission. Integration of donor funding into a sector-wide approach as well as participation of district planning teams, in order to integrate HIV within initiatives targeting maternal and child health, were cited as further important points for a more integrated and balanced approach to HIV/AIDS. The devolution of decision-making powers to the district level has been one of the strongest elements of health sector reform in Burkina Faso and presents important prerequisites to deliver the benefits of integration, including intersectoral HIV/AIDS control.

Improving the quality of planning does not necessarily translate into good or better outcomes; the latter depend on many factors, such as staff capacity and resources at health facility level. Policy documents serve to generate interest in the process of policy formulation and to guide implementation. But their content tends to be lost in the process of implementation when a multitude of other issues come into play. Moreover, we summarised our assessment of the policy documents here, and a number of their specific strengths and weaknesses are not presented in full detail. The research focus included a few governmental directorates and could not cover the role of all stakeholders in depth, including bilateral and multilateral partners and NGOs, disregarding their potential relevance. A related limitation includes not having followed developments over time, and thus missing potential improvements as structures become established.

On the bright side, key informants' views expressed during this research were that since 2008, the situation in Burkina Faso with regard to ARV treatment policy making has changed and generally improved. It could be argued that a comparison of the national AIDS Commission to the MoH Directorates for HIV and Family Health is inappropriate, given the larger mandate of the AIDS Commission to provide a multisectoral response, including areas other than health,

such as education and social services. HIV and AIDS are clearly not a health issue alone. Nevertheless – and this was reflected in the AIDS Commission's budgets – most of their response was being implemented through the health sector.

6.6 Conclusion

International debates on HIV/AIDS in recent years have hardly acknowledged the potential adverse effects of multisectoral responses, such as inefficient and imbalanced resource allocation due to the setting up of parallel structures. This study found big imbalances in resource allocation to HIV compared to maternal and child health and other reproductive health needs when assessed against the burden of disease in Burkina Faso. The national AIDS Commission's work was not well integrated with that of the MoH Directorates for HIV and Family Health. Their strategic documents were relatively less developed and poorly used compared to those of the public health sector. HIV was much less of a priority and services less visible at district level. District planning went on as “politics-as-usual” with an emphasis on burden of disease-related responses. National and district level structures as well as strategic documents of the “politics-as-usual” sectors were better established and generally of a higher level of quality, likely due to their longer establishment and more incremental and needs-based approaches. Imbalances and new structures potentially trigger important adverse effects which are difficult to remedy and likely to increase due to the dynamics they create. It therefore becomes crucial, from the outset, to integrate HIV/AIDS funding and responses into health systems.

7 National and district health expenditure before and after ART scale up in Burkina Faso, Tanzania and Uganda

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7.1 Abstract

Proportionate funding for HIV/AIDS compared to other disease areas, its actual absorption and sustainability has become a central theme of global health debates. Recent studies have investigated international funding for different interventions over time (Fryatt et al. 2010; Greco et al. 2008; McCoy et al. 2009; Pitt et al. 2010; Piva and Dodd 2009; Shiffman et al. 2009). Studies have however not compared national and district level funding for different disease areas.

We examine funding for HIV/AIDS compared to other essential health interventions, in Burkina Faso, Tanzania and Uganda, looking at 2004 as a year prior to ART and 2007 as a year after its scale up. The paper draws on primary district budget data and as well as country expenditure data as compiled by the WHO and the OECD.

Funding for different interventions assessed against burden of diseases is especially high and disproportionate at district level and most notably for HIV/AIDS. Other areas such as child and maternal health remain relatively under-funded. These are important gaps and imbalances especially in the light of overall low per capita expenditure at district level. Important gaps exist between national and district per capita expenditure, especially in Burkina Faso and Uganda, less so Tanzania. District per capita expenditure for health in Tanzania is more than double of what it is in Uganda and Burkina Faso. To conclude, funding for HIV/AIDS has been disproportionately high and more attention needs to be paid to the pass-through of funding from national to district levels being potentially indicative for absorptive capacity and effective implementation.

7.2 Background

Despite past years' increase, funding for health still falls short of needs. The World Bank estimates that achieving the health MDGs will cost USD 20-25 billion per year, which would require a tripling of Official Development Assistance (ODA) as disbursed in 2003. The Joint United Nations Programme on HIV/AIDS (UNAIDS) estimate for global needs to fund a comprehensive HIV/AIDS response is between USD 14 -19 billion per year, which would require also a tripling of global spending on HIV/AIDS as of 2004 (OECD and The World Bank 2005). While estimates to fund targets such as the MDGs vary, they all conclude that gaps are real and will need to be covered largely by external support (Atim 2006; Brugha et al. 2004; World Bank 2006a). Sustainability, absorptive capacity and needs-based allocation according to burden of diseases consequently constitute key concerns. Looking at resource allocation priorities against actual burden of disease profiles over time might indicate funding for priority diseases replacing funding for other health interventions. Proportional and changing pass-through of funding at district compared to national level allows formulating questions with regard to decentralization, governance, as well as dynamic and allocative efficiency.

GHIs have become a main vehicle to increase funding for disease-specific interventions. A common criticism has been that their rapid and large scale funding is disproportionately high for some disease areas and does not sufficiently account for capacity and system constraints especially in low income countries. There has been some documentation of comparative spending changes at national and international level (Fryatt et al. 2010; Greco et al. 2008; McCoy et al. 2009; Pitt et al. 2010; Piva and Dodd 2009; Shiffman et al. 2009). Country assessments of GHIs suggest constraints related to absorptive capacity, but overall, evidence on effective spending, sustainability and additonality remains scarce. Partly this is due to a lack of data and methodological challenges. Expenditure is not tracked to trace the causes between systems weaknesses and absorptive capacity at different levels of the health system. Data remains spurious and limited due to diverse data sources, different definitions and information systems, lack of clarity whether data concerns budgets or expenditures as well as non-available and fragmented data from donors (Bernstein and Sessions 2007;Atim 2006). National health accounts (NHA) and sub-accounts provide some information on resource allocation to different sectors. In Rwanda for example national AIDS sub-account illustrated high out-of-pocket expenditure which subsequently led to an increase of donor assistance in that sector (Pearson 2004). Such applications remain however limited given that NHAs often exist only for some years and areas. The question of how national funding allocates to district level more closely reflecting actual service delivery remains largely neglected. To address

these issues we look at overall funding for health, for HIV/AIDS compared to other interventions, at national and district level, over time and across three countries.

7.3 Methods

We assessed funding for HIV/AIDS and other interventions at district and national level referring to 2004 and 2007 as reference years before and after the initiation of national ART programmes. We looked at Burkina Faso, Tanzania and Uganda to present the cases of a low-prevalence country and two high-prevalence countries. The assessment was based on an application mapping cost items for health interventions against burden of disease profiles to highlight disparities between budgets and needs.

Cost items to assess district budget allocations were primarily drawn from annual district plans and budgets. These tended to not include vertical programme items such as vaccines, antimalarials and antiretrovirals which were collected separately through exchange with respective programmes. In cases of gaps we formulated assumptions, usually in terms of other years' population and exchange rates or based on drug calculations for target populations (i.e. children under five for vaccines). Burden of disease profiles are those provided by the respective sentinel district demographic surveillance sites (DSS) in each district (Indepth 2011). All data entered a modified version of a district health accounts tool first introduced through the Tanzania Ministry of Health's Essential Health Interventions Programme (TEHIP) from 1996-2006 to facilitate needs-based resource allocation for district planning purposes. The tool was adopted in 2007 by the Tanzania Ministry of Health and Social Welfare to implement a corresponding national planning tool "PlanRep" (de Savigny et al. 2001; Ministry of Health and Social Welfare 2011). It tabulates budgets with their sources for 52 health interventions which form six broader categories including communicable diseases, non-communicable diseases, maternal, neonatal and child health, and health promotion. It allows a high level of detail for data-entry and cross-country comparison. We used budgets as a proxy for expenditure as information on expenditure did not provide sufficient detail. Intervention costs included all annual recurrent material and operational costs but excluded personnel costs and annualized capital costs.

For national total health expenditure (THE) we used figures from NHAs as published by WHO (WHO 2010a). To account for the lack of disease-specific information within NHAs, we drew on the creditor reporting system (CRS) compiled by the OECD. The database reports bilateral funding from the 22 OECD member states, since 2007 sixteen multilateral donors have also

been included such as the World Bank and the Global Fund (OECD 2011). It covers approximately 90% of all Official Development Assistance (ODA) from the OECD member states. It uses a detailed and yearly coding system for different interventions. One of its limitations is that it shows donor disbursements which might differ from actual expenditure at country level. Another one is that it omits data from some non-OECD countries (i.e. India or China) as well as funding from non-governmental organisations. It has nevertheless become the most widely used source to assess allocation of donor funding to different interventions and years (Fryatt et al. 2010; Greco et al. 2008; McCoy et al. 2009; Pitt et al. 2010; Piva and Dodd 2009; Shiffman et al. 2009). Reviews judge it as one of the most comprehensive data source on international development funding (Patel et al. 2011; Powell-Jackson and Mills 2007).

7.4 Results

Uganda and Iganga District

Iganga district has a low total health expenditure of USD 3.60 per capita in 2004 and USD 5.79 per capita in 2007 (Table 7). Total health expenditure increased by 61% between 2004 and 2007. Increases were relatively modest for all interventions except for HIV/AIDS which experienced an almost fourfold increase, from USD 0.33 per capita in 2004 to USD 1.25 per capita in 2007. Increases for maternal health were four-fold but low in absolute terms, USD 0.02 per capita in 2004 compared to USD 0.09 per capita in 2007 (Figure 12 and 13). Proportional budget allocation against burden of diseases shows disproportionately low budget allocations for all interventions other than malaria, HIV/AIDS and the expanded programmes on immunization (EPI) in 2007 (Figure 14).

