Pharmaceutical Government

An ethnography of stock-outs and the institutionalization of free access to ART in Uganda

Dissertation

zur Erlangung des Doktorgrades der Philosophie (Dr. phil)

vorgelegt

der Philosophischen Fakultät 1

der Martin-Luther-Universität Halle-Wittenberg

Fachbereich Ethnologie

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Verteidigung am 10.6.2014

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Abbreviations

ACP	AIDS Control Program, Uganda
ACTs	Artemisinin Combination Therapy (antimalarial medication)
ART	Antiretroviral Therapy
ARVs	Antiretrovirals
CDC	Center for Disease Control and Prevention, United States
CHAI	Clinton Health Access Initiative (The Clinton Foundation)
CRS	Catholic Relief Services, United States
DANIDA	Danish International Development Agency
DHO	District Health Office
EMHS	Essential Medicines and Health Supplies
FDA	Food and Drug Authority, United States
Global Fund	The Global Fund to Fight Against HIV/AIDS, TB and Malaria
HC2, HC3, HC4	Health center level 2, Health center level 3, Health center level 4
JCRC	Joint Clinical Research Center
JMS	Joint Medical Stores, Uganda
MJAP	Mulago Mbarara Teaching Hospital's AIDS Program
MoH	Ministry of Health, Uganda
MSF	Médicins-Sans-Frontières
NMS	National Medical Stores, Uganda
PEPFAR	President's Emergency Program For AIDS Relief, United States
PEPFAR SCM	PEPFAR's Supply Chain Management Organization, United States
PMTCT	Preventing Mother-to-Child Transmission of HIV
SIDA	Swedish International Development Cooperation Agency
TASO	The AIDS Support Organization, Uganda
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNGASS	United Nations General Assembly Special Session
USAID	United States Agency for International Development
WHO	World Health Organization

German Summary—Deutsche Zusammenfassung

Die vorliegende Dissertation untersucht Versorgungsunsicherheiten in der HIV-Behandlung in Uganda. Diese Versorgungsunsicherheiten werden in Uganda mit dem englischen Begriff *stock-out* bezeichnet. Die vorliegende Dissertation analysiert diese Versuchungsunsicherheiten durch eine empirische Untersuchung von Lieferengpässen und Versorgungskrisen im Zeitraum 2009 bis 2011.

Der Fokus auf Versorgungsunsicherheiten thematisiert die wissenschaftlichen und infrastrukturellen Bedingungen einer normalen Lebensführung mit HIV, die mit der Institutionalisierung des freien Zugangs zu HIV-Medikamenten verbunden sind. Die Therapie der chronischen Krankheit macht eine regelmäßige Einnahme von antiretroviralen Medikamenten erforderlich. Vor diesem Hintergrund zeigt die Knappheit von HIV-Medikamenten, dass normales Leben und normales Sterben als Ausdruck einer *conditio humana* verstanden werden müssen, die sich als infrastrukturelle und gesundheitspolitische Unvorhersagbarkeit in der HIV-Behandlung ausdrückt. Versorgungsunsicherheiten zeigen auf drastische Weise die Spannungen zwischen den Erwartungen der Vorhersehbarkeit sowie der Berechenbarkeit in der lebenslangen HIV-Behandlung und einer unübersichtlichen *Projektifizierung* der HIV-Behandlung durch neue Organisationsformen und Akteure in der Weltgesundheit (*global public health*). Die vorliegende Dissertation dokumentiert und analysiert diese Spannungen. Sie untersucht, wie global zirkulierende Modelle, Technologien und Organisationsformen in kalkulative Praktiken übersetzt werden, ohne die eine Institutionalisierung der HIV-Behandlung für die Vielzahl an Patienten in Uganda nicht möglich wäre. Die vorliegende Dissertation diskutiert im Besonderen, wie Akteure, durch Rationierungspraktiken von Medikamenten und Improvisationen in der HIV-Behandlung, die Versorgung während einer Medikamentenknappheit aufrecht erhalten.

Die empirische Analyse von Versorgungspraktiken und Versorgungsroutinen zeigt, dass Versorgungsunsicherheit sowohl als eine Rationalisierung der Therapie als auch eine Rationalisierung der Knappheit von Medikamenten zu verstehen ist. Darüber hinaus zeigt die vorliegende Dissertation, dass Medikamentenknappheit in Uganda Teil einer

permanenten Neuorientierung und Reorganisation der HIV-Krise ist, die sich an den ständig verändernden Bedingungen der Versorgung ausrichtet.

Acknowledgements

The research project for this dissertation was generously funded by the Max Planck Fellow Group "Law Organization, Science and Technology" (LOST) and the Priority Program of the German Research Foundation "Adaptation and Creativity in Africa" (SPP1448). Both programs and their research agendas have tremendously shaped my approach in studying biomedicine, HIV, and the production of therapeutic orders in Uganda.

First of all, I want to express my deep appreciation to informants, friends, and colleagues in Uganda. This text could not have been written without their views and experiences they shared with me. As it is often the case, it is difficult to distinguish clearly between friends, colleagues, and informants. In the text, all names have been replaced with pseudonyms and with invented characters in order to protect my informants' identities, which makes this acknowledgement into a very incomplete appreciation.

For wonderful discussions in Kampala, Jinja, Gulu, Soroti, and Masaka, I would like to thank Gitte Beckmann, Lioba Lennart, Lotte Meinert, Herbert Muyinda, David Kyaddondo, Rene Umlauf, Anne Wermbter, Lisa Ann Richey, Sarah Biecker, Richard Rottenburg, Susan Whyte, and Michael Whyte. I would like to thank Herbert Muyinda and David Kyaddondo for their constant support and inspiring discussions in Uganda and Germany. This PhD-project was part of a larger project on "Global Health Technologies" funded by the German Research Foundation. I am very grateful to Herbert for writing the grant application together, for doing field research together, for teaching together in Halle, and most importantly for the great sense of humor. I want to thank David and his family for hospitality. My deep gratitude also goes to Susan and Michael Whyte for their amazing generosity and most importantly the constant encouragement to do field research in Uganda.

In Halle I would like to thank Andrea Behrends, Stefanie Bognitz, Ralph Buchenhorst, Sandra Calkins, Daniele Cantini, Rene Gerrets, Conny Heimann, Kati Illmann, Fazil Moradi, Johanna Mugler, Ronn Müller, Katharina Schramm, Manuela Schmidtke, Thomas Thadewaldt, Jim Thompson, Larissa Vetters, Julia and Olaf Zenker for help, shelter, sharing food for thought and real food, and for a good number of years of great discussions.

I am very grateful to Uli Beisel and Nele Jensen for their sturdy lessons on global health during our consultancy on medicines and pharmaceutical R&D.

I presented chapters at various occasions and workshops. For invitations, suggestions, critique, and friendly words, I would like to thank in particular Carlo Caduff, Susan Erikson, Anita Hardon, Julia Hornberger, Janina Kehr, Thomas Kirsch, Vinh-Kim Nguyen, and Peter Redfield. In particular, I would like to thank Michael Guggenheim and his wonderful research team on "Organizing Disaster" at the Goldsmith College in London. Michael's invitation to a workshop on the organization of disaster was of enormous help in my attempt to develop an argument on the permanent reorganization of the AIDS crisis.

I must especially thank Vinh-Kim Nguyen and Susan Whyte and their work on ART for enormous inspiration. This dissertation, certainly like many other studies in this field, is heavily indebted to their work and generosity. I am grateful to Vinh-Kim for taking time to comment on really raw chapters. Finally, I want to thank to Richard Rottenburg. The institutions, people, networks, workshops, and ideas in this acknowledgement are more than in one way also connected to Richard. So apart from this, I want to express my deep respect and appreciation for his way of teaching anthropology from A to Z.

The endless reading of chapters and all efforts to fix these chapters would not have been possible without jokes, patience, and comments by Rene, Stefanie, and Thomas—and most importantly not without Karla and Sarah.

1. Introduction

This dissertation examines the stock-out of antiretrovirals in Uganda. It relates these stock-outs to the production of order and disorder—normalcy and crisis—in the AIDS epidemic. Between 2009 and 2010, numerous clinics in various places in Uganda were running out of antiretrovirals. The subsequent rationing of antiretrovirals gave rise to a number of ethical and moral dilemmas that will be discussed here in order to generalize more broadly on the social and scientific prerequisites of a 'normal life' with HIV. More than for other pharmaceuticals, the expectation that antiretrovirals can enable a 'normal life' with HIV, regardless of where one lives, is intricately linked with the trust that these life-prolonging medicines will be supplied permanently and without any interruptions.

I do not pursue a definition of the meaning of a normal life. Rather, I understand the association of a normal life with antiretrovirals as an expression of the human condition, which, as Hannah Arendt insisted, differs from conventional beliefs in one universal "human nature" (Arendt 1967). Human nature is to be born and to die, which are irreducible facts of life. The idea of a normal life and normal death, by contrast, highlights the indeterminacies of this human nature, which constitute the human condition. This indeterminacy is predicated upon "man-made things"—in the case of this study, life-prolonging medicines—"and these things, which would not exist without humans, are themselves conditions of human existence. Human beings, whatever they decide to do or not to do, are always conditioned beings. [But also] things would not hang together meaningfully, if they would not condition human existence" (Arendt 1967: 18-19).[1] A normal life, unlike a merely biologically defined life, is a life that takes place in the material and social orders of collective practices. Normal life is in this regard done in practices.[2] Thus a normal life is localized among things and human beings rendering the political nature of collective practices (Arendt 1967: 33). These practices are according to Arendt

[1] Own translation of the German text *Vita Activa* (Arendt 1967: 18-19).

[2] The paraphrase 'practices doing things' should capture the German term "Tätigkeit des Handelns" (Arendt 1967:18).

moreover the origin of the public as a political realm in which human existence transpires (Arendt 1967: 59).

The contemporary global circulation of biomedical technologies like antiretrovirals is an emblematic expression of this human condition. Antiretrovirals redraw the boundaries between science, politics, and society by permanently negotiating between biomedical definitions of life and normative expectations of order and predictability (e.g. Lock 2002). Understanding therapy as a pointed expression of the human condition, then, momentarily suspends considerations of HIV as a purely biomedical crisis and the roll-out of antiretrovirals as the only intervention needed to "renormalize societies" after the AIDS crisis.[3]

In order to elaborate on the more specific human condition implied in antiretrovirals in making living and dying normal, I will examine the organization of the supply of antiretrovirals to inquire how HIV is "enacted" in mass HIV treatment as a chronic illness (Mol 2002). The supply of antiretrovirals is closely related to the 'provision,' 'distribution,' or the 'delivery' of antiretrovirals, but these terms all differ slightly in their analytical emphasis. Max Weber's sociology is helpful to situate the supply in these different analytical angles. The supply of goods highlights the logistic and infrastructural systems, which individual life and, more importantly, public life has to "count on," (Weber 2004: 12), without knowing or questioning the calculative practices and technical mechanisms involved in making basic goods like antiretrovirals available. Max Weber emphasized in his lectures on *Science as Vocation* that this 'counting on' is in fact a "blind trust" in numbers and infrastructures, which nevertheless creates predictability and foster public life as the core of modern rationalization (Weber 2004; see also Weber 1930).

Weber's notion of rationalization may not immediately seem relevant to the current global circulation of humanitarian ideas that travel with antiretrovirals to countries like Uganda. But rationalization needs to be revisited critically as it has already entered post-colonial

[3] The Ugandan AIDS researcher and physician Alex Coutinho evoked the term "renormalization" to emphasize that the AIDS crisis early to emphasize the chronicity of the HIV epidemic (Coutinho 2004).

problematizations of order and disorder in Africa, albeit with different connotations. The anthropologist Jane Guyer, for instance, begins her discussion of food supply in West African cities by stating that supply is usually imagined as "a constant routine function in all differentiated societies, taken for granted most of the time by those not directly involved" (Guyer 1987a: 1). One must take this imagination of rationalization associated with the supply of basic goods seriously in order to fully understand how "Africa's apparently deepening problems attract world attention" (ibid.). The nervousness of post-colonial science and administration about crises arising out of a shortage of food or water (see also Rottenburg 2009a), in the case of this dissertation, the stock-out of life-saving pharmaceuticals, is not only a reflection of the terrible consequences of infrastructural breakdowns but a sign of a scientific perception that "little is known about the conditions of [food] supply" in African countries (Guyer 1987a).

I will show below that the shortage of antiretrovirals provokes a desire for more information, more scientific objectivity, and greater rationalization of therapy. This scientific and administrative understanding of the supply of antiretrovirals and its infrastructural breakdown rests on the assumption that a constant routine function requires that organizations and individuals just follow the rules of technical systems—in this case pharmaceutical supply management systems. Brian Wynne counters this assumption by shifting the attention to accidents (Wynne 1988). According to Wynne, accidents are not deviations of technical rules, but they are windows into processes of social ordering in the normal functioning of infrastructural systems. Accidents demonstrate that "the operating rules of technologies are an *ad hoc* brew of informal modes accommodating imprecise general principles to particular circumstances of implementation. These practical rules are more complex, ambiguous and very different from the neat, rule-bound image of technology projected in public" (Wynne 1988: 149). It is this ad hoc brew of practical rules in making the supply of antiretrovirals to a routine, which should raise critical attention, like its breakdown or its escalation to a crisis, for understanding the production of orders and disorders in the AIDS epidemic.

It is against this background that I want to scrutinize the logistic and technical practices in managing the insecurities in the supply of antiretrovirals, which define ART as therapeutic

apparatus. My interlocutors and colleagues in Uganda were concerned with many other problems, too, but the insecurities in this apparatus to enable a normal life with HIV are the ones I want to relate to in this dissertation. In terms of my own experience, I had known HIV mostly through public health campaigns on AIDS and safer sex, which were quite present in German cities in the 1990s. Then in the mid 2000s, during my undergraduate studies, HIV appeared in various readings in medical anthropology, Science and Technology Studies, and, of course, in work on topics like the AIDS denialisms in Africa, which predominantly focused on post-apartheid South Africa. When I started to work on HIV as a research topic in earnest, it was no longer a symbol of a gruesome and unjust death. By this time, antiretrovirals had become a powerful source of hope and played a key role in global treatment activism (Hardon 2012).

I recall these personal experiences in order to emphasize that, when I started the kind of field research on the supply of antiretrovirals in Uganda in 2009, the discussion about the AIDS epidemic had already shifted from discussions about cultural controversies toward critical and even self-critical assessments of the disease-specific structure in global public health. AIDS was regarded to be well explored and well-funded, while other major killers such as Malaria or cancer were ignored. Moreover, the advent of global public health in the form of mass HIV treatment was and still is to a great extent concentrated on the African continent. As a result, it seemed that research and humanitarian relief were saturated with representations of 'Africa' as a poor and disease-ridden continent (Butt 2002).

The stock-outs discussed in this dissertation took place "after ART," as it is sometimes glossed. That is, after antiretrovirals became widely available and the AIDS pandemic ceased to be the humanitarian disaster of the twenty-first century (Comaroff 2007; Hardon and Dilger 2011). Since then, we have terms like roll-out, scale-up, universal access, global public health, or just "free ART" as Ugandans say. Also the use of words like HIV, AIDS, or epidemic has become more precise. The familiarity with these terms in this particular domain emphasizes the remarkable expansion of infrastructural orders and technologies without which ART could not have been institutionalized. Yet, prepositions like 'before' or 'after' obscure the fact that the HIV epidemic is a "long-term event" because of the specificities of the HIV pathogens, as Tony Barnett and his colleagues have been arguing

long before antiretrovirals became available (Barnett 2004; see also Nixon, et al. 2011). Moreover, the temporalities evoked by this distinction are not easily untangled for any crisis, which in many settings are persistent and recurrent in nature, as Henrik Vigh suggests (Vigh 2008: 8). What makes HIV remain a persistent crisis after the massive rollout of ART over the last years cannot be explained by the nature of the HIV pathogens alone. One must also consider the logistical, technological, infrastructural, and scientific apparatus in organizing access to treatment in Uganda. Both, crisis and normalcy, must be understood symmetrically as distinct characteristics of the co-production of scientific and social orders in global public health. In spite of the partiality and incompleteness of the global health architecture, I do not think there is a way to return to the older and more comprehensive ideas of primary health care in Africa, as AIDS has irreversibly altered the moral expectations in public health care. The distinction of 'after' and 'before' then should aid in capturing the radical shift brought about by HIV treatment, which has affected HIV itself as an object of global public health and reflect how antiretroviral therapy has changed a place like Uganda. In light of this shift, in which the stock-out of antiretrovirals is situated, 'after ART' more urgently raises the question of how to do research and how to do global public health after the pervasive presence of the AIDS crisis (e.g. Livingston 2012).

The problem of antiretroviral stock-out

This dissertation deals with the practical and theoretical problem of understanding the emergence of the stock-outs of antiretrovirals in contemporary global public health in Uganda. The practical problem, which is posed as antiretroviral stock-outs, centers around the instabilities and insecurities in mass HIV treatment programs, which depend on a regular and stable of supply of antiretrovirals. Here, I am concerned with questions like why, how and when stock-outs occur. The practical problem examined in this dissertation is not to be mistaken as purely technical and administrative challenge to increase the number of patients or maintain patients on treatment. Rather, these technical and administrative questions itself are the object of study. I understand the practical problem as a problem for a critical social science, which is closely interrelated with a theoretical

understanding of the kind of global health politics emerging around mass HIV treatment programs. According to critical observations of contemporary global health politics, the stock-out of antiretrovirals has to be considered intrinsic to the fuzzy architecture created by global health to which anthropology as a social scientific discipline has been intentionally or involuntarily making its contribution (Pfeiffer and Nichter 2008). Addressing the antiretroviral stock-out as a practical problem is thus inherently a question about the position in the field of global public health, which social scientific research should or does not want to occupy (Pfeiffer and Nichter 2008; Whyte, et al. 2011). This delineation of a position in global public health cannot be separated from a social theoretical understanding of how positions are produced and how they inform the articulation of critique and disciplinary self-critique of methodological commitments in and the desire for producing knowledge (see Chapters 2 and 3).

Along these questions on the articulation of disciplinary positions toward the emerging global health, the theoretical problem is concerned with a social theoretical conceptualization of the stock-outs of antiretrovirals. I will address this theoretical question by discussing Foucault's notion of biopolitics and ask to what extent stock-outs reflect the emergence of new forms of therapeutic domination in the globalization of health (Foucault 1978; 2003a; 2008). Understanding stock-outs and the respective rationing of these life-saving technologies as a treatment crisis is close to the assumption that contemporary biopolitics is predicated upon a politics of exception, which the AIDS epidemic has come to designate. Following Giorgio Agamben's notion of biopolitics (Agamben 1998), the crisis mode in which Judith's pharmacy was operating over a period of months, while patients were waiting for treatment, might be considered to resonate with Walter Benjamin's proposition that the "'state of exception in which we live has become the rule" (Benjamin 2007: 133; see also Agamben 1998: 12). In this understanding the rationing of antiretrovirals during stock-outs seems to confirm that in "modern biopolitics, sovereign is he who decides on the value and nonvalue of life as such" as Agamben writes (Agamben 1998: 142).

Such decisions about the value and nonvalue of life and, more importantly, of death are particularly visible during the stock-out of antiretrovirals, as I will describe throughout the

chapters. In his ethnography of the early years of ART in West Africa, Vinh-Kim Nguyen suggests the term therapeutic sovereignty to describe the sorting and triaging of "those who should live from those who could go without treatment" (Nguyen 2010: 6). Such treatment decisions raise the question of whether the exercise of a therapeutic sovereignty over life is limited to specific contexts and situations, or if it is rather a "historical aberration that will wither away" (Nguyen 2010: 110). In other words, are stock-outs a technical problem that can be resolved by increasing funding or by introducing other technological innovations? Are antiretroviral stock-outs on the rise and if so, what does it mean for global health? By contrast, do the biopolitical structures of these stock-outs reflect a more fundamental global treatment crisis? Are the stock-outs of antiretrovirals in Uganda, which make people decide over life and death, rather harbingers of more profound organizational predicaments, presaging, as public health experts warned, a global treatment crisis? Are new forms of therapeutic sovereignty being shaped by decisions of whose life is worth being saved and who can go without treatment? Finally *who* takes these decisions about the value and nonvalue of life?

I will return to this these theoretical questions in Chapter 6. Here, I want to give a provisional account of the analytical concepts, the methodological approach, the argument in examining the stock-outs, and remarks on the background of my field research, terminology, and the structure of the dissertation.

The argument

In this dissertation, I argue that the stock-out of antiretrovirals is not adequately captured as a crisis and moreover does not confirm the assumption that the state of exception has become the rule. On the other hand, the supply of antiretrovirals cannot be understood as a taken for granted routine either. Stock-outs rather demonstrate how, both, ideas of normalcy and crises are configured in the organization of access to ART. Stock-outs show how people move between the AIDS crisis and normalcy by constantly fixing institutional mechanisms to scale-up access to treatment, maintain HIV as a chronic illness, and more importantly in dealing with the underlying scarcity of antiretrovirals. The continuous

recalibration of the institutionalized mechanisms of providing treatment leads to a permanent reorganization of the AIDS crisis around the supply of antiretrovirals. This permanent reorganization of the AIDS crisis reflects not only humanitarian ideas but moreover expresses a distinct rationality of pharmaceutical government against which the stock-out of antiretrovirals can be conceptualized. The discussion of this argument is twofold.

First, I suggest that stock-outs are inherent to the calculative practices and the techno-scientific arrangements undergirding the advent of free ART in Uganda. In spite of the frequent portrayals of an enormous flow of financial resources to African countries, resources in the field of mass HIV treatment in Uganda remain surprisingly scarce and unpredictable. In addition, efforts to increase access to antiretrovirals are increasingly oriented towards economic and 'cost-efficient' distribution, which, in effect, means that antiretrovirals continue to be rationed at various levels—though in a very orderly manner. This ordered scarcity is inscribed into the many standardizations and procedures that constitute the therapeutic apparatus of mass HIV treatment and regulate the demand for antiretrovirals by a large number of people in order to provide a steady supply of antiretrovirals. This orderly scarcity is unstable and can flip into acute stock-outs as the above-mentioned ethnographic examples show, which will be further explicated as the rationalization of scarcity in the chapters below (Chapter 6, 7, and 8).

Second, I examine mass HIV treatment programs in Uganda as a permanent reorganization of the AIDS crisis around the availability of antiretrovirals. Barnett and others' description of the AIDS epidemic as a long-term event suggests that HIV treatment should be considered a never-ending project due to the chronicity of HIV (Barnett 2004). All interventions remain 'unfinished projects' when they come to the end of a project cycle, and this creates new insecurities in free ART, as my ethnographic examples above indicate. Humanitarian interventions in global health constantly alter the infrastructural and logistical apparatus in organizing access to ART. This results in a permanent reorganization of the techno-scientific apparatus and, more importantly, the AIDS crisis itself, which is continuously adjusted to the supply of antiretrovirals and moreover an unpredictable field of AIDS financing.

The argument advanced in this dissertation attempts to go beyond an understanding of stock-outs as a permanent state of emergency, in which differences between order and disorder and normal and crisis have become indistinguishable. Such an understanding implicitly (and sometimes explicitly) assumes that crisis marks a rupture of the normal course of events. But what is a normal course of events? As Vigh eloquently argues, common definitions of a crisis as a temporal rupture are too coarse-grained to capture the realities of the persistent and recurrent nature of crises in contemporary social life (Vigh 2008). Stock-outs are not only a threat to patients' health and life; they demonstrate the persistent insecurity built into the therapeutic apparatuses of ART, which literally produces a normal life with an almost ordinary chronic illness. Following Vigh, the stock-outs of antiretrovirals, can be understood to demonstrate more drastically the meaning of "crisis as a condition" (Vigh 2008: 10), which revokes the eschatological rhetoric in global health that the AIDS crisis will be overcome by increasing patient numbers, funding, and fostering scientific innovation.

It is important that situations of persistent insecurity do not necessarily result in apathy or a complete breakdown. Rather "[w]hen analyzing practices in situations of crisis, we see, as such, people attuning their idea of movement and action to an opaque and fluctuating social environment. [...] In such situations act and environment are in constant dialogue" (Vigh 2008: 18). The stock-out of antiretrovirals demonstrates that normality and crisis are permanently reorganized around the supply of antiretrovirals. To elaborate on the permanent reorganization of the AIDS crisis, I suggest that it is helpful to draw and elaborate on Annemarie Mol's argument for studying the way a disease like HIV "is done" (Mol 2002: 6). In this regard this dissertation asks how the organization of antiretroviral supplies bring HIV as a chronic condition into being. To paraphrase Mol, counting, measuring, calculating, and transporting medicines in the organization of ART bring HIV into being. It is a slightly different HIV each time and at different sites (Mol 2002: vi).

To elaborate on Mol's praxiographic analysis for analyzing practices of care in a hospital, I will include the broader organizational field of global public health, even if one runs the risk of getting lost in the technical details of an abstract problem. Large parts of this dissertation struggle with this challenge in terms of the methodological question, the framing of the

theoretical debate, and the way I have assembled the ethnographic material in the following chapters. It is not one single health center or doctor who is going to appear in this study. The kind of ethnographic research I conducted attempts to extend the idea of doing a hospital ethnography *within* an ART clinic[4] toward an inquiry of practices of coordination, contestations, and negotiations taking place *between* organizations in the provisioning of free antiretrovirals.

I began my field research started at one single ART clinics in Kampala where I was placed in various departments. I dispensed drugs, took records, assisted in the laboratory, and attended the annual meetings of the umbrella consortium. I quickly noticed that the procedures, staffing, internal organization, and number of patients differed remarkably between different clinics, and could not be easily compared to each other. Rather, the diversity of projects was part of a problematization of the way access to ART is organized in Uganda. Instead of focusing on one ART clinic, I began to visit a number of ART clinics, donor organizations, government agencies, and technical working groups in which these problematizations were articulated, contested, and gave rise to the reorganization of the supply of antiretrovirals.

The object of the study

In this dissertation I examine calculative practices in the organization of access to treatment. Furthermore I argue that these calculative practices are better understood as permanent reorganization of the AIDS crisis. The empirical focus on calculative practices is inspired by Michel Callon's and Fabian Muniesa's work (Callon and Muniesa 2005; see also MacKenzie, et al. 2007). The global supply of ARVs builds on a range of calculative

[4] Sjaak van der Geest and Kaja Finkler have conceptualized hospital ethnography as a distinct research approach (Geest and Finkler 2004). This approach situates hospitals within processes associated with the term globalization and argues that hospitals as the foremost institutions of biomedicine express a great diversity. Doing ethnography in a hospital then brings "core values and beliefs of a culture into view" (Geest and Finkler 2004: 1991). In contrast, this study focuses on the circulations and flows of things and ideas, which do not 'enter' a singe site but constitute fields and problems. Circulations of information, capital and drugs in defining global health as an institution of biomedicine, necessarily take place between organizations and among actors.

practices that make humans and pharmaceuticals calculable; these practices attribute values, such that they can be counted as human bodies and commodities and related to each other. As objects, ideas, and models enter into new relations, they materialize new practices and mobilize other elements in the production of knowledge (Rottenburg 2009a: xxxi). This quantification of antiretroviral therapy concatenates objects (pills), ideas ("positive living"), and models ("adherence to treatment"), which all make a normal life with HIV possible.

In this dissertation, I will examine these calculative practices by following Judith and some of her colleagues in the pharmacy of ART. I furthermore describe these practices by focusing on two ART clinics, three research projects, and two workshops in Uganda, which rotate around the stock-outs and the fragmentations in the supply side of antiretrovirals. The major challenge in the analysis of my empirical material is the sheer number of projects and the density of technical information in this field. The introductory ethnographic examples have already demonstrated the crucial role that numbers play in this domain, but are perceived to fail to be a point of reference for the dynamics in field. The numbers that pharmacists like Judith produce travel to other organizations and yield larger numbers, statistics, and more reports, which all need to be taken into consideration when trying to capture the fissures in the circulations of knowledge and pharmaceuticals in the supply side of antiretrovirals. This information is quite bulky and does not necessarily lend itself to a better understanding of the situation. In fact, it might have quite an esoteric effect, even though it is crucial to the protagonists in the supply of antiretrovirals and constitutes a real methodological puzzle to the production ethnographic observation, as Chapter 2 will argue.

I deal with this problem by asking how the lack of information made the stock-out of antiretrovirals to a particularly sensitive issue. In addition, I mostly focus on a body of information and facts that I observed being produced during my ethnographic research. In my methodological discussion in Chapters 2 and 3, I situate the use of ethnographic methods in this domain of evidence-based knowledge production. The conduct of ethnographic research on calculative practices in the pharmacy of ART is here described as an inventory practice of pharmaceuticals as scientific and political artifacts, which likens

ethnography to the stock taking practices in pharmacy. These operations are to a great extent of technical, statistical, mathematical, and biomedical nature and are assembled around the distinct logistical question which free access to ART posits, namely, how to provide a reliable and permanent supply of antiretrovirals to large populations. This amplification of ethnographic research is not to be mistaken as the multiplication of sites defined in geographical terms, which are visited in the course of a multi-sited ethnographic research project, as I will argue in Chapter 2. Ethnography needs to be conceptualized instead as a travelling practice that follows the itineraries of people, models, technologies, and ideas through a space of abstractions and economic calculations, in which actors operate with large amounts of money and pharmaceuticals (see also Falzon 2009).

This methodological choice cannot be separated from theoretical and disciplinary considerations in studying the proliferation of techno-scientific forms in contemporary processes of globalization, most notably the expansion of the paradigm of evidence-based knowledge (e.g., Collier and Ong 2005). The discussion on this issue seems to be influenced by two major streams of current social theory: first, a variety of applications and elaborations of Foucault's notion "biopolitics of population," which is helpful for bringing the calculative practices involved in governing epidemics and mass population into view (e.g., Mahajan 2008; Sangaramoorthy 2012). Secondly, Science and Technology Studies (STS) and Actor-Network Theory (ANT) developed by Bruno Latour (Latour 1999; Latour 2005) increasingly appear as alternatives to study the global circulation of ideas, scientific expertise, technologies, and material objects (e.g. Rottenburg 2009a). Knowledge about medical conditions are created and re-created over time and are better understood as the result of "negotiating an order" in the "encounters of different social worlds of different groups of actors" as Steven Epstein argued in his work on the making of AIDS science (Epstein 1996: 18). In the terminology of STS natural objects, like viruses, AIDS, and antiretrovirals can be viewed as "boundary objects", with "an identity that cuts across social worlds, but understandings of the phenomenon may vary in subtle yet significant ways

depending on the social standpoint from which it is viewed" (ibid.).[5] These technologies create trust, credibility, and authority in the deployment of scientific tools, like indicators, which enable to draw a moral and political line between 'good forms' and 'bad forms' of governing a population's health.

My reading of these two disciplinary streams wants to emphasize the overlapping in methodological choices, namely, studying practices and technologies of government without taking the existence of 'society,' or the 'state,' or the 'sciences' for granted. Yet, these two strands of post-foundational social science are utilized in very different ways in order to make sense of the political orders they belong to. In this respect, I prefer to engage the scholarly debates on the biopolitics in contemporary global public health as they avoid some of the pitfalls peculiar to the use of concepts associated with ANT. To quote the STS-scholar Sheila Jasanoff more extensively, Latour's notion of ANT displays

> "curiously little of the moral and political conflicts that normally accompany the creation and maintenance of systems of governance. [...], when actor-network theory confronts the nature of power, as it often does, it side-steps the very questions about people, institutions, ideas and preferences that are of greatest political concern. Who loses and who wins through the constitution of networks? How are benefits and burdens (re)distributed by or across them? [...] By downplaying such issues, actor-network theory's welcome attempt to reinvigorate the place of the non-human and the material in accounts of power entails substantial costs with respect to the treatment of human agency and human values" (Jasanoff 2004: 23).

So, how does one retain questions of human value and also nonvalue? Or, better, how should one engage the difficult field of human values, and to what extent do these human values stand in opposition to scientific or economic values in the pharmacy of ART? I will

[5] Steven Epstein's argument follows the work of Susan Leigh Star and James Griesemer's on "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39" (Star and Griesemer 1989).

deal with these questions in my discussion of pharmaceutical government in Chapters 6 and 7, where I will inquire into the economic rationalities expressed in the rationing of pharmaceuticals. Rationing is expresses the contradictory values inherent to the distribution of scarce goods, which take place anywhere in the world. How are these contradictions made bearable and endurable specifically in the case of mass HIV treatment in Uganda? What kind of politics is expressed in this pharmaceutical government in mass HIV treatment programs (Chapter 6)?

The government of pharmaceuticals, which I will describe here, is not merely a rule of the political economy of pharmaceuticals, but one that invites questions on the way these pharmaceuticals come to constitute a technology of government, how are the objects of government are fabricated and permanently refabricated through the technologies of government. Here, I find scholarly work in STS helpful to approach the authority of this form of pharmaceutical government by studying the constitution scientific expertise and the trust in the ways in which scientific objectivity is produced in global health. In the course of the chapters, you will see how frequently the 'performance' of organizations and individuals' practices in global public health are measured and assessed. These measurements do not only aim at an improvement of people's health but are rather confirmations of the utility of scientific models and methods themselves, which are tested on the 'ground,' to improve the implementation models and innovations. The permanent measuring of practices and testing of models and methods raises the question according to which principles and goals people's way of doing things are measured, made visible, and turned into the object of another intervention? And more importantly whose intervention is this?

Background of the field research and terminology

The material for this study is based on 17 months of field research in Uganda, carried out from 2009 to 2012. Ethical research clearance (Ref.: 2256) was obtained from Uganda National Research Council for Science and Technology Studies in 2009 and 2011.

During my field research I conducted interviews with a range of health professionals, administrators, and consultants. The main empirical material is based on participant observation in a variety of activities. Judith Hoyelah, mentioned above was part of a group of pharmacists I worked with during my field research on free antiretroviral therapy in Uganda between 2009 and 2012. Like Judith, most of my interlocutors taught me how to do things by sharing their everyday work with me, instead of providing me with an ideal account of how free ART works in Uganda. Such explanations were also provided, of course, but took place in assessing pharmaceutical practices and explaining why protocols had to be implemented in the Ugandan context in a specific way. My informants expected me to learn how pharmaceutical supply chain management works, how research is done, and how to identify the difficulties in organizing access to ART in Uganda. Like Judith, I visited numerous organizations to ask questions like "when will the drugs arrive", or "where are the drugs." How many antiretrovirals were procured, who is supplying antiretrovirals, how many antiretrovirals are in the country, and more importantly how many antiretrovirals are needed? My questioning, of course, lacked the sense of urgency and, moreover, pharmacists had to do many more things. Teaching and learning is also about making jokes, knowing who and who not to blame and criticize in a particular situation, learning how to distinguish between facts and rumors—all which help you get by when effective solutions are neither obvious nor can be expected (see also Whyte 2008). Learning how things work also includes getting involved. In addition to my work at the pharmacy, where I learned to dispense drugs and write drug orders, I also worked as a consultant for the private sector and spent considerable time writing proposals and reports. In addition to the usual ethnographic interviews, I frequently conducted focus group discussions as they often appeared to be more accepted in the domain of global health research. During my field research I became acquainted with the scientific language of indicators spoken in this domain of expertise and acquired rudimentary knowledge in using statistical methods of analysis in global public health reasoning. I also participated in academic initiatives to improve pharmacy training at the universities in Kampala and Gulu. All of these practices were part of playing the global public health game in Uganda.