National THE excluding private out of pocket (OOP) expenditure in Uganda is more than three times higher compared to district level expenditure, reaching USD 13.39 per capita in 2004 and USD 17.94 per capita in 2007. The pass through of government and donor funding from national to district was consequently 27% in 2004 and 32% in 2007. While national THE between 2004 and 2007 increased 34%, the largest part of that increase appears to be due to HIV/AIDS. According to the CSR database OECD donor funding for health in Uganda accounted for USD 9.42 per capita in 2004 and USD 12.74 per capita in 2007. USD 4.38 per capita (17%) and USD 7.97 per capita (30%) of donor funds were disbursed for HIV/AIDS in 2004 and 2007. Proportional disbursements for maternal health were 1% in 2004 and 1% in 2007. Proportional disbursements for malaria were 4% in 2004 and 3% in 2007 (Figure 15 and

16). Figure 17 shows the change of funding for different interventions between 2004 and 2007 at national and district level. Total funding increased moderately at both levels; funding for HIV/AIDS increased substantially at both levels; all other areas show different trends at both levels.

Burkina Faso and Nouna District

Nouna district also has a low total health expenditure of USD 4.79 per capita in 2004 and USD 5.00 per capita in 2007 (Table 7). They decreased for Integrated Management of Childhood Illness (IMCI) and Malaria and increased for EPI and HIV/AIDS. The increase was highest for HIV/AIDS, from USD 0.04 per capita in 2004 to 0.15 per capita in 2007. The decrease was highest for Malaria, from USD 0.55 per capita in 2004 to 0.11 per capita in 2007 (Figure 12 and 13). Proportional budget allocation against burden of diseases shows disproportionately low budget allocations for all interventions other than HIV/AIDS, tuberculosis and EPI in 2007 (Figure 14).

National THE excluding private OOP expenditure in Burkina Faso was almost three times higher compared to district level expenditure in 2004 and almost four times higher compared to district level expenditure in 2007. It reached USD 13.18 per capita in 2004 and USD 19.38 per capita in 2007. The pass through of government and donor funding from national to district was consequently 36% in 2004 and 26% in 2007 (Table 7). The increase of THE between 2004 and 2007 was 47%. That increase appears to be partly due to HIV/AIDS. According to the CSR database 17% (USD 0.90 per capita) and 30% (USD 1.58 per capita) of donor funds were disbursed for HIV/AIDS in 2004 and 2007. Proportional disbursements for maternal health were 5% in 2004 and 6% in 2007. Proportional disbursements for malaria were 3% in 2004 and 1% in 2007 (Figure 15 and 16). Total donor funding for health in Burkina Faso accounted for USD 5.21 per capita in 2004 and USD 5.35 per capita in 2007, which is about half of the donor per capita disbursements in Uganda and Tanzania. Figure 17 shows how funding changed for different interventions between 2004 and 2007 at national and district level. Funding for HIV/AIDS increased at both levels; total funding for health and funding for different interventions either experienced very moderate increases or decreased as it is the case for maternal health and malaria.

Tanzania and Rufiji District

Compared to the other two districts, Rufiji has a relatively high total health expenditure of USD 6.19 per capita in 2004 to USD 11.96 per capita in 2007 (Table 7). Total health expenditure

increased by 93% between 2004 and 2007. HIV/AIDS experienced a more than 18 fold increase from USD 0.11 per capita in 2004 to USD 2.00 per capita in 2007. Malaria experienced a more than fourfold increase from USD 0.16 per capita in 2004 to USD 0.67 per capita in 2007. All other interventions saw relatively little changes (Figure 12 and 13). Proportional budget allocation against burden of diseases shows disproportionately low budget allocations for all interventions other than HIV/AIDS and EPI (Figure 14).

National THE excluding private out of pocket (OOP) expenditure in Tanzania is comparable to district level expenditure if measured in per capita. It increased by 145% from USD 7.29 per capita in 2004 to USD 17.84 per capita in 2007. The pass through of government and donor funding from national to district was consequently 85% in 2004 and 67% in 2007 (Table 7). According to the CSR database OECD donor funding for health in Tanzania accounted for USD 5.27 per capita in 2004 and USD 11.17 per capita in 2007. USD 2.17 per capita (41%) and USD 5.24 per capita (47%) of donor funds were disbursed for HIV/AIDS in 2004 and 2007. Proportional disbursements for maternal health were 1% in 2004 and 1% in 2007. Proportional disbursements for malaria were 6% in 2004 and 7% in 2007 (Figure 15 and 16). Figure 17 shows how funding changed for different interventions between 2004 and 2007 at national and district level. Total funding increased at both levels; the increase of funding for HIV/AIDS was important at both levels and extreme at district level; funding for malaria increased at both levels, funding for maternal health saw hardly any changes.

Table 7: Total Health Expenditure per capita at national and district levels at average exchange rate (USD)

	Burkina Faso			Tanzania			Uganda		
	2004	2007	Change (%)	2004	2007	Change (%)	2004	2007	Change (%)
Total national expenditure (USD on health per capita* excluding OOP)	13.18	19.38	47%	7.29	17.84	145%	13.39	17.94	34%
Total district expenditure (USD on health per capita** excluding OOP)	4.79	5.00	4%	6.19	11.96	93%	3.60	5.79	61%
Percentage Pass-through from national to district level	36%	26%		85%	67%		27%	32%	

*WHO NHA country information

** District Health Accounts analysis

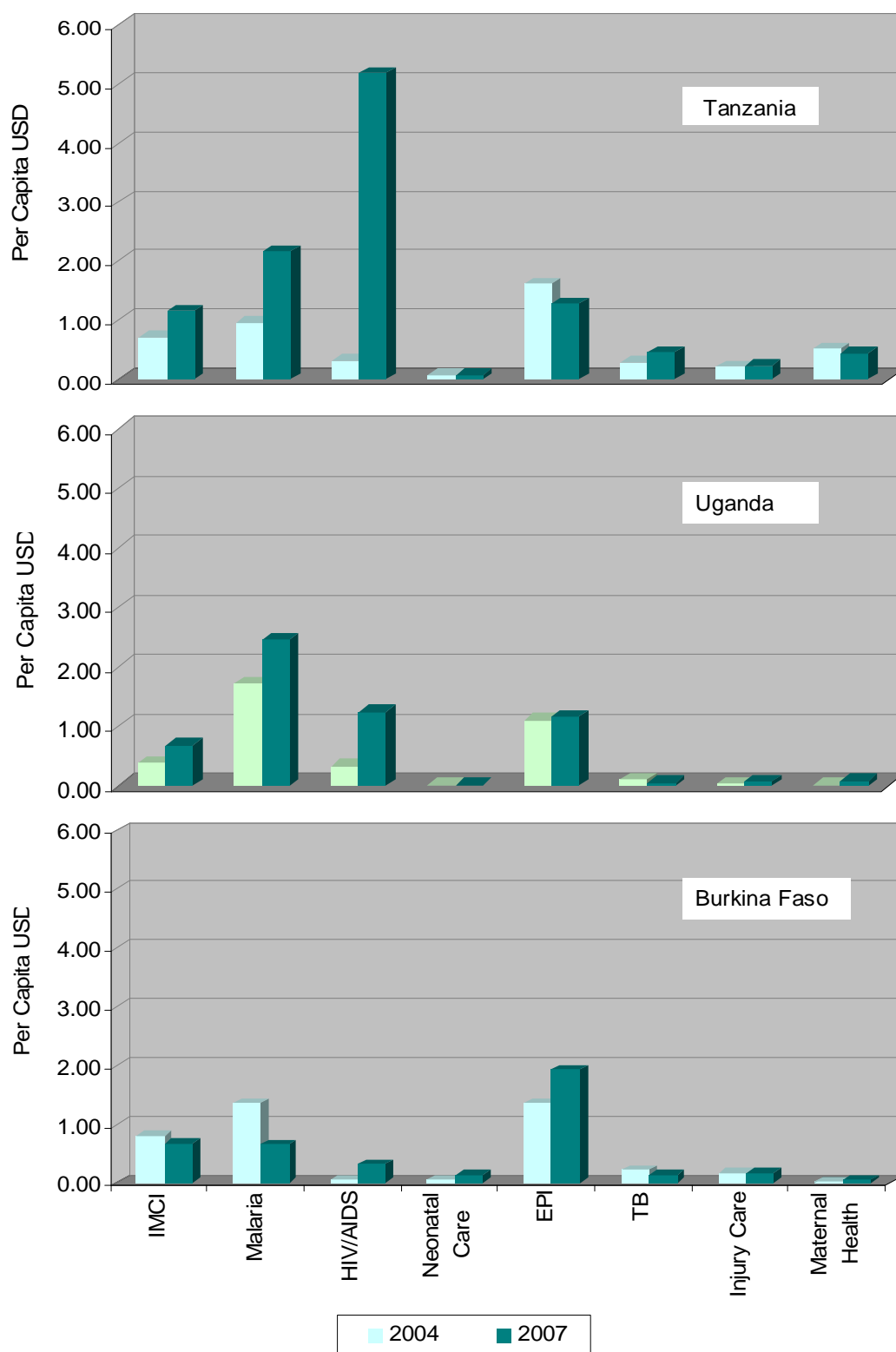


Figure 12: USD per capita expenditure per disease area between 2004 and 2007 in the study districts