During my field research I regularly took lessons in *Luganda*. I mostly worked with professionals in academic and administrative settings of public health were conversations, reports, emails and so on are all in English. I was unfortunately hardly practicing *Luganda* during my research. Thus all interviews are quoted in English as most of my interviews and conversations were respectively conducted in English. Interviews with patients were, however, better conducted in one of the local languages, where friends and relatives of colleagues provided help in translating the conversations.

Figure 1: Geographical map of Uganda.
Perry-Castañeda Library Map Collection, Uganda Maps.
[http://www.lib.utexas.edu/maps/uganda.html].

All names of individuals are pseudonyms and, where possible, I also used pseudonyms for organizations and places. Moreover, I have fictionalized my ethnographic description by condensing interviews and interactions into single events and characters. Ethnographic descriptions are presented in the form of field notes, which are separated by asterisks.

In this study I will use a range of terms employed in Uganda. For instance, I will use the terms 'public sector' to capture all government agencies and hospitals. In contrast, the 'private sector' will refer to all kinds of nongovernmental and faith-based organizations. As I will show, in practice, the boundaries between these two realms are blurry, and these terms are, in fact, evoked to unknot the complex entanglements. Throughout this study, I will follow the UNAIDS terminology guidelines (UNAIDS 2011b). For instance, I will use 'HIV' for human immunodeficiency virus and avoid terms like 'HIV/AIDS' or 'AIDS infection.' HIV will be used to refer not only to the virus, but also in expressions like 'HIV treatment,' 'HIV counseling,' or 'HIV patients.' When necessary, I will use the colloquial expression 'drugs' or 'medicines' to be closer to the everyday conversations about antiretrovirals. The term 'antiretrovirals' will be used to refer to the commodities. When referring to antiretrovirals and medicines specifically as biomedical technologies, the term 'pharmaceuticals' will be used. The term 'HIV treatment' will be used to refer to all kinds of therapies for HIV. The therapy with antiretrovirals will be referred to here as 'antiretroviral therapy,' and I will mostly use the abbreviation 'ART.' Antiretroviral therapy usually consists of a triple combination of antiretrovirals and is usually called HAART for *Highly Active Antiretroviral Therapy* or cART for *combined Antiretroviral Therapy*. This form of therapy comprises *Nucleoside reverse transcriptase inhibitors* (NRTI) and *Non-Nucleoside reverse transcriptase inhibitors* (NNRTI) or a *Protease inhibitor* (PI). The abbreviation ART will be used in expressions such as 'ART program,' 'ART clinic,' and 'free ART.' In the discussion of specific regimens, I will more specifically refer to the combination of therapies according to the names of the active ingredients such as AZT/3TC/NVP, or I will use the trade name 'Combivir' and, respectively, 'Duovir -N' for a generic of

formulation. In Chapter 6, I will distinguish more carefully between these regimens and names in order to illustrate the infrastructural multiplicity in mass HIV treatment programs. The term 'mass HIV treatment programs' is neither part of the UNAIDS terminology guidelines nor to my knowledge used by actors. For this dissertation, I borrowed the term from Nguyen (2009) to capture the scale of this intervention in terms of people, finance, and geography.

Overview of the Chapters

The chapters in the dissertation are arranged as follows: the dissertation consists of three main parts. Part 1 continues with a discussion of my theoretical and methodological vantage point, describes the object of study in more detail, and reconstructs the supply of antiretrovirals as a field of inquiry. It captures pharmacists' definition of stock-outs, how they measure stock-outs, and how stock-outs matter in contemporary global health discourse. In addition, I attempt to make the methodological choices of the research objects and sites explicit, which are going to be taken up in the other parts.

Part 2 addresses the stock-out of antiretrovirals. Here, I attempt to conceptualize and theorize these stock-outs in regards to the production of normal life in the AIDS crisis. This part begins with a short historical description of the emergence of the 'science of ART' in Uganda and how it justified its claim to authority by articulating the moral, economic and political conditions for the scale-up of access to treatment as a scientific and moral progress. In this part, I also attempt to show how the supply of antiretrovirals enact HIV as a chronic illness under conditions of scarcity.

Part 3 discusses the stabilization of the supply of antiretrovirals and the institutional reforms in addressing the stock-out of antiretrovirals. Part 3 approaches the permanent reorganization of the AIDS crisis around the supply of antiretrovirals. It begins with the disappearance of the stock-outs and tries to recapitulate the processes in recalibrating the institutionalized mechanisms of crisis management in the AIDS epidemic in Uganda. I will here focus on the staging of a new project in stabilizing a scientific explanation for the

emergence of stock-outs and producing new credibility of science advice in the field of pharmacy. From the methodological vantage point introduced in Part 1, the plot in this dissertation tells the story of a permanent reorganization of the supply side and moreover of the permanent reorganization of the AIDS crisis as a development toward the quantification of the crisis. Presumably things get more accurate, more stable and acquire homogeneity to achieve a better quantification of needs. In Part 3 I attempt to show that institutional reforms to improve the quantification of needs is related to the need to further rationalization of scarcity in the global public health of mass HIV treatment.

Throughout the chapters, I describe how attempts to stabilize the supply of antiretrovirals and, more generally, improve the availability of pharmaceuticals, became intricately tied to producing more accurate and reliable data. Taking a cue from Thomas Kuhn's theory of scientific revolution, this gradual development of a scientific evidence base can be understood as work in "normal science" (Kuhn 1962). According to Kuhn, normal science follows a scientific paradigm change and elaborates the problems, which became thinkable through this shift (Kuhn 1962). In this case, the roll-out of ART constitutes a paradigm shift in global AIDS policy, which is followed by a number of normal scientific research to address inconsistencies and produce further scientific legitimation (see also Hardon and Dilger 2011). Interestingly, much work on HIV emphasizes the revolutionary dimensions in ART and often ignores how many global health activities and the search for more technical innovation belong to the normal scientific work Kuhn had in mind. A crucial site for studying these normal scientific activities will be discussed in regards to intervention that seek to improve pharmaceutical practices, which is intricately linked to the development of better analytical tools and instruments like indicators to measure these improvements. This normal science draws on the idea that implementation itself must become an object of evidence-based knowledge.

PART 1: THE PHARMACY OF ART

No supplies, no program.

—Basic Principle in Pharmaceutical Supply Management

1. The pharmacy of ART

Out-of-stock

Since mid-2009, antiretrovirals have been out of stock in various places in Uganda, putting the country almost on the brink of a treatment crisis. Between mid-2009 and early 2010, I regularly visited Judith Hoyelah, the senior dispenser of antiretrovirals at Mulago Hospital in Kampala, Uganda's National Referral Hospital, to ask how the supply of antiretrovirals worked. The pharmacy is located on the second floor of the "new Mulago" hospital complex. This new complex was built in the 1960s when Mulago Hospital and Makerere University were still a renowned health institution in East Africa. Judith's pharmacy was close to an office at the Child Health and Development Center at "old Mulago," which I was permitted to use for some time during my field research. From my office on "old Mulago," I walked over a small footbridge and entered the maternity ward on the 4th floor of "new Mulago." My friend Simon Mayanja ironically termed the maternity ward a place of "general happiness," where "common" Ugandan women, who cannot afford the costs of one of the private clinics in Kampala, deliver their children on the floors of an overcrowded labor ward. From this place, I walked down the stairs to the pharmacy unit located on the 2nd floor.

Here, the senior pharmacists at Mulago Hospital had been sending letters to the National Medical Stores (NMS) for months, complaining about the "constant non-delivery" of

medicines and reminding NMS that the intensive care unit at Mulago could not be run without narcotics or oxygen.[6]

At the same time, Judith was managing all of the antiretrovirals supplied by the NMS for at least five different clinics located on Mulago Hill, all of which were struggling with a stock-out of antiretrovirals, which had not been delivered for months. Access to antiretroviral therapy has been free of charge at Mulago Hospital, like at other government hospitals and NGOs elsewhere in Uganda, since life-saving antiretrovirals were rolled out in 2004. In a short period of time, large amounts of international aid and pharmaceuticals were flowing into the countries for the procurement of these expensive medicines. The supply of antiretrovirals had been always standing on a solid financial socket, while Judith's colleagues at the main pharmacy were constantly struggling with a shortage of essential medicines. But in contrast to the frequent portrayals of an abundance of resources for HIV, I often observed during my field research in 2009 and 2010, how pharmacists like Judith were also struggling with acute shortages of antiretrovirals.

Let me give you an introductory ethnographic example taken from my field notes in order to introduce into the object of the study and the problem, before I turn to my argument and the theoretical debates in which this argument is situated, and finally my proposal how the analyses of stock-outs might contribute to an understanding of contemporary global public health.

September 2009—Ordering antiretrovirals

Judith shows me how to order antiretrovirals. She gives me a blank drug order form to be submitted to the NMS, which is supposed to supply antiretroviral medicines and other essential medicines to all public hospitals in the country. In the back is the store for antiretrovirals, where I fetch the stock-cards with the actual consumption figures for each regimen for the last few months. Judith reads out the figures, which are scattered on various pieces of paper, and I compute the order for each regimen with a calculator: one row for

[6] Interview LM and fieldnotes; 8.1.2010; Kampala.

"stock-in-hand," another row for "consumption," and lastly, a row for "quantities received" where I enter "NIL" because the NMS has not delivered any medicines. I then calculate the actual order by first subtracting stock-in-hand and then adding two months' buffer-stock. This pharmacy has been crunching for various months and is completely exhausted. The order is large. For the fixed-dose combination AZT/3TC/NVP—the recommended standard first-line regimen for the so-called "least-developed world"—I multiply months by 60 because each "patient-month" is 60 pills. I multiply the consumption figures by 2 for two months' worth of supplies, add the current stock-level, and so on and so forth. For AZT/3TC/NVP, this yields an order of 739,987 pills, roughly 12,300 pill bottles. This is the two months' supply for about 6,000 patients on this regimen. Other pharmacists are waiting for deliveries, which all pass through Judith's main pharmacy. For instance, Clinic U is waiting for about 5,000 packs of AZT/3TC/NVP.

I am not used to these numbers and am constantly worried about punching an incorrect figure into the calculator. But some figures also sound strange to me, for instance, stock-in-hand and previously supplied quantities do not match. Judith says that the NMS has a computer system to rectify errors and compute the right quantities. Later, Judith tells me she will try to fax the order to NMS or even send a driver to deliver it to the NMS in Entebbe. After I complete the order for a range of antiretroviral regimens, I ask Judith if she believes that this order will be "appreciated by NMS." NMS has failed to deliver any antiretrovirals in the recent past, and the hospital has been out of stock since August 2009. Moreover, Judith tells me that she has been crunching on her buffer stock, the stock of antiretrovirals that every clinic is supposed to keep for emergencies. This order is urgent and Judith comments on the uncertainty about NMS that "they will, they have to." She laughs and says that she will go to Entebbe herself and beg David, the sales manager, to give her the medicines, which she has already done a couple of times before. "They know me," she says, adding, "but you never know, let us keep our fingers crossed. I will tell you when the drugs arrive."

* * * *

The antiretrovirals eventually arrived, though first in the wrong quantities and after a second emergency order, with another month's delay. Until the NMS trucks actually unloaded the boxes at the hospital's main store, no one had a clear picture of the situation and continued to borrow medicines from other sources. Antiretroviral medicines were urgent, but their availability was cloaked in uncertainty, since nobody knew when the medicines would arrive. The stock-out of antiretroviral medicines was not restricted to Judith's hospital. Between 2009 and 2010, pharmaceuticals were out of stock all over Uganda, and NMS, the central drug procurement agency, had rationed antiretroviral and other essential medicines. Respectively, like many other hospitals during this time, Judith had to ration the medicines at her hospital and borrow from other programs. If the medicines do not arrive, reports contain distorted (i.e., higher) consumption figures to offset the losses in future supplies. Or, reporting systems collapse because health professionals simply capitulate sending reports to order medicines. "No report, no medicines" is written in thick letters on all drug order forms, but, proper record-keeping practices are not a guarantee for regular supplies. In contrast, "no supplies, no program" reflects, as Judith and her colleague would reiterate, the basic logistic principle in pharmaceutical supply management.

It is impossible to understand the emergence of stock-outs without considering the complex arrangement of channels through which antiretrovirals, information, and capital circulate in the organization of free access to antiretroviral therapy. The moment Judith finishes her drug requisition forms, these numbers travel to the NMS in Entebbe, which is expected to supply antiretrovirals and procure antiretrovirals from the local manufacturer Quality Chemicals. At the same time, these numbers travel to the Ministry of Health in Kampala, which uses these figures to do the quantification of treatment necessary to plan the scaling-up of access to treatment in Uganda. From the Ministry of Health, these numbers are sent to international organizations like UNAIDS or WHO, which collate such numbers from all countries. Judith only manages the supply of antiretrovirals from NMS. She orders antiretrovirals for about five different ART clinics at Mulago Hospital; one of these ART clinics is Clinic U. In addition, Judith also ordered antiretrovirals from PEPFAR and sent drug requisition forms to *Mulago Mbarara Teaching Hospital's AIDS Program*,

called MJAP. MJAP is an umbrella NGO, which manages the supply of antiretrovirals for about ten clinics in Uganda, including the ART clinics of Mulago Hospital. MJAP, in turn, places an order at the not-for-profit supply organization *Medical Access Ltd.* in Kampala. And Medical Access buys these antiretrovirals on the global market with PEPFAR money that MJAP puts on its account. At Clinic U, the antiretrovirals were dispensed at different windows, patients received different dosages, and the antiretrovirals also had different names. "Yet," as patients frequently complained, "these drugs [were] treating the same condition." Patients remark how both the stock-outs and the complex infrastructural conditions pose crucial questions about the way HIV is brought into being as a specific condition.

The calculative practices used to manage the supply of antiretrovirals are complex and have been created by a vast number of projects. In this context, the stock-out of antiretrovirals more drastically demonstrates the fragility of the life-long commitment to therapy, which a biomedical definition of a normal life promises. When the stock-outs became more frequent, questions such as when will the ARVs arrive, who knows where the ARVs are, and "are the ARVs there," emerged as central matters of concern in Ugandan mass HIV treatment programs. These urgent questions could not be separated from the complex entanglements of infrastructural, logistic, and technical circuits through which antiretrovirals were supplied in the country. These stock-outs in Uganda were soon depicted as a crisis and chaos. These descriptions might not have been to the point, but they showed that despite of the massive roll-out of antiretrovirals HIV remains a long term crisis unlike other emergencies. As I will show in more detail below, stock-outs are not well captured as a complete breakdown of the institutional order. Stock-outs, I argue, give rise to improvisations by which actors' attempts to maintain a tentative order, like Judith's firm determination to beg and squeeze NMS for antiretrovirals during the rampant shortage of antiretrovirals. These improvisations at the same time provoke a desire to build more robust global health institutions and press for the further rationalization of therapy.

The empirical focus of this dissertation is the stock-out of antiretrovirals between 2009 and 2010. Stock-out is a logistical and technical expression for an interruption in the supply of antiretrovirals, which must be permanent and reliable for managing HIV as a chronic

illness. Antiretrovirals are not a cure, but they turn HIV from a deadly disease into a chronic illness. Patients are instructed to take these pills twice a day, everyday, to live a healthy and, moreover, a 'normal' life with HIV. Furthermore, this normal life presupposes that antiretrovirals are supplied in the right formulation, at the right time, and in the right quantities. That is, each patient receives a pill bottle of a particular regimen every month. As described above, this means 12,300 pill bottles for the standard first-line regimen of AZT/3TC/NVP for 6,000 patients. Judith also runs these calculations for other formulations and second-line regimens for another 5,000 patients, who must also wait for the supplies to arrive in order to receive their monthly dosage.

In addition, the supply of antiretrovirals is intended to steadily increase, and new patients are expected to be added to the treatment program in order to stop the AIDS epidemic and the humanitarian crisis it represents. In 2009, when the stock-out of antiretrovirals occurred, about 270,000 people had access to treatment in Uganda. However, more than 600,000 patients are estimated to be clinically eligible in Uganda, and about 1.2 million people have HIV in the country (MoH 2010a). Worldwide, the HIV prevalence is estimated to be 34 million people (UNAIDS 2011a). Ideally, the supply of antiretrovirals is intended to steadily increase, and new patients are expected to be added to the treatment program in order to stop the AIDS epidemic and the humanitarian crisis it represents. These numbers are not entirely accurate, but they give an idea of the life-long fiscal commitment created by the scale-up of access to antiretroviral therapy.

The stock-outs in Uganda between 2009 and 2010 also raised international concerns about a treatment crisis in Africa. Peter Mugyenyi, a prominent Ugandan HIV physician and researcher, warned in the journal *The Lancet*, that the stock-outs would be an indicator for the "flatlining" of donor aid, which he regarded as a "recipe for chaos" (Mugyenyi 2009). According to public health experts, like Mugyenyi, the stock-outs of antiretrovirals could foster irrational uses of antiretrovirals and consequently lead to drug resistances. In fact, public health experts from the beginning have feared an "antiretroviral anarchy" in the distribution of antiretrovirals in 'Africa,' as all kinds of infrastructures were regarded to be missing to control patients' proper adherence to treatment (Harries, et al. 2001). The stock-outs in Uganda also came to be depicted as the "front lines" where the "AIDS war

[was] falling apart," as a series in the *New York Times* provocatively reported.[7] The author of these articles even quoted Eric Goosby, the then new Global AIDS Coordinator of the Obama administration, who stated, after he had toured Uganda during the stock-out of antiretrovirals: "I'm worried we'll be in a *Kampala situation* in other countries soon."[8] It is not immediately clear what he meant by the "Kampala situation" nor what he believed was so shocking about this situation and what kind of crisis he might have seen coming up: whether he was referring to the stock-outs as life-threatening emergency, the specter of large-scale drug resistances, or the shortcomings of international aid in building sustainable HIV treatment programs in a country that was once at the forefront of HIV prevention and treatment in Africa.