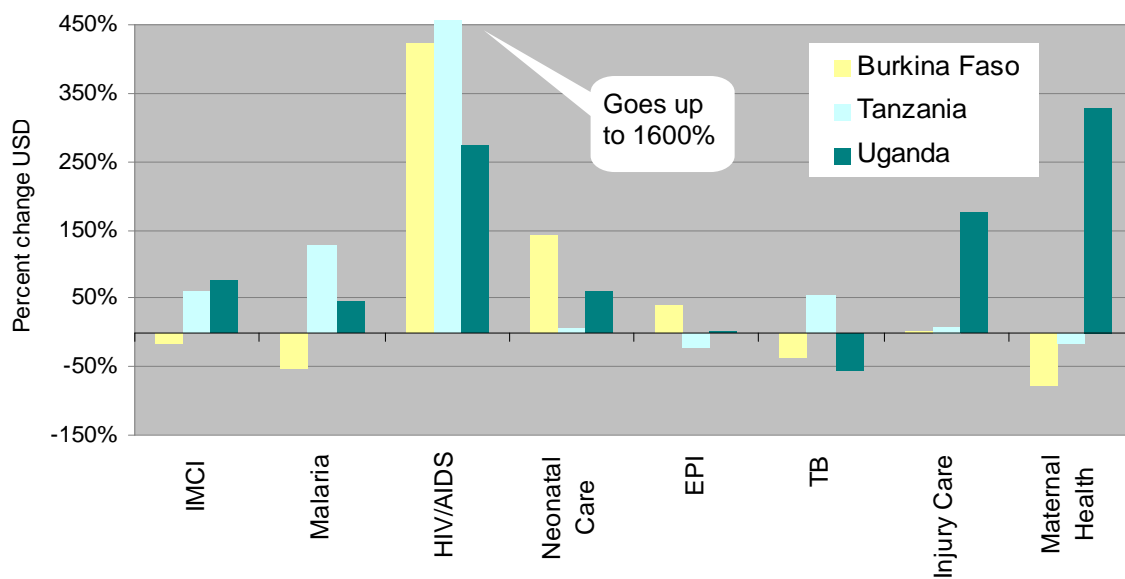


Figure 13: Percent change in USD per capita expenditure per disease area between 2004 and 2007 in the study district.

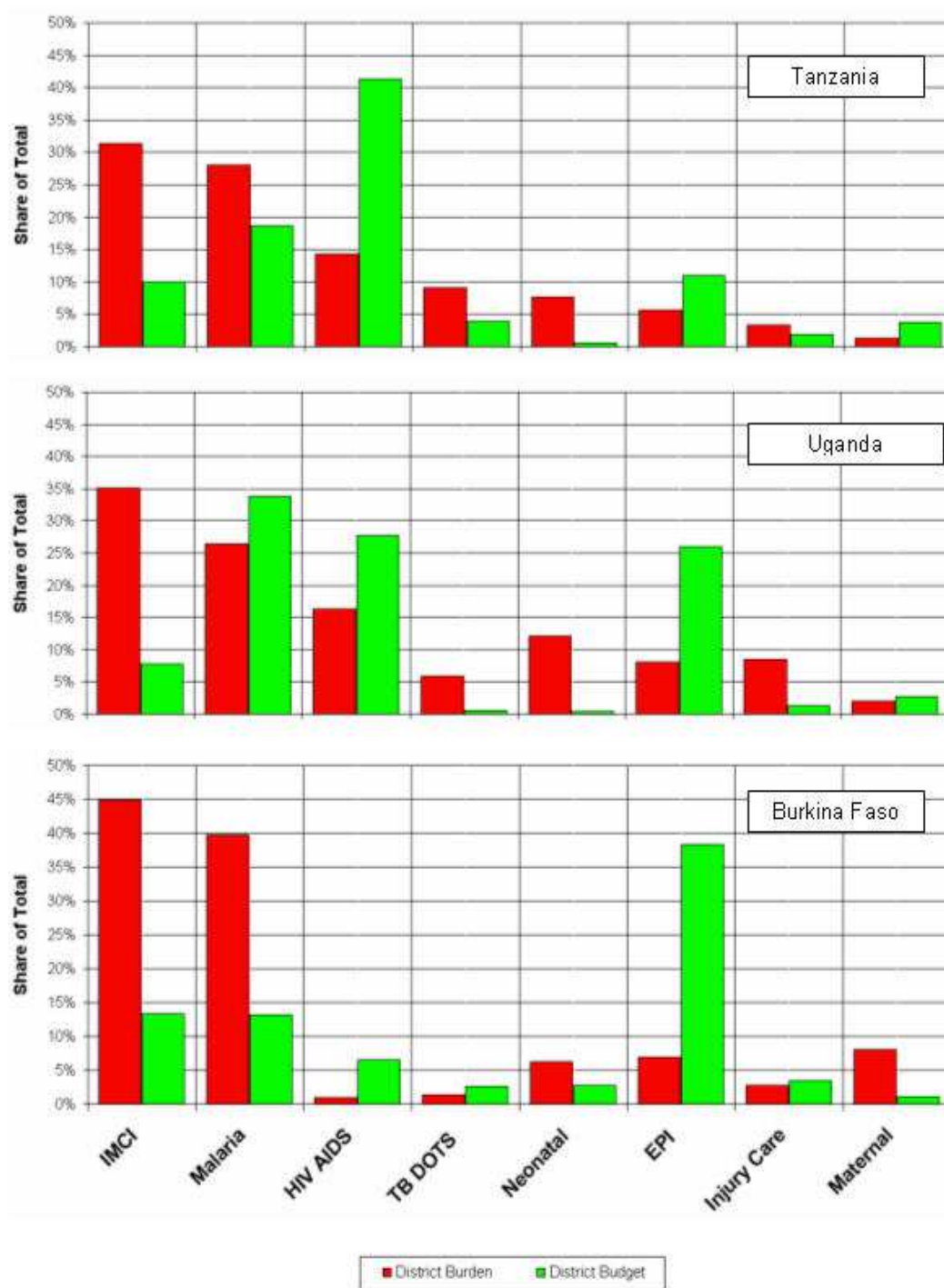


Figure 14: Proportional budgets and burden of diseases in 2007 in the study districts.

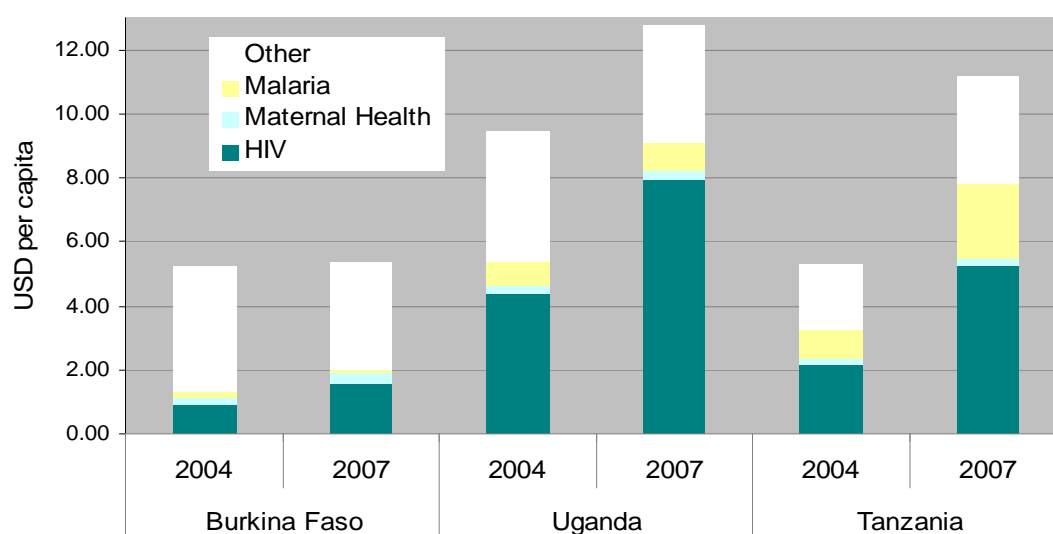


Figure 15: National level health expenditure per capita in 2004 and 2007 in Burkina Faso, Uganda and Tanzania from donor funding. Source: OECD CSR

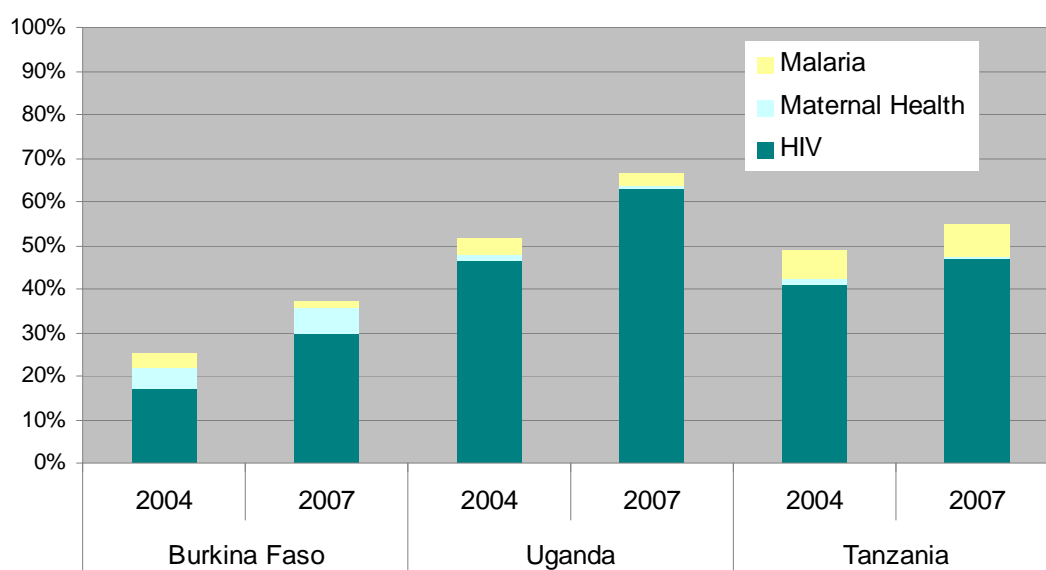


Figure 16: National level health proportional expenditure in 2004 and 2007 in Burkina Faso, Uganda and Tanzania from donor funding. Source: OECD CSR