Uganda had successfully applied for several Global Fund grants worth half a billion U.S. dollars, but, after funding was misappropriated in the Program Management Unit of the Ministry of Health in 2005, the Global Fund immediately suspended all disbursements. The stock-outs of antiretrovirals in 2009 and 2010 are to some extent, the result of this corruption scandal and the gap left by the suspension. Indeed, the availability of antiretrovirals gained more stability after the Global Fund restarted the disbursement of funding five years later, in 2010. It is necessary to include some information on the Global Fund scandal, which will be provided here by way of news articles and existing public reports. I want to emphasize, however, that this corruption scandal took place four years before I started my fieldwork in 2009. During my field research, I was largely interviewing and working with people who were busy working against the unexpected shortage of funding, which was the result of this and other corruption scandals in the country. It is not the major aim of this study to explore corruption; nonetheless, my analysis suggests that corruption does not sufficiently explain the occurrence of stock-outs. One learns more about the public in the 'public sector' of health by following its responses to these scandals. Following practices in the supply of antiretrovirals shows that pharmacists had to deal with many other problems, too, which are inherent to the supply of antiretrovirals that 'targets' a

[7] "At front lines; AIDS war is falling apart"; *New York Times*; 9.5.2010.

[8] "At front lines; AIDS war is falling apart"; *New York Times*; 9.5.2010, my emphasis.

large number of patients in a country like Uganda by a nexus of global health projects. These practices show that these problems are distinct to the fabrication of 'Africa' as an object of development aid and myriads of public health experiments. Moreover, I want to show in this dissertation that these practices in the supply of antiretrovirals make actors constantly reorganize the AIDS crisis to balance the gross discrepancies between the moral expectations and the institutional realities of mass HIV treatment.

Corruption, though central to the stock-outs described here, does not exhaustively explain their emergence. Perhaps, then, stock-outs can be explained by the 'politics' or the 'government,' which in African countries notoriously 'lacks will'? One might intuitively understand what is meant by 'politics' and 'government' in everyday explanations of many social problems in African countries: the kind of politics where one 'old man' rules the party, the parliament, and the state; who is 'supported' by a cynical aid industry, and is the reason why aid for AIDS cannot work in Africa.[9]

In this dissertation, however, I want to argue that the notion of government should not be limited to contemporary notions of politics international relations. Politics should be considered in its greater context of social theoretical developments put forth by Max Weber and Michel Foucault to develop a notion of pharmaceutical politics in the government of populations. Drawing on these writers' concern with calculative rationalities in the formation of modern government, I attempt to methodologically and conceptually reconstruct 'government' to designate a set of practices in ruling people and pharmaceuticals in mass HIV treatment into a field of inquiry. These calculative practices and the specific rationalities they refer to began to proliferate at the same time that humanitarian ideas, biomedical technologies, and distribution models for scaling-up access to treatment were being provisionally trialed in countries of the so-called global South. Stock-outs are, in this regard, a test of the translation of these calculative rationalities into a functioning global health architecture, for which mass HIV treatment programs in Uganda are laboratories of sorts (Tilley 2011, see also Petryna 2009). The assumption in global

[9] For a critical discussion of the variety of representations and controversies on aid for AIDS in Africa, see (Richey and Ponte 2011).

public health being tested is whether ART works in Uganda; this test is moreover distinctive for the use of antiretrovirals as a technology of government, which I term here 'pharmaceutical government', and its capability to carry the biomedical and humanitarian burden expected of it.

Thus, one of the challenges in this dissertation will be to more carefully trace actors' attempts to put scientific expertise into practice in the context of a pharmaceutical politics that is emerging in the problematization of antiretrovirals in discourses on development aid, global health, and Africa, which used to be independent from each other (see also Biehl 2006; Hayden 2007; Richey and Ponte 2011). This, in turn, requires attention to the technical register used by the actors to explain stock-outs and the supply of antiretrovirals with logistics, maps, indicators, figures, and statistical methods of analysis, through which patients, pharmaceuticals, and the huge amounts of donor aid are made calculable, and, moreover, accountable in global health. Not all of these technical details are suitable for ethnographic description, but in this study they are necessary to address my informants' major concerns about the quite tangible insecurities in mass HIV treatment and the future of ART.

Projects, scarcity, and therapeutic domination

The theoretical question, which this dissertation addresses, resonates with the way stock-outs in Uganda were depicted as an indicator for a global treatment crisis. Antiretrovirals were 'rolled-out' in 2004 in Uganda. Since then, access to ART is free of charge and patient numbers have been steadily increasing. Protagonists of global health such as Paul Farmer depict the idea of global health as international aid provided by a "wealthy world taking action on a previously unimaginable financial scale" to "improve the lives of the world's poorest" (Farmer, et al. 2007). But the majority of commentators such as Laurie Garrett have increasingly taken a critical or, at least, cautious stance on these well-meaning humanitarian claims to save lives, which undergird the massive influx of donor aid money (Garrett 2007). This disease-specific structure of global public health is, according to various commentators, undermining the "public sector," as public health experts term the

existing structures for the provision of comprehensive health care services by national governments (e.g., Janes and Corbett 2009; Pfeiffer 2013). These experts in claiming a right to health and survival are crucial actors in understanding who takes decision about the value and nonvalue of life and diseases.

Let me capture this problem by presenting another ethnographic example from my field notes, which attempts to give a provisional account of the problem-space in which stock-outs are situated. The previous ethnographic example depicted the materiality of stock-outs in the form of paperwork, infrastructure, and calculative practices in organizing access to treatment. The following notes want to give an illustration of some of the organizational forms and techniques deployed in global public health, namely workshops, pharmaceutical supply chain management, and projects, in which the stock-out of antiretrovirals is situated.

August 2009—Phasing out

I am attending the training workshop on "ARV supply chain management" in order to get a rudimentary, first-hand idea of the logistics in the supply of antiretrovirals.[10] At the end of this workshop, I will receive a certificate for my successful participation. The participants are all pharmacists and pharmacy technicians. During the workshop, pharmacists give a number of presentations on the improvement of pharmaceutical supply chain management. They present examples from various organizations like *The AIDS Support Organization* to show how these organizations solved their problems in the management of antiretrovirals. Brian, the country coordinator of *Clinton Foundation's Access Initiative* (CHAI), is one of the trainers. The facilitators introduce Brian as a "very busy" person to us. Brian is quite young compared to his U.S. colleagues of similar rank in Uganda and has a degree in economics from one of the more prestigious universities in the United States. He seems to be an unpretentious but focused character. His difficult task during this workshop is to explain why his organization will 'phase out' its donations of pediatric antiretrovirals and expensive second-line regimens and leave a gap of $2.5 million. Compared to the standard therapy for adults, pediatric formulations and second-line

[10] Training Workshop "ARV Supply Chain Management;" 27./28.8.2009; Masaka.

regimens are still expensive. In order to steer the competition among pharmaceutical producers, UNITAID injected large amounts of money into the market.[11] UNITAID had contracted CHAI to procure cheap pediatric ARVs to lower the prices and supply these medicines as donation for a period of two years. After this period, according to the contractual agreement with UNITAID, CHAI will turn to the next global health challenge; in this case, it is anti-Malarial medicines. Because of the gap left by CHAI, Brian tells participants how to recalculate their budgets for antiretrovirals. In fact, he has already done this for us and provides a number of examples for how to make some financial savings, altogether up to 20 percent, which could accommodate the phasing out of pediatric antiretroviral donations. For instance, programs are advised to switch children from syrups to pills or to switch patients to other regimens supplied and funded by the 'public sector.'

* * * *

As a result, treatment providers have to adjust targets and reorganize the supply of antiretrovirals. At this workshop I first realized that ART programs were not only scaling-up access to treatment, but were also struggling with a shortage of antiretrovirals and a shortfall of financial resources. Before CHAI, another organization called DELIVER had phased-out and ended its support to the Ministry of Health. The participants talked about the rumors of JCRC's difficulties to renew its contract with USAID and that other projects were soon to phase out, too. Brian told me after the workshop, in order to understand the complicated provision of ART in this country, I should make myself a picture of the complexity of supply channels—which I did by mapping the supply side of antiretrovirals (see Chapter 3).

The AIDS epidemic has been pivotal for the growth of a quite dynamic and complex "private sector"—as it is commonly framed in Uganda—in opposition to an underfunded and broken

[11] In general, funding volumes are described as being large in global health. Yet, as I will describe in more detail below, these amounts like the funding gap of $1.2 million are relative. They are relatively high in regards to the national budget for ARVs, which stood at $8.9 million (FY 2009-10); however, $1.2 million is ridiculously small in comparison to any other global transactions.

"public sector." Brian, working for CHAI, and the workshop, organized by one of the largest pharmaceutical suppliers for antiretrovirals in the country, give an idea of the development framework of global public health. The huge amount of funding channeled through the numerous organizations in global health (e.g., CHAI) are usually limited to a specific time period, after which they phase out and hand their projects over to the government. The government, in turn, is hardly able to sustain public health systems as it is.

Susan Reynolds Whyte and others suggest the term "projectification" to capture how free access to treatment is provided through a complex network of projects instituting distinct forms of providing care, doing research projects, and creating forms of belonging to an NGO project (Whyte, et al. 2013). Workshops will frequently return as a stage for global health, where a range of practices and the dissemination of information and the articulation of problems can be observed. Projectification in global health is manifest in numerous workshops and the dissemination of an overwhelming amount of teaching materials and power-point presentations. In addition, projects increasingly embark on new models like "support supervision," "mentoring," "on the-job-training," or "training of trainers," to go beyond workshops as they have become somewhat inflationary (see also Chapter 10).

Ugandan heath professionals, administrators, and researchers are increasingly busy with "workshopping." As one Ugandan writer commented: "As far as anyone can tell, Uganda has been workshopping non-stop since 1986. Workshops will be one of those things to remember of the Museveni era."[12] This remark vividly depicts that 'Uganda,' and for the sake of argument, 'Africa,' as much as it is a territorially and culturally defined entity, is also subject to deterritoralizing tendencies brought about by the proliferation of global forms like workshops and projects, which are reterritorialized in new techno-scientific arrangements (Cooper 2005: 92). The projectification of therapy is certainly not limited to HIV care and treatment but is characteristic for the larger field of development aid. After the introduction of the so-called structural adjustment programs, the performance of key functions of the state have been increasingly distributed to NGOs and other non-state

[12] Bernard Tabaire: "To actually fix potholes, first take up a job at a daily paper"; *Daily Monitor*; 8.5.2010.

actors.[13] According to Rottenburg, phenomena like the projectification or NGOization reflect the novel figurations of science, politics, and markets expressed in social experiments like mass HIV treatment in postcolonial Africa (Rottenburg 2009a, b). In the case of humanitarian interventions like the rollout of ART, it is the "unprecedented scale and urgency of the AIDS pandemic, the attempted response, and the non-availability of well-tried solutions; one can only start with what is available and try to proceed in such a way that project implementation becomes a form of experimental variable testing" (Rottenburg 2009b: 425). These large-scale experiments are increasingly carried out by NGOs, private companies, and public-private partnerships and perform key functions of the sovereign state, raising important questions about the type of sovereignty and domination exercised by NGOs.

Projects come and go in Uganda. Each phasing out requires treatment providers to adjust the provisioning of ART or 'hand over' patients to the Ugandan government who these projects have left behind. The phasing out makes visible how projects perform key functions of the sovereign state in providing life-saving antiretrovirals. Didier Fassin describes this as "nongovernmental government" (Fassin 2007). Mariella Pandolfi describes the exercise of power by this form of nongovernmental government as "mobile sovereignty" (Pandolfi 2002: 33) to capture the hit-and-run approach of humanitarian relief—saving lives moment by moment, rushing from one place to the next. However, the notion of mobile sovereignty ignores the question how sovereignty is not only deterritorialized, but also reterritorialized, when nongovernmental government becomes

[13] The body of scholarly work on this topic is broad. James Ferguson has prominently introduced a governmentality approach to study development and the experimentation with modernization theory in Africa (Ferguson 1990). Further, development sociology has been studying the interfaces between development cooperation and social change (e.g., Bierschenk, et al. 1991; e.g., Bierschenk and Elwert 1993). Authors like Richard Rottenburg, David Mosse, and Timothy Mitchell have been following approaches in *Science and Technology Studies* (STS) and *Actor-Network-Theory* (ANT) to inquire into the production of the expert knowledge in this domain (Mitchell 2002; Mosse 2005; Rottenburg 2009a). In the domain of healthcare, one of the most frequently cited work seems to be Meredeth Turshen's study on the deterioration of health situations in various African countries as a result of structural adjustment programs (Turshen 1999). In contrast to the earlier work on development politics, social research on AIDS has furthermore discussed the way structural adjustment programs did not only exacerbate the AIDS epidemic but also created novel forms of projectified orders (e.g. Pfeiffer and Chapman 2010; Dilger 2012; Whyte, et al. 2013).

the routine, or the state in reverse direction is supposed take back some of the functions performed by NGOs after nongovernmental relief apparatus travels to the next emergency.

Workshops such as the "ARV supply chain management training", where internationals like Brian present challenges and suggest solutions, are emblematic of the pervasive presence of and the dependence on NGOs and donor-funded projects in the provision of care and treatment. In Uganda, NGOs emerged with the accession of the present government after fifteen years of war came to an end in 1986. Early on, ideas of accountability were associated with NGO-projects rather than with the national government. As Susan Dicklich notes, after many years of war and the subsequent introduction of neoliberal reforms in Uganda, NGOs were considered to produce greater accountability by fostering public participation and empowerment (Dicklich 1998). Since these early observations, the number of projects and the variety of techniques of accountability and participation, which often materialize in workshops, have been sharply increasing. This increase has been noted with unease. As anthropologists like Johanna Crane point out, 'African' researchers, particularly Ugandan HIV researchers, though being in great demand, hardly stand on equal ground in academic research (e.g., Crane 2010). For Ann Kelly and Wenzel Geissler, these forms of structural inequalities are paradoxically the source of the growth of transnational medical research and health care programs in African countries (Kelly and Geissler 2011: 3ff). This puts anthropological research in an awkward position as this form of involvement in global health research and health care draws substantially on critical medical anthropologists' interventions to "render bare the realities of health disparities and human suffering" (Pfeiffer and Nichter 2008: 410; see also Janes and Corbett 2009). Critical scholars in the field of medical anthropology are dragged back and forth between the new possibilities in global health, which have been emerging through the huge amounts of donor money and the global attention on the one hand, and a critical perspective on what James Pfeiffer and Mark Nichter see as a "growing anarchy on the ground in global health efforts" on the other (Pfeiffer and Nichter 2008: 411).

Weber's political sociology provides a useful entry point to revisit questions about domination in nongovernmental government in global health and clarify the practical and political relevancy of the biopolitical imprint in critical social research. Weber distinguishes

between three ideal typical forms of domination: traditional, charismatic, and legal-rational domination (Weber 1978). Each form describes different mechanisms through which conduct is empirically established. According to sociologist Laurence McFalls, the kind of domination exercised in humanitarian interventions would have escaped Weber's typology (McFalls 2010). Thus, he suggests a fourth type of domination, therapeutic domination, in which sovereignty is exercised by an amalgam of internationals, administrators, technical experts, and medical personnel, like Brian in the above- mentioned workshop, who make life and death decisions in crises and emergency zones. Therapeutic domination replicates a "doctor-patient relationship of command, [where] the ruler claims obedience by virtue of the application of a scientifically valid, impersonal procedure—a treatment protocol—in the extraordinary context of crisis" (McFalls 2010: 322). This type of domination combines the "unnamed impersonal" of legal-rational domination with the extraordinary mode of legitimation in charismatic domination (ibid.). In this respect, therapeutic domination legitimates life-saving interventions by appealing to the extraordinary character of the emergency and, at the same, to instrumental rationality, expressed in counting the lives that are saved. Yet, in contrast to the other forms of domination, therapeutic domination does not appeal to substantive goals beyond a purely biomedical and scientific value of life. McFalls also points out that therapeutic domination does not only save lives but also attends to the violence that interventions themselves produce. For this, he suggests the term "iatrogenic violence" (McFalls 2010: 318). Iatrogenic violence captures the consequences of therapeutic domination, for which nobody is ultimately accountable or responsible. Iatrogenic violence is, according to McFalls, a structural property of the biopolitical paradigm, in which, following Agamben's work, the state of exception has become the rule (McFalls 2010: 326).

Agamben's provocative hypothesis is that modern biopolitics is predicated upon a politics of exception, which systematically produces "bare lives" (Agamben 1998). As Brian admitted, the "end of UNITAID donation is not timely, as ARV budgets are already being squeezed by global funding trends."[14] CHAI was not the only organization about to phase

[14] Training Workshop "ARV Supply Chain Management"; 27./28. August 2009; Masaka.

out. Humanitarian global health seems to confirm this politics of exception, when nongovernmental organizations decide over life and death, leave a funding gap after phasing out, assuming that the Ugandan government or any other organization would step in to take over the business of saving lives.

This form of critical analysis of therapeutic domination, influenced by Agamben's elaborations of the biopolitical paradigm of the contemporary has been frequently met with great skepticism, and it is not necessary to repeat this. Instead, the remarkable response that Agamben's hypothesis of contemporary biopolitics has attracted demands to engage more explicitly the varied uses of biopolitics as an analytical concept. Foucault's notion of biopolitics has, indeed, been a rich source of inspiration for inquiring into the epistemologies and politics in the globalization of biomedicine. Geissler, Rottenburg, and Zenker suggest, however, that there is a "risk of Foucault's open (sometimes contradictory) invitations to profound social inquiry to be eroded to simple narratives about the relations between medicine and governance, according to which biomedical knowledge practices are key tools in modern biopolitical regimes of power" (Geissler, et al. 2012: 12). In other words, too often it is only a few propositions in Foucault's work, which are used to illuminate specific empirical observations. Each empirical observation endorses a particular interpretation of a Foucaultian notion of biopolitics as disciplinary regimes of government, which in turn has been frequently criticized. As Nancy Fraser summarizes this scholarly critique of a Foucaultian analytics, new regimes of global governance escape the prevailing analysis as a disciplinary regime of power, because they are more "multi-layered as opposed to nationally bounded, dispersed and marketized as opposed to socially concentrated, increasingly repressive as opposed to self-regulating" (Fraser 2003: 166). With such configurations of government in mind it might be "tempting to conclude that the disciplinary society is simply dépassé. One might even be tempted to declare, following Jean Baudrillard, that we should all 'oublier Foucault'" (Fraser 2003: 166).