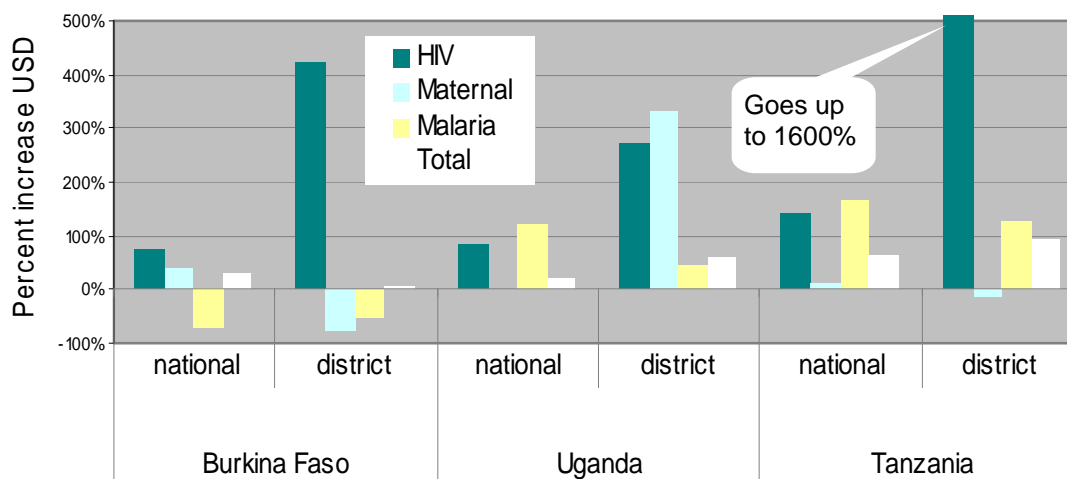


Figure 17: Percent change in funding for major essential health strategies between 2004 and 2007. Source: National data from CRS OECD; District data from District Health Accounts.

7.5 Discussion

Proportionate budgets against burden of diseases

The comparison of funding for different interventions, years, countries and districts shows a diverse picture with some clearly emerging trends. As expected, funding for HIV/AIDS increased at much higher levels compared to other interventions both at national and district level and in all countries, including the low-prevalence country Burkina Faso. Funding for HIV/AIDS substantially surpasses its respective share of disease burden in all three districts. The same is the case for EPI, possibly due to increased costs for new vaccines (Figure 14). Increases for HIV/AIDS between 2004 and 2007 were highest in Rufiji district (Tanzania) at an almost 16-fold level, followed by Nouna district (Burkina Faso) at a four-fold level and Iganga district (Uganda) where funding for HIV/AIDS tripled. One explanation for the proportionately higher increase of funding for HIV/AIDS at district as opposed to national level is that national funding for HIV/AIDS was already high in 2004 but only started to reach districts thereafter causing relatively higher increases between 2004 and 2007. Other areas remain relatively neglected; IMCI and maternal health face especially low levels of funding.

For all interventions other than HIV/AIDS, districts show important disparities between burden of diseases and respective budget allocations (Figure 14). The funding gap when compared to burden of disease is highest for IMCI in all three districts, as well as for malaria and maternal

health in Nouna. Funding for maternal health is very low in Iganga and Nouna and less but still low in Rufiji. Different trends emerge when looking at changes between 2004 and 2007. Funding for IMCI and Malaria decreased in Nouna but increased in Rufiji and Iganga. Funding for tuberculosis decreased in two districts and increased in the third one, the same is the case with regard to maternal health. National level donor funding for different interventions (HIV/AIDS, malaria and maternal health) shows similar disparities, Uganda for example in 2007 received USD 8.00 per capita for HIV/AIDS (much more than the total health budget in Iganga), USD 1.00 per capita for malaria and USD 0.26 per capita for maternal health (Figure 15).

Evidence from other countries show similar trends indicating that already in the early years of scaled up ART budgets for health interventions other than HIV/AIDS have changed less or even decreased. In Uganda and Zambia funding for HIV/AIDS in 2004 exceeded spending for other health interventions by almost 185 percent (Lewis 2005). 73 percent of total national funding for HIV/AIDS (2006) in Uganda came from Pefar (Lake and Mwijuka 2006). Funding for HIV/AIDS (2006) in Zambia was about USD 20.60 per capita compared to USD 26.00 per capita for health in general (Oomman et al. 2007).

At a global level, funding for HIV/AIDS has increased more than fourfold during only five years, from an estimated USD 2.1 billion in 2001 to USD 8.9 billion in 2006 (UNAIDS 2006b). Global funding for health took fifteen years to only triple, from 4.6% of ODA in 1990 to close to 13% in 2005 (Dodd et al. 2007). Shiffman shows that global funding between 1992-2005 increased for health and especially for infectious diseases, but stagnated for reproductive health (Shiffman 2008). Donor support for HIV/AIDS was disproportionate to the burden of disease already in the early years of ART expansion (Shiffman 2006). GHIs such as the Global Fund, Global Alliance for Vaccines and Immunization (GAVI), Roll Back Malaria, and Pefar accounted for about 20 percent of total donor aid in 2003. In 2004, the Global Fund budget for HIV/AIDS was approximately the same as all bilateral funding for HIV/AIDS (Atim 2006).

Evidence with regard to additionality however remains inconclusive. In Benin and Ethiopia the perception of respondents was that external funding has decreased or ceased due to support from the Global Fund but these perceptions were difficult to substantiate (Brugha and et al. 2003). A general view in Ethiopia was that resources from GHIs have been additional without causing decreases in other sectors (Banteyerga et al. 2006). In Benin perceptions differed with contradictory statements as to how far funding decreased in some areas due to increased

funding in others. One example given was that Global Fund moneys caused cessation of another funding partner that had existed for twenty years (Gbangbadthore et al. 2006).

Percentage pass-through from national to district levels

This work shows important differences between national and district per capita total health expenditure (excluding OOP) especially in Burkina Faso and Uganda. Pass-through from national to district level in 2007 was only 26% in Burkina Faso and 32% in Uganda compared to 67% in Tanzania. Per capita health expenditure in Rufiji was more than double of what it was in the other two countries in 2007.

Poor absorptive capacity is one potential cause of such low proportional pass-through. Evidence from other studies supports this assumption (Brugha and et al. 2003). In Uganda only 26% of a Global Fund grant had been spent after twenty months. Main reasons included a weak procurement system as well as mismanagement eventually causing a temporary suspension of funds in 2005 (Brugha 2005; Bernstein and Sessions 2007). Global Fund resources were only partly used in Malawi. Funding for HIV/AIDS was poorly implemented in Ethiopia and Bangladesh mainly due to a lack of absorptive capacity within government structures (Serieux 2007). Global Fund disbursements in Ethiopia were constrained by bureaucratic obstacles; procurement was consequently outsourced to United Nations International Children's Emergency Fund (UNICEF) (Bernstein and Sessions 2007). Notably, most of these examples concern lack of absorptive capacity at national level - potentially suggesting that important bottlenecks exist at national level, not necessarily at district level. As one district representative put it: "If districts know what resources they have, it's easy for them to put money in the gaps. ... There are structures out there to absorb all of it!" (Brugha and et al. 2003).

Absorptive capacity requires health systems and effective decentralization. Decentralization of central government functions to district level has been at the core of health reforms in developing countries during the past two decades. In Burkina Faso, the foundations for decentralization were set in 1991 (Bodart et al. 2001). In Tanzania the current wave of reforms including efforts to better decentralize were initiated in 1993 (Semali et al. 2007). Uganda followed suit in 2000. The relatively late decentralization in Uganda corresponds to late efforts to engage on coordination through sector-wide planning since 1999 (Oomman et al. 2008). These differences, in addition to the more modest increases of total government health expenditure might explain the lower district expenditure in Iganga when compared to Rufiji in Tanzania. According to media releases as cited in this work Uganda has also been the

country most visibly affected by problems related to cases of mismanagement. In one case USD 190,300 earmarked for drugs was used for travel abroad in 2006 for government officials (Uganda Health News 2009). In another case three former health ministers and other ministry staff were charged with alleged misappropriation between 2006 and 2007 (PlusNews 2007). The Global Fund suspension in 2005 resulted in some initiatives to correct for non-compliance but disbursements did not resume until 2008. That year encountered another case of poor accountability resulting in another Global Fund disbursement gap of USD 12 million (Kelly 2008). The government mobilized USD 30 million to fill in the most severe shortfalls, but could not completely avoid service delivery effects such as stock-outs of antimalarials (Zikusooka et al. 2009).

International funding for HIV/AIDS is fragmented and inadequately tracked also due to a lack of transparency and willingness of NGOs as well as GHIs to channel funds through government structures, as apparent during this works' data collection. PEPFAR hardly shares data; the Global Fund publicly discloses most of its financial data. The Global Fund aims at using government structures; PEPFAR largely relies on NGOs, a majority of those being based in the capital (Oomman et al. 2007). PEPFAR is bound by the US congressional budgetary cycle, funding commitments are shorter and disbursements vary by agreement (Bernstein and Sessions 2007).

International funding for HIV/AIDS suffers of unpredictability and fluctuations, affecting the effective pass-through from national to district level. Gaps between donor commitments and actual disbursements continue to be important (Foster 2005a; Bernstein and Sessions 2007). Between 2005 and 2006, international commitments to HIV/AIDS rose by 28% while disbursements rose only by 11%. 70% of total commitments were actually disbursed in 2006 (Kates et al. 2007; Mtonya and Chizimbi 2006). In Uganda for example, while funding for ART has increased considerably, it remained unstable and unpredictable. Global Fund moneys for HIV/AIDS increased by 45% between 2004 and 2005 and then dropped by 18% following its temporary suspension in 2005 (Lake and Mwijuka 2006). PEPFAR's share of HIV/AIDS funding in Uganda increased from 26% in 2003 to 85% in 2006 (Bernstein and Sessions 2007). Moreover, funding is expected to decrease given the current US government's intentions to scale PEPFAR down and hand over responsibilities to national governments. Unpredictability of donor funding can also affect national decisions on resource allocation. Country cases reveal instances where policymakers remain cautious to act due to uncertain future funding. In Ethiopia for example, government officials hesitated to upscale services doubting that international funding would be sustained (Brugha et al. 2004).

Channelling funding through budget support has been proposed as one approach to address such fluctuations. Overall, only about 20% of all health aid is given as general budget or sector support, an estimated 50% of health aid is off budget (Foster 2005c). In cases where GHIs lined up with budget support it was perceived as improving financial management in terms of sub-sector allocations, donor commitments and government spending (Mtonya and Chizimbi 2006). One impediment is that vertical approaches can be easier and quicker to implement as well as more visible in promoting donor targets. Such interests are closely related to the aid-structure and therefore difficult to remedy if not addressed by more radical shifts towards mechanism for global resource allocation (Pearson et al. 2009).

Overall, better evidence including longitudinally data is needed to evaluate actual funding at district levels as well as related concerns such as absorptive capacity and effective implementation. It needs more transparency and information to critically assess channels and innovative finance mechanisms of global health spending and its degree of harmonization (Fryatt et al. 2010). There has also been increasing awareness regarding the diverse health systems dimensions that need to be addressed jointly, including especially the context of aid structure and its governance (Poku and Whitman 2011).

7.6 Conclusion

Global health advocates argue that funding for HIV/AIDS still falls short of needs. Our findings however suggest disproportionate high levels of funding for HIV/AIDS when assessed against actual burdens of disease. They also indicate low proportional pass-through of funding from national to district level, particularly in Burkina Faso and Uganda. Funding for HIV/AIDS remains unpredictable and relatively poorly integrated in national systems. Implications are important especially in the light of persisting scarce resources at implementation level and other high priority areas (such as maternal health or malaria or IMCI). Risks of unpredictable and inefficient funding for HIV include difficulties of sustaining individual treatment levels with imported expensive drugs and qualified human resources that tend to be short of supply. Further serious implications result from the difficulty of reversing distributions of funding to different diseases given needs and incentives of newly created bodies to keep funds for own positions and programmes. Further spiralling effects emerge as disease-specific programmes fail to strengthen weak systems because of existing weaknesses. To address these issues, it needs adequate, efficient, predictable and harmonized approaches to funding as well as systems strengthening to improve absorptive capacity of the various sub-systems required to efficiently implement complex and large-scale interventions such as ART.

8 Discussion

8.1 General Discussion on Health System Effects of ART

“...if the solution WERE easy to see or obvious to everyone, it probably would already have been found. Pushing harder and harder on familiar solutions, while fundamental problems persist or worsen, is a reliable indicator of non-systemic thinking - what we often call the “what we need here is a bigger hammer” syndrome” - Peter Senge, The Fifth Discipline

Looking at allocation of funding against burden of disease profiles at district level over time is key to inform international and national systems strengthening and funding priorities.

This work's findings regarding disproportionate district budgets against burden of diseases indicate the need to further investigate gaps and imbalances especially in the light of overall low per capita expenditure levels at district level. There has been some documentation of comparative spending changes at national and international level suggesting disproportionate high levels of funding for priority diseases (Fryatt et al. 2010; Greco et al. 2008; McCoy et al. 2009; Pitt et al. 2010; Piva and Dodd 2009; Shiffman et al. 2009). Moreover, the fact that ART expansion in the three countries has been almost entirely funded by Global Health Initiatives (GHIs) places special emphasis on the need for sustainable integrated approaches. Limitations of current evidence on budget allocations due to diverse data sources, little attention to time trends have been mentioned by other authors (Bernstein and Sessions 2007; Atim 2006; Shediak-Rizkallah and Bone 1998). These gaps are particularly pertinent given long-term responsibilities such as the need to keep patients on ART. Information regarding district level funding over longer time trends and against burden of diseases remains scarce and is pivotal to inform international and national systems strengthening and funding priorities.

International policy agendas and targets have important impacts on national health systems

Findings of this research indicate the seriousness of national health systems effects caused by international policy agendas and specifically disease-specific priority setting and programming. Fragmentation is caused by international policies, the MDGs for example incorporate a target of universal access to sexual and reproductive health within the goal of

improving maternal health, but combating HIV remains a separate project with malaria and tuberculosis (Germain et al. 2009). Moreover, high-fetched international targets may turn successes into perceptions of failure, and thus undermine future constituencies for donor funding and national progress (Preker 2005). Despite increasing awareness regarding the important of integrated efforts, there are yet only a few specific examples to promote systems strengthening at programmatic level such as those by the Global Fund (GFATM 2011b). Until today also due to a lack of conceptual clarity many disease specific interventions are labelled as “health systems strengthening” which hardly classify as such (Warren 2011).

Health systems and policy analysis that take into account principles of systems thinking is needed to assess integration, efficiency and sustainability of ART scale up.

Aggregated coverage rates in high-prevalence countries such as Tanzania and Uganda imply that access to ART has improved considerably during the last few years. Most surveys and reviews of GHI effects - likely due to their approach of looking at single and aggregate effects - take a relatively modest stance, concluding that, “effects have been mixed and evidence is limited” (Stillman and Bennett 2005; Yu et al. 2008; Biesma et al. 2009; Samb et al. 2009). Only a few studies follow up on time trends of health system effects (Brugha 2005; Oomman et al. 2008; Piot et al. 2009). Little findings exist regarding the actual content and structure of integrated approaches, as well as their relative merits in different sub-sections of the health system (Atun et al. 2010a). Our findings suggest that these numbers and findings do not sufficiently take account of underlying dynamics, stakeholder interests and systems weaknesses that together significantly reduce the prospects of both progress to ART and strengthened health systems. Given systems dimensions as assessed in this work, some of the adverse effects and missed opportunities of GHIs are potentially more serious than suggested by the literature so far. Past reviews have highlighted disintegrating effects of disease-specific programmes such as lack of ownership, parallel structures and centralized responses. But they have paid little attention to systems dynamics, stakeholder motivations and interconnectedness between sub-systems which altogether amplify current and future system effect, taking into account that systems are constantly changing, self-organizing, non-linear, history dependent and resistant to change (de Savigny and Adam 2009). The work on supply chain management in Tanzania and Uganda illustrates how systems weaknesses within the various building blocks affect ART and vice versa, how motivations of donors and other stakeholder impede promotion of integrated approaches and how misbalances and shortages affect service delivery at health facility level.

Existing system constraints reinforce partial and parallel efforts and vice versa.

This work highlights how dynamic, reinforcing and complex effects characterize the relationship between disease-specific interventions and health systems. Findings of this thesis show how vertical programmes have focused on “easy” bottlenecks and neglect key systems prerequisites, such as information systems, better governance and the supply of medicines and technologies. Existing system constraints rooted in different functions of the health system are a main reason why – despite initial policy intentions to opt for integrated systems – parallel systems are being built up instead. The research illustrates the cause and effect relationships and vicious circles created as poor systems increase the attractiveness of vertical approaches, which in turn further deteriorate or at least fail to strengthen existing systems. Initial agendas to strengthen health systems and design interventions in an integrative way are not being followed up and lack - as illustrated by this work – clear intentions and steps for any later action towards integrated approaches. Looking at the dynamics of these effects through the lens of systems thinking shows the likelihood of various bottlenecks in complex and large new programmes, given that they reflect existing weaknesses in the underlying health system.

Dynamic system effects imply that adverse effects might increase exponentially in the future.

The dynamics of systems thinking, including vicious circles, path dependency and irreversibility, suggest that system constraints and bypassing interventions reinforce each other, thereby exponentially increasing adverse effects. Integration that takes place at a later stage may not only be inefficient but also difficult given that structures have not grown stronger in the meantime. The case studies presented here show how parallel systems continue to thrive years into ART programming. Mills also suggests that disease and programme-specific approaches are not easily integrated with sector-wide systems (Mills 2005). While it could be argued that new structures will become more efficient eventually, once they are better established, there is also a risk that structures, once set up, may later be difficult to change due to path dependency. This would suggest that today’s and future decisions depend on past courses of action. A related aspect is organisational inertia caused by the self-interest of actors; effects can be difficult to remedy as new systems become resistant to change and actors develop their own interests like staying employed. Vertical programmes that draw personnel away from the public sector by offering higher salaries reinforce the effects of significant wage differences between the public and the private sectors (Morris et al. 2009; Samb et al. 2009a; Stringer et al. 2006; Stillman and Bennett 2005;

Banteyerga et al. 2006). Other reinforcing effects result from persisting weak systems and increasing pressure to implement quickly. As Senge puts it, “the cure can be worse than the disease: the long-term, most insidious consequence of applying non-systemic solutions is an increased need for more and more of the solution. This is why ill-conceived government interventions are not just ineffective, they are “addictive” in the sense of fostering increased dependency and lessened abilities of local people to solve their own problems” (Senge 1990).