Yet, this conclusion miss the question how legitimate domination is configured and moreover how legitimacy itself is produced in these new modes of global governance, which, both, Weber and Foucault were not tired to put forth. That is, how is the shift in government reconfiguring the mechanisms and procedures to produce legitimacy? What is

the object of this government? How is the conduct of rules created? And finally to which specific political rationality are forms of government of populations referring to?

The strengths in anthropological work may indeed not lie in a genealogical reconstruction of Foucault's work, which would precisely pay attention to the multiple fissures and continuous developments of an analytics of government. Yet these analytics emerge at the intersections of social theoretical discussions put forth by various writers, which might turn out as fruitful sites for probing into analytical and the methodological value of concepts like biopolitics or governmentality.[15] In fact, Agamben's own analysis —whether one likes his conclusion or not— is, in this respect, a quite impressive bricolage of Carl Schmitt's, Walter Benjamin's, and Hannah Arendt's work to provide an account of the biopolitical paradigm of the contemporary (Agamben 1998). Similarly, McFall's recourse to a Weberian *Herrschaftssoziologie* is enormously inspiring for current theoretical debates on biopolitics because it pays attention to the theoretical debates on the shifts in sovereignty to recapture the political implications of contemporary humanitarian interventions (McFalls 2010). Following this example, my discussion of pharmaceutical government in Chapters 6 and 7 juxtaposes a Weberian political sociology (Weber 1978) and Foucault's lectures on biopolitics and governmentality (Weber 1978; Foucault 2007; 2008) in order to address the question of sovereign power in novel forms of pharmaceutical government. The few explicit and implicit intersections between a Weberian social theory of modern rationality and Foucault's analysis of governmentality understood as governmental reason may not justify a full-blown comparison. Nonetheless, as Colin Gordon suggests, there is a chance that "something can be learned" in asking how one might compare Weber's

[15] STS-scholar and anthropologist Kaushik Sunder Rajan develops his notion of "biocapital" by tracing Foucault's notion of biopolitics to capital in Karl Marx's work (Rajan 2006: 14; see also Aradau and Blanke 2010). In my understanding, Rajan rightly emphasizes that Foucault's development of analytic concepts never forgets to elaborate on the methodological approach (Rajan 2006: 18; see also Collier 2011), which Foucault describes as nominalism(Foucault 2008: 16; see also Lemke 2007b: 47). Instead of understanding the state as an idea, Foucault's nominalism asks, how, through a set of practices, the state or a disease as a reality comes into being. Annemarie Mol's praxiographic analysis of how diseases are done, which I take as a point of departure for my own analysis, is methodologically not too far away from Foucault's nominalism (Mol 2002).

sociology with Foucault's notion of biopolitics and governmentality (Gordon 1987: 296).[16] In the case of this study on mass HIV treatment, I expect to discern the way in which pharmaceutical government is shaped by discussing the calculative practices in organizing free access to treatment.

[16] My discussion of Weber and Foucault draws on works like Colin Gordon's analysis (Gordon 1987; 1991). Thomas Lemke also draws on Max Weber's political sociology to situate Foucault's concept of neoliberal governmentality (Lemke 2007a).

3. The tools, the methods, and the field

Evidence, indicators, and the field of global public health

This chapter presents the research methods and the 'field' in my field research. I use the term 'supply side of antiretrovirals' to reconstruct my field as an organizational field. The discussion will take the form of a methodological reflection of two major 'observations' and how these observations were made. First, antiretrovirals were supplied and provided by a number of organizations, which were entangled in complex ways and made the supply side appear fragmented. None of the organizations in the field knew how many patients were receiving antiretrovirals in the country, nor could they exactly determine the gap between the supplies and the demand of antiretrovirals. Stock-outs are in principle independent of the fragmentations in the supply side of ART. But both problems are in their own ways reflections of the incomplete institutional framework of mass HIV treatment programs, which can enforce each other. Secondly, the actors in the field were mostly pharmacists and public health experts. They preferred evidence produced through randomized clinical trials and regarded statistical methods of analysis as the only solid and objective grounds for advancing solutions.

For the actors in my field, the supply side of antiretrovirals was a laboratory in which the production of evidence could not be separated from the attempt to create "order from disorder" as Bruno Latour and Steve Woolgar argued in their analysis of science in the laboratory (Latour and Woolgar 1986: 235). The historian of science Hans Jörg Rheinberger suggests that this experimentation with things should be understood as the production of "epistemic things", which depend on the assemblage of a range technological and social conditions, which make up a laboratory (Rheinberger 1992). This laboratory of pharmaceutical research in global health in Uganda is not a chemistry laboratory of pharmaceutical company, where molecules are developed to medicine to enter the global pharmaceutical market. Chapter 10 will describe how this pharmaceutical research on global health creates a real-life laboratory comprising hospitals, medical personnel, and patients, which Hellen Tilley in her study of the construction of 'Africa' through postcolonial science aptly terms a "living laboratory" (Tilley 2011). In this experiment the

living laboratory creates order out of the fragmented and complex entanglements in the supply side of pharmaceuticals in the country.

In this chapter I will foreground my analysis of the production of order out of disorder in a methodological reflection of the role ethnographic field research plays in the supply side of antiretrovirals as the 'laboratory' of pharmacy. In the research tradition of ethnography, the description of research methodologies seems to be often confined to the enumeration of interviews and focus group discussions or to detailed accounts of the geographical and socio-cultural properties of the field. In contrast, the discussion of my own methodology wants to situate this research tradition in the proliferation of quantitative research methods, which ties into a more general trend toward evidence-based medicines in global public health. I think this step is crucial in order to probe into the limits and possibilities of anthropological research, which ventures into fields of scientific knowledge production. In particular, after the so-called "postmodern turn," ethnographic research must find ways to incorporate "situatedness, variations, differences of all kinds, and positionality/relationality" into its methods and take seriously all of their "complexities, multiplicities, instabilities, and contradictions" without, as Adele Clarke suggests, losing an analytic grip on empirical observations (Clarke 2005: xxviii). There may be no blueprint on how to achieve this other than taking up suggestions from different approaches like laboratory studies, organizational studies, or situational analysis, which have addressed these problems explicitly (Latour and Woolgar 1986; Clarke 2005; Czarniawska 2008).

For the field of organizational studies, participant observation as an ethnographic method became in studying organizations became important through Karl Weick's demand to shift the attention from organizational forms to practices of organizing, as Barbara Czarniawska points out (Czarniawska 2008). In this domain, participant observation meant to study "what people do when they act collectively in order to achieve something" and thereby constitute an organizational field or a network of organizations (Czarniawska 2008: 5). Usually participation and being part of the collective practice is not trivial, as one enters the field as an outsider. By contrast, the field in my field research—organizing the supply side of antiretrovirals—was rich in projects and organizations, which in principle offered plenty entry points. It is rather the complexity of the projects and organizations in this

'organizational field,' which constitutes the challenge for participant observation and also for the field itself.

Organizational fields like international health or global health are predominantly working with numbers and evidence produced through quantitative research methods. My aim in discussing the different methodological and analytical perspectives in the field of global health is not to denounce prevailing notions of evidence based medicine. Rather, in everyday scientific practice, the distinction between quantitative and qualitative research methods or the belonging to a particular discipline is surprisingly of secondary importance in discussing concrete problems. My discussion of methodological and epistemological differences between ethnographic research on the one hand and the field quantitative and qualitative research in the pharmacy of ART on the other, draws on John Dewey's pragmatist philosophy (Dewey 1929). The way I understand Dewey's pragmatism is to reject a rigid emphasis of disciplinary difference. Instead a pragmatist position emphasizes that scientific practices are foremost ordinary practices of knowing *things* and moreover are mediated as material relations. Knowing things revolves around practical matters of concern, for which defining a tangible object of concern is a precondition for establishing control over practical securities. Understanding data and evidence as things, which unfold as material relations, is broad enough to capture disciplinary differences between anthropology and biomedicine in the production of scientific evidence.

I find Dewey's work helpful because it expresses optimism about the power of methods, irrespective of the various methodological differences in scientific disciplines (see also Rabinow 1996). He posits his pragmatist philosophy against traditional epistemology, which neglects experimental knowledge production. Whereas science is biased towards immaterial thought, immutable truth, and absolute certainty, a pragmatist position emphasizes that human beings, in striving for certainty, ultimately seek security (Dewey 1929: 41). Dewey uses the distinction between security and certainty to invert the superiority of thought against action. A pragmatist perspective

> "involves the conviction that security attained by active control is to be more prized than certainty in theory. [...] The aim and end is the securer, freer and more widely

shared embodiment of values in experience by means of that active control of objects which knowledge alone makes possible" (Dewey 1929: 38).

This notion of experimenting with things is not limited to science. Dewey owes this optimism to very structure of everyday experience, where lived insecurity leads actors to try out ways of producing greater security, without necessarily presuming in advance which technical means lead to the desired end (see also Whyte 1997).[17] Dewey reasoning expresses a reservation of the twentieths century intellectualist science of this time, which also Weber expressed in his understanding of rationalization as a sociological problem of modernity (see Chapter 6 and 7). Like Weber, Dewey counters the intellectualist understanding of science by emphasizing that empirical knowledge and any form of inquiry "always start from things of the environment experienced in our everyday life, with *things* we see, handle, use, enjoy, and suffer from. [...] They are the materials of problems not of solutions. They are to be known, rather than objects of knowledge" (Dewey 1929: 83; my emphasis; see also Jackson 1996).

Dewey's notion of the search for security, which also other authors understood as a form of elementary practical certainty in everyday life (Jackson 1996; Jenkins, et al. 2005), differs from contemporary ways of producing knowledge in global health, where technologies like indicators are used to measure and monitor any aspect of collective life in the production of order. The technical and statistical developments in the field of indicators have made it possible to measure and assess increasingly complex and dispersed phenomena seemingly quickly and objectively. Indicators have become key elements in governing global networks of regulation and circulation (Merry 2010). According to Andrew Lakoff the protection of these vital systems through technologies like indicators is distinctive for a politics of security in health, which "does not develop knowledge about an enemy or about regularly occurring events, but rather uses techniques of imaginative enactment to generate

[17] Susan Whyte's work *Questioning Misfortune* is an exploration of Dewey's pragmatism for an anthropological study of "the pragmatics of uncertainty" in Eastern Uganda (Whyte 1997; see also Jackson 1996).

knowledge about system vulnerabilities" (Lakoff 2008: 36). The production of "sound facts" by measuring for instance early-warning indicators has become a field of scientific expertise regarded to be necessary to anticipate and be prepared for the emergence of catastrophes or breakdown in "vital systems" (Lakoff 2008).

Measuring the stock-out of antiretrovirals to control system vulnerabilities and "assure the continuous functioning of critical systems in the event of emergency" (Lakoff 2008: 37), shares with Dewey a rejection of a theoretical and absolute notion of certainty in predicting or preventing events like the stock-out of antiretrovirals. On the other hand the deployment of technologies like indicators in a politics of security with its controversial and far-ranging implications in organizing collective life, differ significantly from the practical certainties and the emancipatory notion of a 'securer' world, which Dewey had in mind in linking security with a "freer and more widely shared embodiment of values in experience" (Dewey 1929: 38). Whose practical certainty is at stake in measuring risks and threats by indicators? Who is warned of a stock-out of antiretrovirals and its threat for health?

Against the background of such questions, Dewey's optimism in the power of methods provides an interesting entry point for grounding a critical assessment of claims to scientific objectivity in the realm of biomedicine (Kleinman 1995; Wendland 2010). This critique engages the empirical reality of things by asking how they are produced and constituted as objects of experience. Quite practically, in the domain of global health, this requires that anthropologists should, like their colleagues, "grapple with IMF conditionalities, negotiations around wage bill ceilings, Medium Term Expenditure Frameworks, and NGO codes of conduct, which indicate[s] sites and points of struggle, engagement, and resistance," as Pfeiffer and Chapman write (Pfeiffer and Chapman 2010: 159).

What kinds of things are to be seen, handled and to be known in the production of practical certainty in measuring indicators? In principle all kinds of materials, which are usually exchanged during field research. After workshops, the presenters would share their powerpoint-presentation. In interviews I would sit with informants around a table in an office or on station. We would introduce ourselves and exchange business cards if available. Then questions would be asked and the conversation starts. At some point we would put

our 'material' on the table, showing each other what we were talking about. Lists, excel-tables, draft reports, or maps, anything, which contains information to keep the conversation going. Talking more than an hour about technical problems without the help of any material is not trivial. Furthermore after conversation I and my interlocutors often asked each other, if the material could be shared as a soft copy or hard copy, which had been discussed during the conversation. The ethnographic material, which I present here, has been gathered in this way.

Gathering 'raw data,' on HIV treatment in Uganda—quantitative data and moreover scientific evidence—was more difficult in Uganda (see also Meinert, et. al 2009). But even in this case, access to raw data, which is the basis for generating evidence, is better understood as a material relation in which epistemic things are produced by exchanging, sharing, and appropriating the above mentioned kind of material, tools, and information, through existing social connections are tightened and new ones are made.

My own experiences with quantitative data on the scale-up of access to treatment in Uganda have been quite varied. Before 2010 nobody could tell exactly how many patients had access to antiretroviral therapy or verify the rate of the scaling-up of access to treatment. Treatment numbers were scattered throughout the complex network of organizations that supply and provide free access to antiretroviral therapy in Uganda. The lack of accurate information and evidence in the field of mass HIV treatment in Uganda are not only obstacles for research and politics in global health, but they also significantly influence anthropological research on antiretroviral therapy. The lack of information leaves a range of puzzling questions about the complex entanglements of the supply channels through which antiretrovirals flow into the country. The variety of sources for the supply of antiretrovirals corresponds to a diversity of ART programs. It was an institutional puzzle and there was no other way to solve it, than visiting each treatment provider in the country and asking for these figures individually.

The provision of care and treatment known as 'the rules of ART,' varies from one treatment center to the next, creating a fragmented landscape (Whyte, et al. 2013: 145; see also Chapter 7). Some facilities can run extensive laboratory tests, are relatively well-

stocked with pharmaceuticals, and have the most recent computer systems to register patients and manage the logistics. In contrast, public hospitals in rural Uganda, for example, may have to send patients all the way to the next regional hospital for blood results. Clinics are understaffed or pharmaceuticals are constantly short in supply, which leads to the rationing of pharmaceuticals. In extreme cases, some facilities scale up access to treatment, that is, put more patients on ART, while other facilities experience severe shortages of medicines and have to ration medicines. But which treatment providers have supplies and which treatment providers would send their patients away without antiretrovirals was difficult to know.

To resolve this puzzle, my field research tried to "take stock" of antiretrovirals, like pharmacists' practices of controlling the stock by counting pills, and track pharmaceuticals as a way of inquiring into the mechanisms through which medicines are made available. This was inspired by pharmacists' routines of taking stock of medicines in their stores. By approaching my research in this manner, I tried to extend the idea of studying the "social life of pharmaceuticals," a concept introduced by Sjaak van der Geest, Susan Whyte, and Anita Hardon in the anthropology of pharmaceuticals, which considers the production, distribution, and consumption as biographical "life stages" of pharmaceuticals (Geest, et al. 1996a). These life stages are increasingly subject to technologies, statistical methods of analysis, and models in pharmaceutical supply chain management, which attempt to track and control the "life course" of these pharmaceuticals more accurately. Anthropological research needs to consider this, too. In particular, pharmacy, which is also a health profession, is increasingly occupied with counting pills, checking the stock records, and using statistical instruments for an exact calculation of the relationship between supply and demand in order to optimize the logistics of medicines and hence improve the availability of these medicines.

My first meeting with Joy Kabayaga in 2009, who led a data collection team for measuring "harmonized monitoring and evaluation indicators for the procurement and supply management systems for ARVs, anti-Malaria medicines, and TB medicines", a project I wanted to participate at, took off with this short conversation:

Joy: "What are your indicators?"

SJP: "Sorry?"

Joy: "What are you measuring?"

SJP: "I don't measure anything."

Joy: "I mean, what are your tools, your instruments?"

I should have responded, "I am my tool" and explained the importance of joining her data collection team to do participant observation. I should have told her that my form of research was to 'immerse myself' into the field of pharmaceutical research on global health in Uganda. But putting too much emphasis on ethnographic research methods in this context was inappropriate. In contrast to the hermeneutic tradition in anthropology, "the positivist research model encourages one to strive for objectivity by erasing all personal influences on the research. Self-reflexivity is an approach to research that is critical of many of the principles of positivism" as Allaine Cerwonka and Liisa Malkki reflect on the production of anthropological knowledge in interdisciplinary research (Cerwonka and Malkki 2007: 30). Researchers like Joy Kabayaga have more trust in indicators and other quantitative research methods to 'produce results' than in a vague repository of tools in ethnographic research, which puts anthropology's traditional methods of participating and observing others' practices in an awkward position.

Instead of using my observations and encounters as a form of studying the experts, I want to emphasize the interdisciplinary dimensions of such encounters, which are pertinent to social studies of global health research. These interdisciplinary forms are not necessarily fraught by a principal misunderstanding, but raise more basic comparative questions on different understandings of methods and methodologies, which are potentially fruitful in pursuing a reflexive approach. To what extent are anthropological research methods differing from statistical methods analysis? What are the underlying epistemological positions? Is it useful to draw a sharp line between anthropological and medical research? How are different beliefs in tools and methods to generalize specific problems complement each other in interdisciplinary encounters?