Governance is a key and relatively neglected research and programme area, especially if assessed according to principles of systems thinking instead of static and target driven perspectives.

A majority of studies on health system effect of GHIs highlight adverse effects related to governance, including inefficient management, lack of ownership and parallel policy agendas (African Union 2005; Buse and Walt 1996; Panos 2006; Waddington 2004; Gbangbadthore et al. 2006; Caines 2005; McKinsey and Company 2005; Biesma et al. 2009; Bill & Melinda Gates Foundation and McKinsey & Company 2005; Brugha et al. 2004; Brugha 2005; Grace 2009; Stillman and Bennett 2005; Wilkinson et al. 2006). Studies however commonly focus on the more static elements of policy analysis, such as the existence of policies that hardly reflect the complex systems world of implementation. Findings in this work highlight the importance of assessing key dimensions of governance defined as roles and rules of diverse actors and drives health systems performance through effective oversight, appropriate regulations and incentives as well as attention to system design and accountability (Doherty and Gilson 2006; GFATM 2009b). Donald also mentions bureaucratic needs as an important driving force and argues how the political context of day-do-day work where policy decisions are made in the context of money, power, and precedent (Donald 2001).

Administrative capacities, regulatory structures, information and incentives needed to monitor and ensure quality standards are often particularly limited in the context of low income countries (Tangcharoensathien et al. 2008; Bennett et al. 2005). Governments face many important implementation challenges that make prioritization difficult, politically as well as managerially. As policy reforms and changing priorities intensify due to ART scale up, the need for policy dialogue and coordinated planning, as well as for new coordination and regulatory mechanisms increases.

Another related finding of this work is that national priorities within policy making are being shaped by a subjective sense of urgency promoted by international events and policies instead of by epidemiological evidence and country needs as expressed at decentralized levels. The work of Kinsman, for example, shows how international and national experts have

not had the decision-making power needed to have an impact on the international agenda (Kinsman 2009). Along the same lines, it has been criticised that international targets such as the “3 by 5” initiative or the MDGs made little use of evidence during their development (Court 2004; Overseas Development Institute 2004). This highlights the importance of using open systems thinking approaches and other non-linear policy models, such as Kingdon’s multiple stream, rather than linear input-output models not suitable for considering the various and dynamic dimensions of decision-making processes.

Incentive structures and the various sub-systems interact as important drivers of system performance.

One of the rationales of systems thinking is that stakeholder behaviour is a key driver of system dynamics. This works’ case studies shows how stakeholder incentive structures constitute an important driving force of system effects. Examples for incentives include higher salaries for GHIs, programmes being easier to manage with parallel structures and targets. Moreover, international policy agendas are shaped by single stakeholders and events (i.e. a decision to make HIV a priority in Burkina Faso) as also sharply illustrated by the work of Pisani (Pisani E. 2008). The work illustrates how systems constraints and incentive structures are both inherent to the development aid and public sector context of low-income countries and therefore difficult to remedy. Donors, for example have an incentive to reach short-term targets but reaching these targets becomes less feasible when interventions rely on existing weak national structures. Schneider also highlights how organisational constructs develop and dissolve depending on the actions of individuals, which do not necessarily overlap with organisational aims and health policies, as it is for example the case if health staff opts for extra pay (Schneider et al. 2006). The interaction between stakeholder incentives and system effects is a key aspect of systems thinking and argues against any linear input-output or stages model of policy analysis. Instead, looking at the way actors manage policies, dynamics over time and underlying behaviours (Richmond and Waltham 2000; de Savigny and Adam 2009). A related issue is how policies are being shaped by actors, their interests and capacities during implementation. As Gilson puts it, the latter consists of a piecemeal adaptation of those goals by “street-level bureaucrats”, the “how to” of which will only emerge in the process of doing (Gilson 2005).

It needs principles of systems thinking to know the important systems changes that are required and avoid quick and easy targets.

There is a tendency of GHI to opt for “easier approaches”. A repeated message heard throughout interviews during this research was that often, the approach of initial national ART programmes was to just start in some way, given the need to initiate programmes, and to think of systems issues, such as how to integrate vertical programmes into country systems, at a later stage. Findings of this research highlight the importance of applying systems thinking at a conceptual stage, given that contextual and behavioural dimensions, such as donor-aid structures, related incentives, and power structures constitute key driving forces of health systems performance. It needs systems thinking in order to anticipate and address these dimensions and system constraints, taking into account that “a system’s failure requires a system’s solution – not a temporary remedy” (WHO 2008b). One-sided solutions or quick fixes are unfeasible given the system dynamics involving major personnel, organisational, and institutional changes. Critical structural and contextual dimensions of systems need to be addressed by, for example, ensuring functioning systems and better working conditions, as well as changing donor-aid structures and limited government capacity, particularly apparent in line-ministries like health. Funding partners need to break the cycle of focusing on disease-specific programmes because of weak health systems. This is especially important as countries that receive the greatest levels of aid are often also those with the weakest systems and absorptive capacity. Combined with the low priority placed on health by some governments, a double squeeze on health systems is created.

A complex intervention like ART increases the need to apply systems thinking for analytical and conceptual purposes.

It has been argued that both vertical and systems approaches have its merits and need to work together (Mills 2005; Ooms 2009). One way to assess this assertion in relation to ART is to look at the way the programme is implemented. Transaction intensiveness refers to the number of transactions required to deliver a service. Applying categories for transaction intensiveness as introduced by Pritchett and Woolcock has led to the development of a framework to categorize the complexity of implementing programmes: a public information campaign is an example for a discretionary, not transaction intensive “technocratic policy”; curative care exemplifies a discretionary and transaction intensive “idiosyncratic practice”; vaccinations are a transaction intensive, not discretionary “bureaucratic programmes” (Pritchett and Woolcock 2008). According to the framework, ART falls into the second category, as it requires many steps that, according to Pritchett and Woolcock, are

“intrinsically incompatible with the logic and imperatives of large-scale, routine, administrative control”. For an intervention requiring many steps, a general rule is that the more flexible the steps and the fewer that can be replaced in case of failure, the more likely an intervention will succeed. Intensifying policy reform efforts initiated at central level does not solve the challenge of creating the structures needed for implementation. Instead of vertical planning approaches, more attention needs to be given to the means and incentives (at implementation level) to evaluate the various steps. To provide flexibility and space for constant tuning, conditions need to be created that allow for adaptable and sustainable local solutions by avoiding the bureaucracy of central planning. This kind of incremental approach recognizes that health systems are complex adaptive systems, and not mechanical systems. Complexity becomes an issue during implementation, when system constraints pose further challenges and initiatives intended to strengthen some elements of the health system are being constrained by weaknesses in other part of the health system and by the context in which it all takes place. Along these lines, all case studies in this work underline the importance of working incrementally within established systems and of including technical experience and midlevel managers, as is also suggested by the work of Grindle and Thomas (Grindle and Thomas 1998b).

Another important issue to consider is that expanded health system interventions alone might not suffice to achieve better performance in the health sector, given its dependence on other sectors. Wagstaff demonstrates that increased public investment in health alone, even at very high and sustained levels, will not be sufficient to achieve the health related MDG targets by the year 2015. Parallel investments in other sectors, including education, sanitation and infrastructure are also needed (Wagstaff 2002b). Similarly, Filmer and Pritchett suggest that a positive, but only modest, correlation exists between health spending and health outcomes when controlling for possible confounding factors (Filmer and Pritchett 1999). Focusing on economic growth instead of health systems is, however, also unlikely to lead to the health targets envisaged in developing countries. Assuming an unlikely growth of 8% of GDP in developing countries between 1990 and 2015, overall under five mortality rates would be expected to improve by 20%, and maternal mortality rates by 30% --still much lower than the MDG target reduction of 67% and 75%, respectively (Wagstaff 2002a).

8.2 Methodological issues related to health policy and systems analysis

Applying and combining frameworks

This work demonstrates how frameworks can be applied to complement each other, such as widely accepted frameworks (the WHO health systems framework) and systems thinking perspectives (i.e. trends over time, dynamics and actors). One main advantage of the WHO framework is that it comprehensively captures all the important dimensions of a health system. It however keeps a broad level, its elements overlap and each one includes very different types of variables, including physical elements, “soft” elements, such as knowledge, and formal and informal flows and processes. Service delivery, for example, is an outcome encompassing all other elements of the framework. Inputs and processes are better defined in areas like information and technologies, but less so in the area of governance, which includes a much wider set of variables and dimensions that transcend all other building blocks and cannot be quantified: “Is policy the language, rhetoric and concepts of political speeches and party manifestos? Is it the written document produced by government or company officials? Is it embedded in the institutional mechanisms of decision making and service delivery? Or is it whatever people experience in their interactions with street level bureaucrats?” (Shore and Wright 1997).

The present study goes somewhat towards answering these questions by combining existing frameworks with systems thinking through the use of open approaches, like GT, for data collection to investigate the relevance and potential of different dimensions for health systems strengthening. The study used analytical approaches to assess system dynamics, such as the incentive structures that affect stakeholder behaviour. However, even by using open enquiry techniques to gauge new dimensions, and combining analytical concepts in a flexible way, assessing underlying system dynamics remains challenging and there is little guidance on how to do so. As Senge explains in his work on systems thinking, “there are no simple rules for finding high-leverage changes, but there are ways of thinking that make it more likely. Learning to see underlying “structures” rather than “events” is a starting point... Thinking in terms of processes of change rather than “snapshots” is another” (Senge 1990). Research recommendations of this work therefore keep a relatively modest stance; in the realm that there are simply no straightforward answers to some of the conceptual and methodological questions, at least not at a general level, given their context-specificity.

Linear output measures vs. open qualitative assessments

Defined benchmarks are needed to measure process achievements, to provide a common metric that allows comparison between different interventions, to judge their efficiency and effectiveness. Pre-defined assessment criteria must be set to indicate the extent and quality of implementation, and of the information systems that track that information. Regulatory mechanisms are an example of applying benchmarks to assess outcomes according to pre-defined criteria – rules and restrictions that serve to control actions and thus, implementation of policies, through both formal and informal measures (Koops and et al. 2006). Where such regulatory mechanisms existed and were adequately followed, this research on supply chain management could, for example, have looked at quality control mechanisms and their enforcement at different levels for licensing, manufacturers, distributors, pharmacies, district medical officers, and others ordering and handling drugs at district level. However, regulatory mechanisms as well as corresponding information systems to assess the latter rarely exist especially in the context of low-income countries. In general, choosing the variables to use to assess structures and processes through common indexes or metrics causes important methodological challenges.

Moreover, the feasibility and usefulness of benchmarks can be questioned in areas (like governance) where the relevant processes or causal relationships cannot be captured according to pre-defined criteria due to variations depending on the context, sub-system and circumstances. Moreover, given the complexity and interconnectedness of health systems and sub-systems, it is usually difficult to trace out attribution, including dynamic effects of actions and organisational threats on future outcomes. In response to these limitations, this works' case studies were subject to a broader assessment that looked at general trends and bottlenecks, identified through interviews and surveys.

Using policy documents as indicators for governance

One way to evaluate processes is to compare its implementation with what has been expressed in policies and strategic documents. The policy then serves as a benchmark by which to assess the efficiency of the implementation process. Given the methodological challenges of measuring and attributing dynamic processes and health system outcomes, there is a tendency to limit assessments to a few defined inputs, such as whether or not a policy document exists. One survey, for example found that out of 152 countries, 29% had no official medicines policy document (WHO 2004). Health facility surveys have a similar approach in terms of looking at the existence of inputs. A facility survey is not able to capture other quality dimensions of service delivery either, but information about supplies in place

tends to be a relevant indicator for service delivery. This is not necessarily the case for a policy document that might not even be relevant or used during the process of implementation. However, some policy documents such as annual plans reflect the intends of implementation and other important dimensions such as how far epidemiological evidence, an analysis of past bottlenecks and participatory approaches were applied to produce documents. This works' case study on policy making in Burkina Faso presents an approach to assess documents accordingly, which goes beyond a tick-box approach looking at whether a policy exists or not.

Policy implementation itself may quite differ from what was previously written in a policy document such as annual plan. It is a dynamic process that depends on a multitude of unpredictable factors. It will see many changes during implementation, making it difficult to define in advance for any prospective study design. Many of these dimensions cannot be quantified, and are very difficult to gauge through "yes/no" answers; hence open case study approaches in line with systems thinking are needed.

Translating systems thinking into data collection

This thesis identified Grounded Theory (GT) as a useful approach to investigating the dynamic and diverse dimensions of health systems, according to the rationale of systems thinking. GT reasons that many topics in qualitative research only emerge in the process of investigation and therefore cannot be predicted in advance (Flyvbjerg 2006). Even with a fixed set of open-ended questions, the themes that will arise are unpredictable. Often a trade-off exists between prior definitions of themes that will guide analysis and an open approach that allows for new ideas to emerge and unpredictable connections to be made (Charmaz 1990). Grounded Theory, therefore, also suggests avoiding interview transcription and instead, directly synthesizing responses after interviewing in order to generate concepts and findings relevant for subsequent interviews (Wimpenny and Gass 2000). Moreover, assessing qualitative data according to predefined subjects and analytical frameworks may lead to bias, as greater emphasis is placed on issues that most confirm frameworks, research questions and views as intended by the researcher (Ryan and Bernard 2003).

An open approach to interviews and combining different data sources and methods for data collection turned out to be important, given varying accessibility of interviewees. Availability of information differed considerably from country to country and depending on the context. In Tanzania and Uganda, national partners were less accessible and open due to the various demands and investigations of similar research initiatives. There was however a substantial body of grey literature in terms of other evaluations this work was able to draw upon. In

Burkina Faso, access to information was easier, most of the stakeholders interviewed were open to discuss and share information.

The use of existing surveys and evaluations was essential to capturing the broad array of health system dimensions, as discussed in this work. Investigating them all through primary research would simply not have been feasible. In Uganda and Tanzania, this research for example drew on work published in grey literature, including quantitative information on drug availability, programme coverage and expenditures. One limitation to extensive reliance on existing studies is that information is unlikely to match exactly the research needs. Moreover, combining findings from different studies is limited due to diverse research designs, data sources and definitions. For the reasons outlined above, existing evaluations do not quantitatively capture areas important to this work. Information on national expenditure data and drug availability was, for example, particularly limited and of limited use to this study. Where possible, the research tried to collect additional information when notable gaps emerged.

Reflecting and predicting real world settings

Respondents' answers and interpretations by the study team remain, to some extent, subjective within qualitative research, especially in areas that are less clearly defined. Governance is one such area, classified as "the most complex but crucial function. It is also one of the most difficult functions to measure because of inherent difficulties in definition and measurement" (Samb et al. 2009). The case studies in this study present a simplified – and to some extent subjective – image of a complex reality. Given the gap between the latter and the research undertaken to capture it, potentially relevant details might not be investigated. The research sought to minimize limitations by judging how likely any neglected issue might have affected research findings. There may also be limitations in the messages put forward in this work on likely future developments. One of the important statements of this work is, for example, that GHIs have caused inefficiencies that are resistant to change. The statement is based on the analysis of past trends and system dynamics. Such trends may turn out differently if, for example, the efficiency of structures increases over time or other variables that were unaccounted for come into play.

Lack of conceptual guidance and other applied research

There is limited methodological guidance to apply principles of systems thinking. One reason is that by definition approaches to assessing systems need to be open and, therefore, do not lend themselves to pre-defined guidance. Another reason is that corresponding approaches to

systems thinking in applied research remain under-represented. This is likely due to their conceptual complexity. Gaps appear to be related to both the complexity and broadness of health systems, governance and policy concepts as outlined above. For some important areas, such as accountability, little research has been undertaken, which is likely due to its politically sensitive nature.

Limited and non-integrated information of budgets according to intervention areas

During the data collection process of this work's budget analysis it became apparent that funding for vertical disease-specific programmes largely bypasses district plans and budgets, effectively ruling out a needs-based and informed district planning process. Potentials of increasing transparency regarding budget information and burden of diseases are shown by the way a version of the district health accounts tool the Tanzania Ministry of Health and Social Welfare in 2007. It was further developed to become "PlanRep" and is today used by all districts as a national planning tool (de Savigny et al. 2001; Ministry of Health and Social Welfare 2011). A further limitation regards the lack of comprehensive district budget information within the past reducing options to assess longer time trends. Moreover, though disease-specific sub-accounts of NHAs are being developed, they usually exist as separate exercises for single years and disease areas, and are thus of limited use for health systems assessments over time as done in the frame of this work. The creditor reporting system (CRS) compiled by the OECD provides such information but only for OECD bi- and multilateral donors, thus also presenting an incomplete picture.

Assessing budget allocation to systems strengthening is generally limited by the lack of commonly agreed and criteria to define health systems strengthening (Shakarishvili et al. 2010). This has been addressed by Warren in her work to assess Global Fund round 8 grants against defined criteria for health systems strengthening (Warren 2011).

8.3 Possible extensions to the research

Some general issues need to be taken into account to identify possible extensions to this work's research. As explained in previous sections, both the research content and methods of this study encompass a broad array of potential questions. A pilot phase and/or further adaptation may be needed to evaluate the feasibility and relevance of potential research questions and approaches. The following sections, therefore, focus on general directions and lessons as they emerge from this work instead of on more narrow or specific recommendations.

Many of the questions about the implementation of interventions are closely related to programme evaluations. A first criteria, therefore, is to determine the added value of systems research over operational research as is done during programme evaluations. The advantage of operational research, as applied to programme monitoring and evaluation is that it generates immediate and context-specific findings that can be used to adapt interventions. By contrast, health systems research might be better to trace cause and effect and to investigate complex settings, dynamics and developments over time according to long-term, prospective and controlled study designs.

Where health systems research has been deemed to add value, both the benefits and limitations of using systems thinking to assess the interactions between disease-specific interventions and national health systems need to be carefully assessed. There is little conceptual guidance and experience of applied systems thinking in the health sector from which to draw upon. These gaps and challenges are particularly important when it comes to assessing processes. Identifying important variables within systems that can potentially induce change and recognizing quantifying effects to illustrate the scale of system constraints can help determine where to focus system strengthening efforts. One of the implications is that research themes need space to develop and adapt as important issues become apparent in the process of further inquiry.

Many of the areas identified as key to performance, such as governance, organisational capacities, integration and coordination, are complex and difficult to change for reasons described in other sections of this work. Research directed to questions that are first, difficult and time-consuming to assess and secondly, unlikely to induce system changes, might not be worthwhile. Regarding the choice of themes to address these potential risks, one possible remedy is to use systems thinking to identify leverage points - those seemingly small interventions that can result in substantial system-wide change. Again, there is limited scope for giving specific recommendations on potential leverage points, given their context-specificity. The general message is that research on interventions in other systems suggests that such leverage points are primarily located in the sub-systems of governance and information (Meadows 1998). These are both areas that have received relatively little attention in health systems research to date (Health Metrics Network 2008b).