These questions must begin with the observation that unlike *ethnographic* research methods, *qualitative* research methods are today an established and thoroughly standardized repository of methodological tool, as the field of organization studies demonstrates. It is against this background that Cecil Helman argues that the notion of applied anthropology where ethnographic research can play a distinct role in policy-making processes in the field of health and illness (Helman 2006) should be revisited. However, as Graham Fordham counters, ethnography in multidisciplinary donor-funded AIDS research is often complicit in producing legitimacy for the unquestioned expansion of international health politics (Fordham 2005). It is "submerged in a mass of social science research produced by researchers from various disciplines such as biomedicine, public health, social demography, epidemiology, [which] is hardly even anthropology lite" (Fordham 2005: 25). Thus, in the realm of global public health research in Uganda, it does not seem to be enough to promote qualitative or ethnographic methods in order to enhance quantitative findings in collaborative projects because we could then simply replace anthropology by some other discipline giving the "lite" accounts of the complexities in social life. Furthermore, as Whyte and others argue, we cannot resort to an "anthropology proper" but should rather attend and reflect on the productivity of interdisciplinary research (Whyte, et al. 2011). Instead, we need to reflect on the practices and conditions that enable or limit collaborations across a diversity of disciplinary positions and research projects (Whyte, et al. 2011: 139).

The dichotomy between social science in its many methodological facets and the expansion of biomedicine does not adequately capture how the growth of transnational research on AIDS in most African countries (Geissler and Molyneux 2011). Uganda in particular offers a range of favorable conditions for transnational research. The official language is English and the government has been under Museveni's relatively stable and friendly to all kinds of NGOs and medical research projects. Thus 'Uganda' has been quickly turning into a busy and lively environment for doing global health research and instituting novel forms of research partnerships. Such an environment offers a range of opportunities of doing research. Local NGOs encourage their staff to conduct their own research projects to acquire skills in operational research, using both qualitative and

quantitative research methods. Most of my key informants were pursuing further degrees in higher education—upgrading their diplomas to BAs in pharmacy or adding an MBA to their degree in pharmacy or medicine. On the ground, empirical research is an essential element in pursuing academic qualifications and, more importantly, in doing 'everyday work,' which however often results in a set of practical recommendation to improve the public health policies in Uganda.

Often ethnographic methods are considered to be less amenable for generalizations and the generation of theoretical knowledge. Ethnographic evidence that emerges out of this research tradition is regarded to be less objective and too anecdotal compared to the evidence produced by statistical research methods in the field of biomedicine to the extent that anthropologists have tended to abandon studying certain fields of biomedicine altogether (Ecks 2008: S83). This stark opposition ignores that biomedical evidence enters into various facets of ethnographic explorations of health problems. Stefan Ecks explains that "biomedicine defines most of the parameters within which we are working. Biomedicine informs anthropology on all levels of inquiry, from the definition of what we aim to study, to the way we write field notes, and to the way we stake our claims in arguments with medicine. On each level, questions of 'evidence' are crucial" (Ecks 2008: S87). As Ecks points out anthropological research cannot do without biomedical evidence such as the prevalence of HIV, treatment numbers, and even biomedical taxonomies, in articulating research questions on AIDS or any other health problem. But what if biomedical evidence is lacking? Here, complementary of research methods usually does not hold in the other direction (Ecks 2008). Scientists hardly welcome the idea of working with other's methods and would rather assign anthropologists the task of studying the social-cultural dimensions of science and technology (Rottenburg 2009a).

In the following section, I will consider the methodological challenges in studying calculative practices from an interdisciplinary vantage point. I will also describe some of the methodological implications of this conceptualization of interdisciplinary research by deploying the notion of 'taking stock' of antiretrovirals as, both an emic term for an elementary practice in pharmaceutical supply chain management and as a metaphor to

describe my field research as an *inventory practice* of pharmaceuticals as objects of the "knowledge economy of global health" (Janes and Corbett 2009: 176).

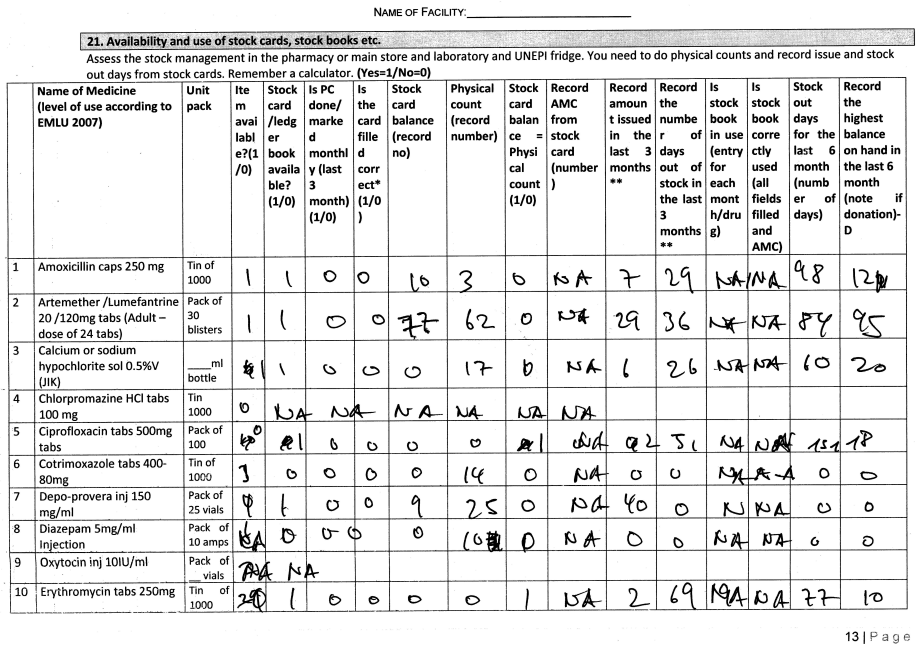
Ethnography as an inventory practice

So, how to do ethnographic research when biomedical evidence as a possible guide for studying the institutionalization of ART is missing? As Dewey suggested this is not only a disciplinary problem about the production of abstract knowledge. Knowing, as a practice, by contrast, starts with practical matters of concern in which disciplinary boundaries are of secondary importance. In regards to the lack of basic evidence on mass HIV treatment, I suggest that ethnographic research is not very different from practices in pharmacy. Ethnographic research can be even likened to pharmacists' practices of taking stock of pharmaceuticals and conceptualized as an inventory practice of pharmaceuticals as political and material artifacts in the production of knowledge in pharmacy. As Dewey suggested, this is to follow practices of knowing in this case practices of counting and measuring availability of antiretrovirals. Moreover, ethnography as an inventory practice follows pharmacist and inquires how pharmaceuticals are constituted as objects of knowledge by counting and measuring them. This form of ethnography does not aim for a deconstruction of quantitative knowledge but seeks to understand the particular problems and questions that the counting of pharmaceuticals make visible. This requires in the terms of the research tradition of ethnography to follow pharmacists, to travel for collecting data, and moreover participate in the material relations and abstract problem-spaces, which turn pharmacies and hospitals into a laboratory of global public health. In ethnographically taking stock of antiretrovirals, then does not only count pharmaceuticals, but accounts for the creation of social and scientific order out of disorder in the pharmacy of ART.

Pharmacists regularly need to count their store of pharmaceuticals in order to control the stock level and ensure availability. The stock levels are usually recorded on stock cards. Similar to bookkeeping practices, stock cards record how many medicines were received and how many were handed out (for an example see Figure 15 in Chapter 7). Taking stock of pharmaceuticals is also a method of checking and assessing pharmaceutical practices,

which compares the records with the actual medicines in the store (see Figure 2). Although hospitals regularly produce stock-status reports to the higher-level units in ordering pharmaceuticals, they are often considered to be inaccurate or inconsistent. In fact, it is often the task of external consultants to measure the accuracy of reporting mechanisms and the availability of medicines when problems in the supply of medicines lead to stock-outs. These consultancies to measure and assess pharmaceutical practices are essentially about practices of counting the pills, which means to take stock of pharmaceuticals at the place where they are physically stored—usually the store of a hospital.

Figure 2: Stock taking in pharmacy; Eastern Uganda.



NAME OF FACILITY:_____

21. Availability and use of stock cards, stock books etc.

Assess the stock management in the pharmacy or main store and laboratory and UNEPI fridge. You need to do physical counts and record issue and stock out days from stock cards. Remember a calculator. **(Yes=1/No=0)**

	Name of Medicine (level of use according to EMLU 2007)	Unit pack	Item available?(1/0)	Stock card /ledger book available? (1/0)	Is PC done/ marked monthly (last 3 month) (1/0)	Is the card filled correct* (1/0)	Stock card balance (record no)	Physical count (record number)	Stock card balance = Physical count (1/0)	Record AMC from stock card (number)	Record amount issued in the last 3 months **	Record the number of days out of stock in the last 3 months **	Is stock book in use (entry for each month/drug)	Is stock book correctly used (all fields filled and AMC)	Stock out days for the last 6 month (number of days)	Record the highest balance on hand in the last 6 month (note if donation)-D
1	Amoxicillin caps 250 mg	Tin of 1000	1	1	0	0	10	3	0	NA	7	29	NA	NA	98	12D
2	Artemether /Lumefantrine 20 /120mg tabs (Adult – dose of 24 tabs)	Pack of 30 blisters	1	1	0	0	77	62	0	NA	29	36	NA	NA	84	95
3	Calcium or sodium hypochlorite sol 0.5%V (JIK)	____ml bottle	1	1	0	0	0	17	0	NA	1	26	NA	NA	60	20
4	Chlorpromazine HCl tabs 100 mg	Tin 1000	0	NA	NA	NA	NA	NA	NA							
5	Ciprofloxacin tabs 500mg tabs	Pack of 100	0	1	0	0	0	0	1	NA	22	51	NA	NA	151	18
6	Cotrimoxazole tabs 400-80mg	Tin of 1000	1	0	0	0	0	14	0	NA	0	0	NA	NA	0	0
7	Depo-provera inj 150 mg/ml	Pack of 25 vials	1	1	0	0	1	25	0	NA	40	0	N	NA	0	0
8	Diazepam 5mg/ml Injection	Pack of 10 amps	1	0	0	0	0	0	0	NA	0	0	NA	NA	0	0
9	Oxytocin inj 10IU/ml	Pack of __ vials	NA	NA												
10	Erythromycin tabs 250mg	Tin of 1000	250	1	0	0	0	0	1	NA	2	69	NA	NA	77	10

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Figure 3: Data collection tool to measure the availability of medicines. This tool captures the "physical count" of pharmaceuticals in the store and relates it to the figures in stock cards. Based on the physical count, one can measure the accuracy of record keeping practices and calculate a score for these practices.

The analysis of the correctness and accuracy of stock-management practices is one of the standard indicators used to measure good pharmaceutical practices. Stock-taking survey teams visit a sample of health centers to physically count the medicines in the stores and relate these numbers to a range of other indicators that measure the availability of medicine at hospitals (see Figure 2 and 3). Finally, such indicators on the availability of medicines are then used to generalize these findings for the whole country.

How are sites for taking stock of pharmaceuticals selected? What do these travel routes of anthropological research look like? In fact, I participated in several data collection activities and research projects and also 'travelled upcountry' to the rural areas outside of Kampala. Uganda is considered to be a predominantly rural population where most people 'stay in the villages.' This is where the 'real problems' are because rural Uganda usually lacks the kind of infrastructure in Kampala. Thus, only doing research in Kampala would not be representative. Not all regions, however, are suitable for research. Many researchers cautioned against visiting Northern Uganda, for example. The war in this region has

attracted too many post-conflict rehabilitation projects, making it difficult to compare the situation in Northern Uganda with other regions. The first assessment of pharmaceutical practices I participated in took me to eight different clinics of TASO in eight different major Ugandan cities in three weeks: Kampala, Entebbe, Jinja, Mbale, Soroti, Masaka, Gulu, and Masindi (see Chapter 10). The second project I participated in was Joy's project on the measuring of "harmonized monitoring and evaluation indicators for the procurement and supply management systems for ARVs, anti-Malaria medicines, and TB medicines" on behalf of the WHO. In this project, I visited ten randomly selected hospitals throughout the whole country. My final participant observation, which will be described in more detail in Chapter 10, had a much broader coverage of 45 districts out of more than 100 districts in Uganda. This project had a number of research teams working in different regions, and I joined the Eastern Uganda team and visited ten health centers. Additionally, I participated in a pre-study where I visited 15 health facilities all located in different districts and had a short exercise in which I assessed the accuracy in data collection in four districts. Of course, the researchers I followed in the data collection process do make more visits than I did, and, unlike me, must often make several visits to hospitals over a longer period of time for several consultancy projects and interventions.

This is all to demonstrate that stock-taking practices are spatially dispersed, and the sites come into focus through statistical sampling techniques. Doing participant observations of stock-taking may be conceptualized as a form of multi-sited ethnography (Marcus 1995). As George Marcus proposed in doing multi-sited ethnography observers follow their research objects and, more generally, the circulation of things, conflicts, narratives, and whatever is deemed as an 'object' of anthropological research (Marcus 1995). Mark-Anthony Falzon cautions that Marcus's notions of multi-sited ethnography, which has been quite popular in reformulating anthropological research, should not be mistaken as the multiplication of spatially defined sites and research periods but emphasizes that mobility and spatial dispersion of the objects of research requires "being likewise surely becomes a form of participant observation [...] it is fieldwork as travel practice" (Falzon 2009: 8-9). The wide geographical coverage of facilitates may lead to the mistake of thinking multi-sited ethnography is research simply multiplying the sites, which, in turn,

diminishes the time spent at every site. In fact, I often collected data for various indicators and spent no more than two days at one site, and could only revisit some of the facilities after the rest of team had returned to Kampala. When that happened, health workers were curious as to why I had returned. Often they were busy and had to do other work. Yet, time is important to reach deeper into the everyday routines. In contrast, traveling widely leaves too little time to make these loosely connected sites hang firmly together in an ethnographic description. In other words, the danger is to get too close to the statistical abstractions that researchers in pharmacies produce in their sampling sites.

However, it is crucial that travel practices need not be limited to a geographical understanding of space. In this regard, studying research methods like stock-taking or the use of indicators means to follow experts in traversing an organizational field, which unfolds in a conceptual and infrastructural problem-space. Moreover, this problem-space is defined by globally circulating models of pharmaceutical supply management and statistical techniques in sampling sites to measure and assess pharmaceutical supply management practices. Such models and techniques describe the space in which the flow of pharmaceuticals and information from different sites, organizations, and regions is conceptualized. In the following chapters, I will discuss these quantitative mapping practices in more detail and ask how they create an abstract space to measure and assess global public health interventions.

In doing so I attempt to emphasize that these practices are "reterritorializing activities," as Gille Deleuze and Felix Guatarri have proposed it (Deleuze and Guatarri 1987: 65ff). As reterritorializing activities, practices can be understood as sites, which reveal the translation of global forms in scientific disciplines like the pharmacy of ART into new conceptual problem-spaces and thereby create another order.[18] As Deleuze and Guattari argue, it is "accounting and bureaucracy [which] proceed by tracings," against which these authors posit the idea of a rhizomatic order of realities, which escapes the binary logic of the

[18] Deleuze's and Guatarri's terms „deterritorialization" and „reterritorialization" has been frequently used in varied ways to explore contemporary processes of globalization, see (Collier and Ong 2005; Cooper 2005; Mennicken and Miller 2012).

scientific practices of representations that classify, categorize, and measure a slice of the reality (Deleuze and Guattari 1987: 15).

In this regard, taking stock of antiretrovirals, which I pursue in this chapter, differs radically from the scientific apparatus installed to monitor the itineraries of pharmaceuticals by using maps and other knowledge-technologies that are used to produce homogeneity, visibility, domination, and normalizations. Pharmaceutical practices of measuring and taking stock of pharmaceuticals diverge from anthropological methods such as doing participant observation in respect to the question of what counts in mass HIV treatment. What is enumerated in actual practice may not be the same as what matters to the people when it comes to care and treatment (see also Kleinman 2006). But these tensions are inherent to any social problem. The ambiguities which the phrase 'what counts' exhibits will be taken up again in Chapter 6 in the discussion of a Weberian distinction of formal rationality, in which the provision of goods like pharmaceuticals matters only so far as it can be expressed in calculable terms. Formal correctness in the provisioning of goods, however, is independent of what matters for a group of people and their substantive consideration of material needs.

The following chapter wants to illustrate this tension between formal and substantive rationalities by reconstructing participant observation of pharmaceutical practices methodologically as an inventory practice of pharmaceuticals as social and political artifacts. In this perspective ethnographic research illustrates and reflects on the practices to make social and political artifacts, like antiretrovirals, calculable. Examining these calculative practices ethnography as an inventory practice reflects the political rationalities through which pharmaceuticals like antiretrovirals are made available, distributed, and consumed.

> *To know what can potentially flow through the network, mapping of available relevant connections, knowledge, competencies and resources is necessary. A directory of members, with their affiliations, expertise, interests and recent projects is an example of this. Knowing who knows whom, and who knows what, encourages and facilitates the connectivity between members. [...] But since network mapping involves a lot of work, it is important that the purpose of the knowledge network is clear to ensure that the information that the map will yield will be useful. —Natividad , et al.* "Knowledge Networks for Global Health" *(2012: S80).*

3. Taking stock of free antiretrovirals in Uganda

Mapping the supply side of antiretrovirals

In the following chapter I want to elaborate on this notion of ethnography as an inventory practice of scientific and social artifacts by discussing a mapping exercise of the supply of antiretrovirals, which I conducted in the course of my field research. During my field research among researchers and health professionals, I was struck by the discrepancy between the scientific rigor in instruments like indicators, which corresponded to the huge amount of paperwork at ART clinics on the one hand, and the absence of data and information on the other, which, according to scientists, had to be of good quality in order to produce evidence.

Information was scattered throughout the complex entanglements of channels that distribute antiretrovirals to more than 400 ART clinics in the country. Data on consumption figures and patient numbers are usually reported to the different supply sources for antiretrovirals. Though most reporting formats overlap in key areas, as in treatment numbers or the availability of pharmaceuticals, it is difficult to match the numbers to each other and produce an overall figure of the scaling-up of access to antiretrovirals in Uganda. In principle, treatment numbers for the country should be the sum of patients at all treatment providers. Such numbers are usually expected to be accessible at one of the central government bodies, such as the Ministry of Health or the

national AIDS Control Program, where technical experts, managers, and others need these numbers to plan the procurement of antiretrovirals.

However the complex entanglements of supply channels exemplified the contingency and unpredictability in the disease-specific layout of global public health, which Joy Kabayaga described as "disorganized". As Joy emphasized, and this was affirmed by all other pharmacists I met, nobody knows the exact number of patients nor do they have accurate information on the supplies of antiretrovirals to Uganda. Additionally, Joy said, "donor money has disorganized our system."[19] Thus, there was no other way to know the treatment numbers than to visit all the major supply organizations and the headquarters of large NGOs and ask pharmacists and program managers for data on patients and pharmaceuticals.

My first activity was to produce a situational map of the supply side of antiretrovirals based on the information gathered from the different organizations (Clarke 2005). I had not planned to produce a map on the supply side of ART in my field research, but because of the fragmentations in the field, such a map was crucial to navigate through complex organizational field and figure out "where and how to enter" the field (Clarke 2005: 83). Following Clarke, this mapping can be considered as a situational map, which "include[s] all the analytically pertinent human and nonhuman, material, and symbolic/discursive elements of a particular situation as framed by those in it and by the analyst" (Clarke 2005: 87). I frequently used the map during each interview and asked who supplied antiretrovirals, to which hospitals drugs were delivered, and how many patients were supplied. With each interview, the map became more complex making the fragmentations, problems, key issues, and positions in the logistic circuits of the supply of antiretrovirals visible (see Figure 4).

[19] Interview DA; 3.10.2009; Kampala

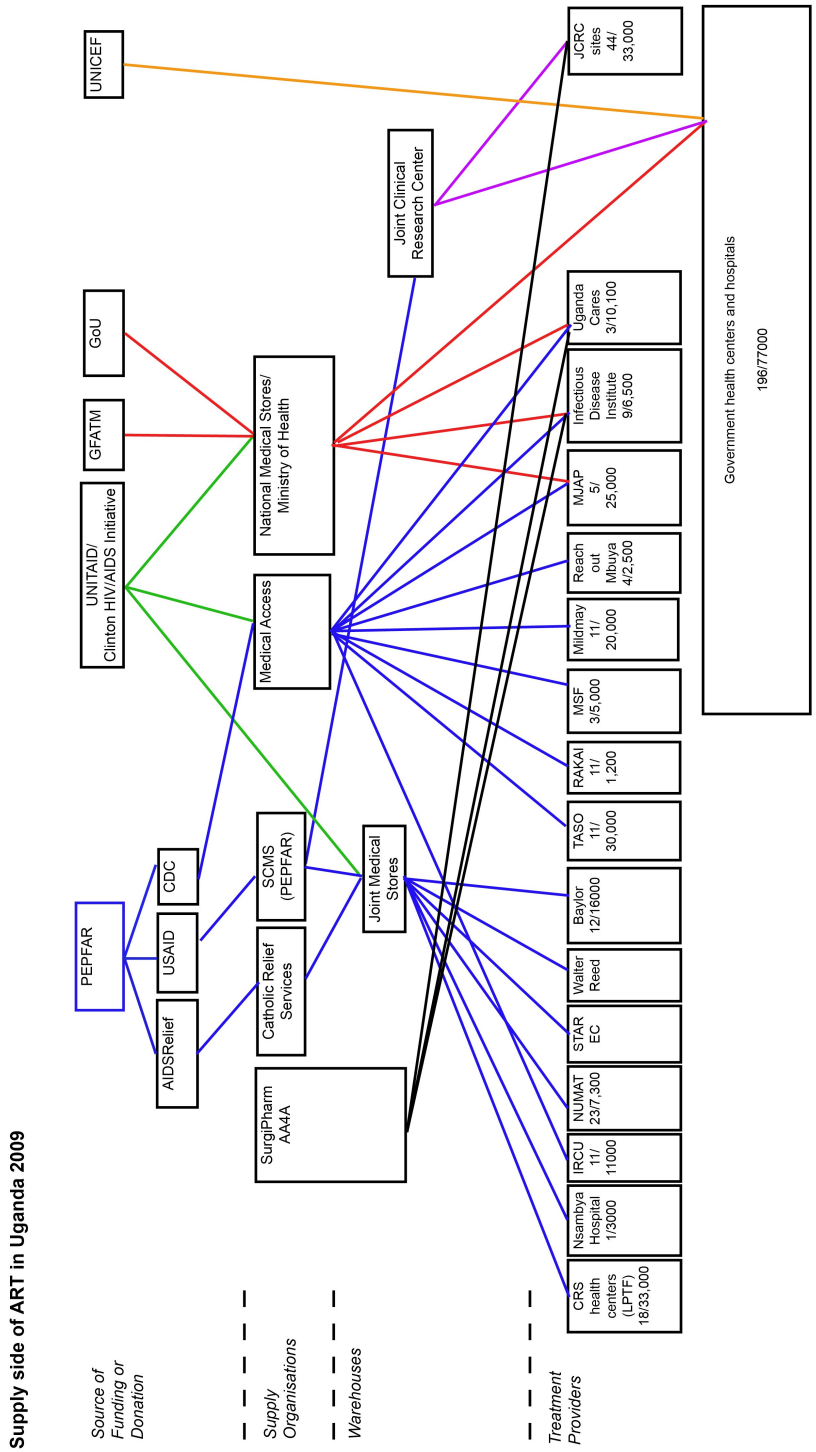

Figure 4: Mapping the supply of ART.
This map depicts the entanglements of the supply side of ART in Uganda in 2009/2010. It shows the travel of antiretrovirals through sources of funding, supply organizations, warehouses, and HIV treatment programs (top to bottom).

Returning to my account of my initial conversation with Joy Kabayaga on our different understandings of our tools, it eventually occurred to me that the map was the tool I used for engaging conversation and, more importantly, building working relationships with key informants like Joy Kabayaga. Like many other administrators, researchers, and technical experts, she was extremely eager to use the map. For instance, Joy used the map for a next meeting of the 'Technical Working Group Committee' at the Ministry of Health to advocate for a 'basket funding system.' In such a system all funders would put their money to procure antiretrovirals and have one supply source to resolve the entanglements in the supply of antiretrovirals. And, she also used the map to do the sampling of sites for a survey, which will be described below.

Other organizations in this field made copies or used this map to make more complex mappings in order to run interventions and measure a variety of indicators in pharmaceutical supply chain management (see Chapter 10). In return, I received support letters for my own PhD project from these organizations. Key informants provided me with data such as patient numbers and drug prices, which were, at that time, pretty difficult to come by. In addition, I was invited to participate in various survey activities to gain insight into the way tools and instruments such as indicators were used in large-scale interventions.

Giving support, 'sharing' data, and even tools—then appropriating them— appeared to be a central mode of producing knowledge in this quite dynamic field where numerous projects operate at once. More importantly, sharing and exchanging data and tools were mediated by the social relationships that crossed rigidly defined boundaries between projects and scientific disciplines. Reasons for sharing and, of course, also for not sharing data are vast. In some cases, it is a matter of personal trust and friendship; in others, a form of investment in social relationships, and in others still, a matter of obligation. Finally, in many other cases, social and material relationships constrain access to data within such a fragmented network of supply channels. As a result, however, data is shared precisely because important data is rare and scarce.

As much as collecting data constitutes a scientific practice that draws on well-defined research designs, it also requires social practices of 'sharing' data and tools between individuals and projects in order to produce evidence. Reciprocities in exchanging information, resources, and tools are constitutive elements of social practices, which transcend project and disciplinary boundaries.

However, taking stock of ARVs and practices of measuring, counting, and tracking pharmaceuticals are always incomplete. They hardly capture the dynamics in the field, where projects are constantly phasing out and new projects are incepted. Likewise, the map I produced to use during my interviews could hardly keep step with these dynamics. In my experience, essentially everyone was aware about the fragmented landscape and the dynamics in the funding arrangements. But it needed a visualization and documentation in order to problematize and analyze the dynamics and fragmentations in the supply side of antiretrovirals.

Data gaps and the global picture of HIV treatment

'Taking stock' as an anthropological research practice also turned out to be a way to engage the fragmentations and complexities in the supply side of ART as entanglements of global and local orders (Randeria 2007). Taking stock of free ART programs reveals the multiplicities, entanglements, and fragmentations that characterize the assemblage of disparate elements in global health (Randeria 2007: 34). These elements are globally circulating techno-scientific, organizational and bureaucratic forms, which according to Aiwha Ong and Stephen Collier's adaptation of this notion of assemblage, are articulated in specific situations and pose novel political, economic, and moral problematizations of life after ART (see also Collier and Ong 2005). This global circulation of ideas, models, and artifacts in the supply of antiretrovirals and the way the complex entanglements in these circuits give rise to novel problematizations in Uganda demonstrate a remarkable continuity in the supply of all kinds of commodities in Africa. Guyer writes in her historical account of the food supply system of Yaoundé that "distribution systems offer an insight into the discontinuities, contentions, and indeterminacies which global processes generate

in local arenas. [...] These distribution systems are reducible neither to some primordial African structure nor to a Western administrative blueprint, but to the emergent process of confrontation between the two" (Guyer 1987b: 7). Today questions about infrastructures, supply systems, and distribution mechanisms in African contexts belong eminently to the domain of development cooperation. As Rottenburg shows, international organizations and experts increasingly claim that they are the ones who mediate this confrontation between global models and their local adaptation (Rottenburg 2009a).

It is instructive to contrast the logistical and infrastructural entanglements in the supply side of ART with a publication entitled *Meeting the Demand for Results and Accountability: A Call for Action on Health Data from Eight Global Health Agencies* by former leading figures in global health such as Margaret Chan, Michael Kazatchkine, and others. In this article, the authors argue that accountability has been a key tenet in the "results-based financing mechanism" in the sense of tracking and evaluating progress, performance, and impact (Chan, et al. 2010: 1). However, according to these authors, most "developing countries have limitations that hamper the production of data in sufficient quality and timeliness" (ibid.). These 'data gaps' affect the ability to account for the huge financial input as well as the expected outputs. As the authors continue to suggest, in order to increase transparency and accountability, new approaches to build capacities of country institutions are required, which, according to these authors, remains to date a major obstacle in advancing global health.

As mentioned above already in the context of the complex entanglements and fragmentations in the supply side elementary key indicators like treatment numbers for free ART provision in the whole country were missing. Without accurate treatment numbers, however, organizations were also not able to quantify the needs for the whole country, make proper projections of the scale-up of free access to ART, nor account for the money already spent on ART, which are all necessary requirements for managing donor money for antiretrovirals. The gaps and blockages in the circulation of information raises questions regarding who has access to what information, who the producers of information are, for whom is information produced, and furthermore, who determines what counts as information in mass HIV treatment. In this regard, a full account of how patients get access

and how free access to ART is measured needs to consider the practices that are connected to material arrangements in mass HIV treatment.

Concerns about the lack of accountability and information have given rise to various attempts to improve the measurement of indicators through standardization and, more importantly, to localize these gaps by defining early warning indicators. In 2009, the Ministry of Health began to test the WHO-tools for "Harmonized monitoring and evaluation indicators for the procurement and supply management systems for ARVs, anti-Malaria medicines, and TB medicines in Uganda."[20] These tools were also tested in Burkina Faso, Guinea Bissau, Cameroon, Burundi, Côte d'Ivoire, Zimbabwe, Zambia, and Tanzania. According to the manual for this test, the harmonized indicators should be understood as a

> "quantitative data collection instrument developed by WHO for the conduct a facility-based survey to assess health commodity logistics system performance and commodity availability at health facilities. The Harmonized Indicator System can be used to monitor the performance of certain processes involved in the logistics management of health commodities over time, to evaluate certain outcomes of logistics interventions, to provide ongoing supervision and performance monitoring, and to monitor commodity availability."[21]

The Harmonized Indicator System however focused only on medicines for HIV, Malaria and Tuberculosis. When I asked Joy Kabayaga, "why these three medicines only?", she answered that "these medicines are for 'programmatic diseases,' which are HIV, Malaria, and Tuberculosis." These diseases account for the largest amount of donor aid from

[20] Data collection was conducted between January and June 2010. See also WHO (2011) "Harmonised monitoring and evaluation indicators for procurement and supply management systems: Early-warning indicators to prevent stock-outs and overstocking of antiretroviral, antituberculosis and antimalaria medicines." [http://www.who.int/hiv/pub/amds/monitoring_evaluation/en/index.html].

[21] See also WHO (2011) "Harmonised monitoring and evaluation indicators for procurement and supply management systems: Early-warning indicators to prevent stock-outs and overstocking of antiretroviral, antituberculosis and antimalaria medicines."

financing mechanisms like the Global Fund or PEPFAR. The supply of these medicines circumvented the national public health system and had enforced the fragmentation in health services. To reduce the infrastructural complexities in the supply of medicines for HIV and the other 'programmatic diseases,' the WHO-tools suggested focusing only on "12 core indicators," which would measure the most important areas in pharmaceutical supply management like the availability of medicines. Furthermore, based on a limited number of indicators, 'early warning indicators' such as stock-outs were supposed to be identified.

In my understanding, it was one of the first exercises to collect information to measure harmonized indicators on these 'programmatic diseases' in Uganda. The testing of these key indicators began in 2009 and appropriated my mapping exercise. Joy Kabayaga told me only afterwards that her team had used the supply map to design the data collection process for these indicators by identifying data sources and justifying her sampling strategy in her presentation at the final meeting in Bamako, Mali (see Figure 5).

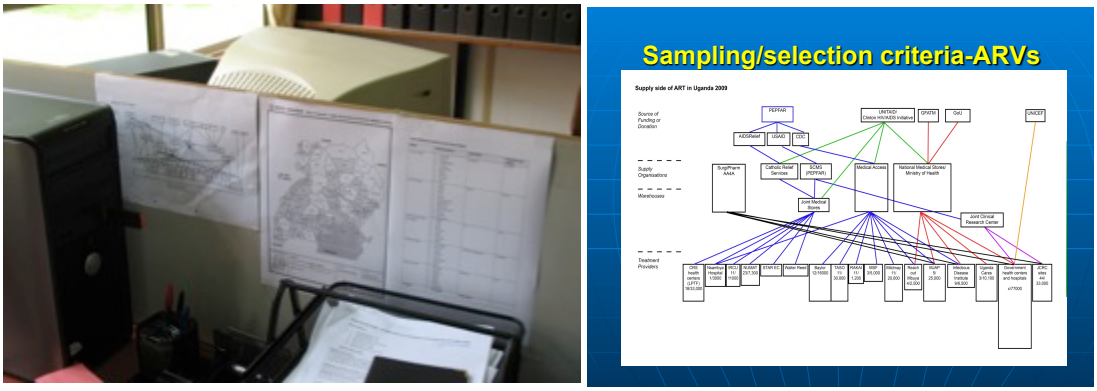

Figure 5: Supply map at work.
At the offices at the Ministry of Health in Kampala (left-hand side) and in Joy's final presentation in Bamako/Mali (SJP/MoH).

I take this exchange in order to discuss what indicators are and how they are used. What is an indicator? What was Joy Kabayaga measuring? The WHO-project had provided a manual for all twelve indicators. This manual explained in detail what each indicator was

supposed to measure, how to run the necessary calculations, how to identify the data sources, how to analyze these indicators and, finally, it asked for comments on any problem in measuring these indicators. For instance, the indicator for the availability of ARVs, tuberculosis, and malaria medicines was defined as

> "Percentage of treatment sites that had a stock-out of one or more required medicines during a defined period."

This is quite an example of an indicator. The power of this indicator is its capacity to transform a complex question, namely the availability of medicines, into an abstract yet unambiguous and clear object of knowledge (Merry 2010: S84). Once stock-outs are defined as an object of knowledge, it can be measured, assessed and utilized for the production of comparisons like the availability of medicines. But such definitions and the categories measured are not self-evident, as Sally Engle Merry points (ibid.). They are not easily translated into a set of statistical methods to measure concrete occurrences of a phenomenon. As I will describe in this chapter and then in Chapter 9 and 10, the supply of antiretrovirals and stock-outs can be measured in different ways, yielding quite different pictures of the meaning of the availability of antiretrovirals in providing ART as a life-long therapy.

How did this project measure stock-outs? The manual WHO-tools suggested the following formula to move from the definition of an indicator to is actual calculation (WHO 2011):

$$\frac{\text{Number of health facilities dispensing ARVs, tuberculosis, and malaria medicines that experienced one or more stock-outs of a particular product in the past year}}{\text{Total number of health facilities dispensing the particular ARV or tuberculosis or malaria medicine in the past year}} \times 100$$

It is crucial to understand that this indicator cannot be measured by simply asking organizations and individuals, "how many days of stock-out did you have in the past 12 months?" Measuring an indicator like "the availability of medicines" requires data from stock cards, reports, or some other kind of inventory data, none of which were readily available. For some indicators, like measuring the ratio of pharmaceuticals procured and pharmaceuticals consumed, data was not uniform across the three programmatic diseases. For other indicators, data simply did not exist. Indicators like the "country median price levels" are not really applicable to antiretrovirals and anti-TB drugs because there is no substantial local market for these pharmaceuticals. Indicators to measure "supplier performance" were too complex and required access to invoices, delivery notes, etc. Other indicators were not comprehensively provided by organizations, like "the number of timely deliveries" or "the number of stock-out days for the medicine." Some numbers that were readily available like "medicine losses" were reluctantly shared by organizations because they documented the waste of valuable resources.