Application of quantitative methods can be limited as discussed before when it comes to the analysis of context, processes and structures - due to difficulties of systematically disentangling contextual effects and intervention effects in settings other than prospective study designs. However, where feasible, not necessarily statistical analysis but simply

descriptive numbers related for example to budgets, stock-outs, salaries, employees, coverage rates are important add-ons, as they help to weight and, therefore, prioritize among the potential pitfalls and adverse effects (i.e. brain drain, poorly decentralized funding, etc.). Examples of potential benchmarks, as they relate to the present research, would be the mark up required by a national drug store to work efficiently, or the number of wholesalers, procurement agencies and pharmacists a supply chain management system needs to run efficiently. Looking at time trends, in terms of stakeholder behaviour and development of interventions, is a way to weight effects, comparing “before and after” scenarios to signal changes without quantifying them. This research has done so, for example, by assessing trends and interviewing people about trends during past years, such as persistent failure to integrate over several years.

Further attention should be paid to those areas that indicate lack of integration, imbalances and inefficiencies within a system. Those are the areas that are potential leverage points. Research to date has often focused on sub-systems that are relatively easy to quantify, like human resources or financing. Quantifiable units that can point to imbalances include salaries, staff numbers, as well as budget allocations and transaction costs in different sectors and at different levels. They were partly addressed within this thesis, but require more extensive research to generate the evidence needed for policy changes. Some of the gaps identified in this work include looking at what is needed to improve working conditions, incentive structures and human resource capacities within a public sector context. Weight can be added to such findings by assessing the same factors in different countries. Applying similar study designs to different country contexts’ can help reveal common bottlenecks.

Ideally, future research designs will provide better evidence regarding the efficiency of disease-specific interventions as opposed to integrated responses. There are methodological challenges in defining costs and outcomes and attributing outcomes to specific interventions when assessing system wide interventions. This work on budget allocations according to intervention areas and against burden of diseases however shows that it does not necessarily need prospective or cost-benefit designs to generate information to support balancing of health systems strengthening.

9 Conclusion

9.1 Implications of results

This research shows how disease-specific programmes largely fail to address important root causes of systems and opt for parallel processes and structures that partly weaken national systems. Poor performance and weak integration is amplified by weak conditions at all levels of the health system and by systems dynamics such as path-dependency and difficulties to redirect resource allocation and the interests of actors within newly created institutions. They relate to governance and specifically stakeholder issues such as incentives and power structures. Results on national and district budgets for different interventions and against burden of diseases quantify existing misbalances. Other research has already shown disproportionate high levels of funding for HIV and relatively little resources to areas such as child and maternal health. High differences between total per capita funding at national compared to district level especially in Burkina Faso and Uganda indicate low levels of pass-through. More attention needs to be paid to this dimension. It might not only reflect low levels of funding at implementation level, but also be indicative for a lack of decentralization and inefficiencies.

This research applies analytical approaches to systems thinking and health policy analysis – a research arena that generally lacks applied work and is characterized by methodological challenges and a lack of conceptual clarity. To address the latter issue, the work reviewed analytical frameworks for their usefulness for applied work. Findings of the case studies add to the lack of factual knowledge regarding the interface between disease-specific programmes and health systems. They provide a valuable evidence base from lessons learnt during the early years of ART with relevance for guiding efforts to scale up in other countries and for other interventions.

One of the general lessons from this work is that systems thinking approaches are needed, both to evaluate as well as to design interventions in a way that maximizes effectiveness, efficiency and sustainability of health systems. Importantly, there are no quick fixes; challenges are complex but largely known, as they correspond to past efforts to strengthen health systems. Findings and principles of system dynamics however underpin that adverse effects of non-integrated efforts are potentially more serious than currently assumed given the difficulty of correcting, reversing or remedying new structures and processes due to path-dependency and health systems that remain weak as neglected by investments and parallel

disease-specific programmes. Weak systems closely relate to dimensions of governance with enmeshed and dynamic incentive structures that need to be approached through the use of systems thinking.

To further assess and address these issues, it needs a stronger focus on system dynamics and driving forces as they impact on the sustainability and integration of disease-specific interventions. Interventions themselves need to be conceptualized to address and improve important dimensions with potential to strengthen health systems and address underlying dynamics such as motivations and power of actors as well as contextual issues such as aid structures and bureaucracies. These present key barriers to better performance and have not yet received appropriate attention. The multiplicity and complexity of existing challenges require a long-term and systems perspective essentially in contrast to the current short term and programme-specific nature of external assistance.

9.2 Steps forward

The importance of systems thinking for investigating and approaching complex systems, their context and underlying dynamics needs to be further promoted through applied research. As detailed in the previous section, specific recommendations to move forward with research are to identify - within the broad area of potential systems thinking approaches as applied to health systems - research topics that bear the potential to effect change, add value over operational research type programme evaluations, and add quantitative information on themes where the potential for new findings that can be assessed by qualitative research has reached a saturation point. Questions of “what works, how, and for whom” can often only be approached through qualitative case studies. It is often the specific details of case studies that provide evidence on diverse causal links within processes. However, findings from qualitative case studies remain context-specific and do not tell decision-makers the relative size of bottlenecks to inform prioritisation of interventions. Consequently, as a tool for decision-making, to gauge efficiency and compare across interventions, quantitative data or defined benchmarks are needed. These are all complex choices to make and much less straightforward compared to research decisions in the area of single diseases and interventions with pre-defined study designs. They nevertheless need attention as a requisite for research on complex settings that encompass different dimensions of a health system.

Systems thinking can conceptually inform programme designs. It however needs awareness and incentives to support complex health system efforts instead of the more popular interventions for short-term gain. One important programmatic recommendation that emerges from this work is to opt for integrated designs at an early stage. The case studies show that

complex interventions such as ART need to be approached as part of a system that provides an efficient working environment in the long-run. Inefficiencies, risk of irreversibility, and persisting poor systems were found to be the main pitfalls of not taking a systems perspective.

Increased international focus on health systems, as described in the introduction, is a crucial step to promote a health system strengthening agenda but must be followed by long-term funding, and a priority shift within the international donor community to opt for slower and more comprehensive systems approaches. As proposed by Senge, “Faster is slower... all natural systems have intrinsically optimal rates of growth. The optimal rate is far less than the fastest possible growth. When growth becomes excessive... the system itself will seek to compensate by slowing down” (Senge 1990). Efforts to improve health systems performance address dynamic and continuous processes. They include major personnel, organisational and institutional changes, take time, and often yield little visibility, making it difficult to measure progress. Efforts to strengthen health systems relate to inherent complexities, including interconnected system weaknesses and dynamics. They touch upon the long-term recurrent nature of most health needs, the large number of development partners, private sector involvement in financing and delivering health services, dependency on multiple sectors to achieve health outcomes, as well as low levels of resources and institutional capacity, among others. Countries are challenged by these issues and need technical support to approach systems strengthening. National ownership that allows for needs-based research in these areas, as well as continuous follow-up and adaptation, constitute vital prerequisites for countries to pursue systems strengthening.

Applying systems thinking to health interventions implies a conceptual shift. At the same time, many of the issues are not new. Past efforts to promote a primary care agenda, for example, had similar objectives to systems thinking, such as integrating and linking up different levels, considering various system dimensions, avoiding centralized responses and adapting interventions to local needs through bottom-up and participatory approaches. What appears to be missing is a sense of urgency. System constraints need to be addressed before imposing disease-specific interventions with additional structures. There is also still a lack of awareness that easy and quick fixes are not feasible, given the complexity of multiple needs within health systems that require a long-term perspective with sustained efforts and investments. Vertical programmes have been able to claim that they work towards promoting health system agendas without really addressing any of the root causes of weak systems, as highlighted in this work. This is likely due to the lack of conceptual clarity. Additional conceptual clarification, as well as applied systems research, can help to prevent misconceptions and promote approaches that foster synergies as funding for ART is provided in a way that deliberately seeks to strengthen overall health systems.

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Education

2007 - 2011: Swiss Tropical and Public Health Institute (Basel, Switzerland)

Epidemiology (PhD)

Health System effects of scaling up antiretroviral treatment in Burkina Faso, Tanzania and Uganda Supervisor: Don de Savigny, PhD

2002 - 2003: LSE and LSHTM (London, England)

Health Economics and Health Policy (MSc)

- Health Policy, Planning and Financing
- Health Economics
- Epidemiology

1999 – 2002: Hamburg University (Hamburg, Germany)

Economics and Business Administration (Diploma)

- Business Administration
- Economics
- Social Sciences

2000 – 2001: Macquarie University (Sydney, Australia)

Business Administration (Bachelor)

- Strategic Management
- Asian Economics
- Financing

Experience

01-2012 - : Hoffmann-La Roche (Basel, Switzerland)

Modelling, Outcomes Research, Statistics and Epidemiology (MORSE)

01-2011 - 01-2012: HealthEconAG (Basel, Switzerland)

2010 and 2011: Fresenius University (Idstein, Germany)

Teaching, MSc. International Pharmacoconomics and Health Economics

2004 - 2007: Swiss Centre for International Health (Basel, Switzerland)

Project Associate Public Health

- Project management, fundraising, evaluations
- Contractual work for the Swiss Development Cooperation (SDC), the Swiss Federal Office of Public Health (FOPH), the World Health Organization (WHO), the German Technical Cooperation (GTZ), Novartis
- International consultancies in Romania, Ukraine, Tanzania, Nepal, Germany and Switzerland

10/03 - 02/04: German Technical Cooperation (Katmandu, Nepal)

Short-term assignment

- Hospital Finances
- Feasibility study Community Health Insurance

07/03 - 09/03: EPOS Health Consultants (Diourbel, Senegal)

Short-term assignment

- Survey Community Health Insurance

Skills

Data management and analysis

- Microsoft Office Word, Access, Excel
- STATA, Epi-Info

Languages

- German: 1
- English: 1
- French: 2
- Spanish: 2

Scale of 1 to 5 (1 - excellent; 5 - basic)