More importantly, the indicators for the availability of medicines were supposed to be measured for the whole country. Yet this raised the question of how to identify the "data source," meaning, "where should one collect the data?" According to the manual, "information is collected centrally, at the level at which health facilities submit their inventory control reports or requisition forms for ARVs and tuberculosis and malaria medicines." Yet, the word "centrally" does not adequately capture the vertical structures that procure these medicines and distribute them through several organizations, which was precisely the problem in the first place in developing a harmonized set of indicators. This means that data would have to be collected at each treatment site in order to determine the "number of health facilities that experienced one or more stock-outs."

The mapping of the supply side of antiretrovirals depicted this problem (Figure 4). The research team thus used the map (see Figure 5) to justify their selection of organizations, which were identified as sources.

INDICATOR 10- Availability

Percentage of health facilities dispensing ARVs, ACTs, and anti-TB that have experienced at least one stock-out of one or more required medicines in Jan-June 2010

Indicator Analysis	ARVs	ACTs	Anti-TBs
No. HF of with at least one stock out of any of the medicines (Jan- June 2011).	115	241	No information
Total No. of respondent facilities	120	246	
% Availability	4	2	

Figure 6: Excerpt from the summary of the data collection.

This availability of medicines indicator yielded horrifying percentages of 4 percent availability of ARVs and 2 percent availability of ACTs (see Figure 6). Indeed, during this period many health facilities had experienced more severe stock-outs. The extent of the stock-outs and how many drugs were missing in the country were hardly captured by this result.

The quality and accuracy in this indicator, again, could not be separated from the complex entanglements and moreover the projectification of ART in Uganda. Because the team at the Ministry of Health did not have the resources for making too many facilities, which can be a very expensive exercise, it had to improvise a sampling strategy. Questionnaires were sent to all health facilities and Joy took the number of respondents as total number of sites against which they put the number of facilities, which had reported stock-outs. But only few facilities reported back.

Why did so few facilities report back? Accessing data from organizations like the national pharmaceutical procurement agency NMS was extremely difficult. As Joy told me, NMS was simply not willing to share data for political reasons. Few facilities reported back and provided data for the key indicators. Too many projects asked for the same numbers, and this increasingly resulted in a 'data fatigue' by all organizations in the field. Irrespective of the correctness and the plausibility of these numbers, the exercise of measuring twelve indicators demonstrated the difficulties in applying statistical methods of analysis or using

proper sampling techniques to an organizational field such as the supply side of ARVs. The supply side of ART lacked homogeneity from the smallest health unit to one of the central procurement agencies in the country. As will be shown in Chapter 7 and 8, it requires an enormous amount of funding for a large-scale intervention to run such an exercise due to the many fragmentations brought by the vertical programming in global public health (see also Pfeiffer and Nichter 2008; Pfeiffer 2013).

In contrast to the above-mentioned article by the leading global health actors, Joy's exercise in measuring harmonized indicators reflected and even criticized a position 'from below,' in which poor data and the lack of accountability were attributed to the verticality of global health. As Joy put it:

> "Over the years, many countries and organizations had developed interventions and methods of handling the health problems caused by diseases of public health concerns. All these had different methods of measuring the successes or failures of the interventions depending on the vision and mission of the particular organizations. The measurements were covering specific interests of individual countries or organizations, and it had become difficult to see the global picture of these attempts to combat the diseases."

Joy's observation of spatiality of global health fits aptly to philosopher Fraser description of new regimes of global governance as "la nebuleuse"[22] (Fraser 2003: 168). Following Fraser these new regulatory modes of global governance can be understood as a "dispersion of governmentality" (Fraser 2003:167), which "unlike its Fordist predecessor [...] tends to 'govern-at-a-distance,' through flexible, fluctuating networks that transcend structured institutional sites. No longer nation-state-centered, today's social ordering works through the powers and wills of a dispersed collection of entities." (Fraser 2003: 168). The consultation processes for the development of these twelve indicators included next to the

[22] Fraser takes the term "la nebuleuse" from Richard W. Fox (see Fraser 2003; FN 16). Fraser's discussion of global governmentality does *not* consider global health, which would have given her argument a more immediate example to revisit the notion of biopolitics.

WHO and the national Ministries of Health a comprehensive 'platform' of the most relevant donor organizations, commercial providers of science advice, and AIDS organization, not less than

- Centrale médico-humanitaire pharmaceutique,
- Global Fund to Fight AIDS, Tuberculosis and Malaria,
- President's Emergency Plan for AIDS Relief (PEPFAR),
- Office of the Global AIDS Coordinator, (USA),
- i+solutions, (The Netherlands),
- John Snow Inc, (USA),
- Management Sciences for Health,
- Rational Pharmaceutical Management Plus, (USA),
- UNAIDS,
- UNICEF,
- World Bank.

As Fraser puts it, it is "no longer nation-state-centered, today's social ordering works through the powers and wills of a dispersed collection of entities" (Fraser 2003: 168). The harmonization of indicators in this regard is not only a tool to improve the scientific evidence base of this regulatory mode of governance, but expresses the demand for better coordination of the dispersed and lose assemblage of actors and projects, necessary to assert legitimacy and political authority in global health.

Mapping the supply side, visually and through numeric representations, suggests to administrators that the supply side of medicines needs homogeneity, simplification, and centralization of supply channels in order to increase the institutional stability in Uganda's AIDS response. In other words, the production of meaningful evidence presupposes that actors, medicines, and projects constitute a cohesive and tangible pharmaceutical order. In this regard, the supply side of antiretrovirals also constitutes a major area of scientific expertise and the development of new intervention to produce a order in which people,

medicines, and projects firmly hang together such that it can be measured and quantified (see Chapters 8 and 9).

Drawing on the methodological consideration of my field research, I suggest that these complex entanglements in the supply side of antiretrovirals and the shortage of antiretrovirals are interlinked. In the following chapters, I will provide an illustration of the stock-out of antiretrovirals in order to describe how HIV is brought into being as a chronic condition in free antiretroviral therapy programs—or 'free ART' as it is commonly termed in Uganda. The stock-out of antiretrovirals demonstrates how ideas of a 'normal life' drastically depend on a range of logistic, technical, and infrastructural conditions, which have been conjured up by a broad network of organizations to provide a steady supply of antiretrovirals. The chapters in Part 2 details the practices in the pharmaceutical government of ART and address the entanglements of logistic channels and infrastructural circuits in the supply of antiretrovirals through which Uganda and other epicenters of the AIDS epidemic are integrated into global health. At the center of this pharmaceutical government is the discovery of a mass of population that needs to be provided with treatment. This reality poses a distinct logistic question around which a range of governmental and nongovernmental organizations are assembled to implement and test this large-scale humanitarian intervention: how to provide a reliable and continuous supply of antiretrovirals to mass populations and mobilize scarce resources under conditions of unpredictability.

We have little information about indicators like the stock-out of antiretrovirals. Consequently there is also little knowledge about the stability and the reliability of the supply of antiretrovirals, which might be a result of the partial overview of antiretroviral supplies and the institutionalization of free ART programs. But we know why actors believe why it is so difficult to produce such information. It is the sheer number of donors, international organizations, and NGOs that make the supply of antiretrovirals— according to experts— "fragmented," "complex," "disorganized," or "unpredictable." In this context stock-outs elicit a nervousness that the institutional framework of ART may not be too thin to bear all the therapeutic, material, and political expectations raised in global health discourse.

In this regard the institutionalization of free ART is characterized by a remarkable proliferation of NGOs, projects, and calculative practices, which constitute a distinct apparatus in Uganda that Whyte and others term a "projectification" of free antiretroviral therapy (Whyte, et al. 2013). In this projectification of mass HIV treatment, information produced by indicators circulates trans-locally and is essentially a means to establish accountability in global governance in distant places. The collection of data, e.g., for indicators like treatment numbers, is extremely local and determined by the specific institutional layout of projects. Information, which is often poor in quality and lacks actual relevance, then travels to the centers of global health in the United States and Europe where funding priorities and interventions are ultimately determined (Feierman, et al. 2010). To paraphrase the French sociologists Luc Boltanski and Eve Chiapello, in this projecitification of therapy information must freely circulate to produce knowledge because perfect and pure information is not available simultaneously in its entirety to everybody in the complex network of global health projects (Boltanski and Chiapello 2005). However, projects are dynamic. Some projects run with short-term targets that determine how many patients are provided with drugs. Other projects phase out, and patients must be referred to other programs. Likewise, new projects have to be constantly re-invented in order to put more patients on treatment.

PART 2: BIOPOLITICAL CONFIGURATIONS IN STOCK-OUTS

The mapping of the supply side of antiretrovirals showed how in a few years' time free access to ART had developed an enormously complex field of treatment providers in Uganda. This field comprises an unstable 'public sector', which is heavily underfunded, and a transient 'private sector,' where foreign aid is concentrated on HIV treatment. The last chapter described the difficulties in quantifying the antiretroviral roll-out. Availability of antiretrovirals, one of the pharmaceutical supply chain management indicators the survey team at the Ministry of Health measured in the country, was estimated to be 4 percent, meaning that 96 percent of the clinics had experienced scarcities of antiretrovirals—technically termed stock-outs—over a period of six months. Such a rate would be alarming, if one would assume the validity of the quantification to be independent from the survey team's experiences in navigating through the projectified landscape of mass HIV treatment in Uganda. As the previous chapter suggests quantifying the availability of antiretrovirals is not only a problem for scientists but also for administrators working in globally interconnected organizational fields.

In the following chapters I will first describe the infrastructural emergence of this therapeutic apparatus as a process of co-production of scientific and material orders. This discussion draws on the work of a range of Ugandan researchers, who published their experiences with ART provisions and their scientific conclusions in international journals and thereby shaped the idea of an ART program. These publications were addressing the adherence to treatment not only from a clinical point of view but included questions of social justice, societal order, and equitability as key determinants of adherence.

Chapter 5 will introduce Clinic U as exemplary case for the institutionalization of the idea of free ART. The clinic, thereby, serves as a lens into the larger field of mass HIV treatment in Uganda, reflecting the exceptionality as well as the partiality of global public health in Uganda. Chapter 5 also returns to the topic of the study and discusses stock-outs of antiretrovirals at Clinic U. It considers stock-outs as a drastic demonstration of the way ideas of a 'normal life' and more importantly a 'normal death' depend on a range of

logistical, technical, and infrastructural provisions, conjured by a broad network of organizations trying to provide a steady supply of antiretrovirals.

Against this background I will then discuss the rationing of antiretrovirals and argue that rationing is intrinsic to free ART. This means that it is not only the result of a lack of funding, but in addition an expression of the rationalization of the scarcity of resources, which is fundamental to any provisioning system. I will situate this argument in the social theoretical debates on mass HIV treatment and develop a notion of pharmaceutical government in Chapter 6. Chapter 6 and 7 will then follow in more detail the calculative practices in free ART to depict how this rationalization of scarcity shapes access to treatment.

4. The AIDS crisis and antiretroviral roll-out

"A new disease" in Uganda

The first reports on AIDS in Uganda gave an alarming picture of an unknown disease that later became identified as HIV and AIDS. In 1982, the first female patients with Kaposi's sarcoma were admitted to the cancer institute of Mulago Hospital. Alex Coutinho recalled how he and his colleague, the British surgeon Wilson Carswell, found this odd: "At the time, we knew it was an endemic cancer in Africa that affected old men" (quoted in Boseley 2013: 1895). But Kaposi's sarcoma "had been seen in young men in San Francisco and New York" (ibid.). Most reports of this new disease, however, came from the southwest of Uganda. Researchers argued that it had spread rapidly throughout the whole country, overwhelming everyone with questions, helplessness, and fear (Serwadda, et al. 1985; Goodgame 1990; see also Kinsman 2010). The first scientific study was conducted in the Rakai and Masaka Districts in western Uganda. The findings were published in the journal *the Lancet* under the title, "Slim Disease: A new disease in Uganda and its association with HTLV-III infection" (Serwadda, et al. 1985). The authors of this article, including Wilson Carswell and other researchers such as Nelson Sewankambo, described in detail the symptoms they observed in Western Uganda: fever, cough, prolonged diarrhea, sores,

swellings, and herpes zoster. But they did not necessarily associate these symptoms with AIDS at that time. It was not entirely clear if people were dying of AIDS, the authors reasoned, since the Ugandan population was considered to be "largely heterosexual," though "promiscuous," and the predominant view of AIDS at that time was associated with "male homosexuals" (ibid.). Indeed, throughout the 1980s, researchers and journalists were busy explaining to the world why AIDS would largely remain a "gay disease" (Treichler 1998: 37-8). The researchers in Uganda argued that although "many of the features of slim disease satisfy the criteria for AIDS, it can be distinguished from AIDS by the extreme weight loss and diarrhoea" (Serwadda, et al. 1985: 851). The commonly observed features were "extreme wasting" and "weight loss," which led people in Western Uganda to name the disease *siliimu* or "slim." They concluded that "slim disease is a *new* syndrome hitherto unreported in Uganda" (ibid.; my emphasis).

The anthropologist John Kinsman quotes Wilson Carswell, one of the authors of this first publication, that this conclusion "was for publication" (quoted in Kinsman 2010: 55). Regarding the information passed to the Ministry of Health, Carswell recalled: "We said, you've got AIDS in this country. And there's lots of it, clinical cases. And in apparently healthy people. The people with Slim, they're beyond, you know, it's too late" (ibid.). The other co-author Dr. Serwadda told Kinsman that he thought "it may have been hard for people to believe that this disease was the same as the one striking white male homosexuals" (quoted in Kinsman 2010: 56). Dr. Serwadda went on to say that the major problem was the political context and a "culture […] of not reading" in the Ministry of Health at that time (ibid.). "[T]hings just drop[ped] on people's desks... It's difficult to know whether the lack of interest was because people had other things on their minds. This was the time of Obote 2 and Okello and there was very difficult instability. A lot of struggle. And the priorities were very different" (quoted in Kinsman 2010: 56).[23]

[23] This account refers to the short-lived and brutal period of transition after Idi Amin's presidency. The edited volume "Uganda Now" provides a much more detailed account of these years of general political turmoil, economic crisis, and physical insecurity (Hansen and Twaddle 1988). I will only give a brief explanation of these expressions. Milton Obote returned to power in 1980 after Idi Amin was ousted of power. The second Obote government, which people designate as the time of

The establishment of the name 'HIV' and the objective measures of this new disease, for example, prevalence rates, were highly political decisions in Uganda. *Slim* became officially recognized as the generalized AIDS epidemic after Yoweri Museveni took power in 1986.[24] In the very same year, Museveni established the national *AIDS Control Program* (ACP) to develop the first prevention strategies and, as antiretroviral therapy did not exist at that time, design public health measures that provided treatment for opportunistic infections associated with HIV. Museveni's standpoint toward the AIDS epidemic was internationally regarded as being progressive at that time. Unlike in neighboring countries, which were much slower to officially recognize the AIDS epidemic, Uganda's early AIDS policy brought large amounts of donor aid to the country (Kinsman 2010: 65). It was at this time that Uganda gained international prominence as a model country for controlling the epidemic through public education campaigns (Allen and Heald 2004: 1148-9).

Subsequent epidemiological prevalence studies conducted in the Rakai district by researches at Makerere University estimated the adult HIV prevalence to be 13 percent (Sewankambo, et al. 1994) and later 16 percent (Sewankambo, et al. 2000). These studies established HIV "as the leading cause of death in Rakai" (Sewankambo, et al. 1994). More than half of the deaths were related to AIDS. A visitor to any hospital in Raikai in the 1980s to 1990s would have seen overcrowded wards with patients admitted with AIDS. 50 to 60 percent of all hospital admissions were the result of HIV-related problems, putting health workers under extreme stress (Katabira and Oelrichs 2007: S7). Patients were in stages that doctors describe as 'terminally ill.' As health workers remembered, hospitals with an ambulance would bring patients back home, only to return the next morning with new patients.[25]

Even before ART, researchers and physicians argued that prevention campaigns alone were insufficient and that the health care system should be prepared to provide extensive,

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"Obote 2" was overthrown by Tito Okello in 1985. The succeeding Okello dictatorship did not last long and ended when the present Museveni government seized power in 1986.

[24] For a detailed assessment of Museveni's position toward AIDS, see (Kinsman 2010).

[25] Interview notes Dr JB, Nsambya Hospital; 2.11.2009; Kampala.

palliative care to AIDS patients. As Richard Goodgame reported in *The New England Journal of Medicine* (Goodgame 1990: 386), programs such as the Ugandan AIDS Control Program had defined a list of relatively inexpensive medicines for palliation in Uganda. Although these medicines were relatively cheap, it was the sheer number of AIDS cases that was disconcerting. Goodgame expected about 10,000 AIDS cases a month in Uganda for the coming years and suggested, "[n]ow is the time to begin stockpiling drugs and establishing community-based programs that can deal effectively with the patient case-load" (Goodgame 1990: 386).

The advent of ART and the 'science of ART'

The advent of antiretroviral therapy in Uganda in 2004 radically changed this picture. Instead of stockpiling medicines for palliative care, scientific research began to address the clinical and technical conditions for antiretroviral therapy in Uganda. This research was not only descriptive. Ugandan physicians and researchers who had authored the first study were now actively shaping the idea of ART by conducting research and publishing articles in peer reviewed journals, which provided the scientific and moral justification for the wider mobilization of resources for antiretroviral therapy. Scientific research engaging with ART in Uganda had a strong activist tinge. For example, when triple combination therapies were still expensive, physicians like Peter Mugyenyi became a prominent AIDS activist for importing cheaper generics and producing scientific evidence to prove that ART provision was 'feasible' in Uganda.[26]

In 2000, antiretrovirals slowly started to trickle down to a few selected clinics such as the *Joint Clinical Research Center* (JCRC). The first pilot project to expand access to ART to a larger population in Uganda was tested in 1997. The project was part of the *UNAIDS Drug Access Initiative*, which was launched in Uganda, Côte d'Ivoire, Chile, and Vietnam (Weidle, et al. 2002; Katzenstein, et al. 2003). In Uganda, five treatment facilities that

[26] Peter Mugyenyi turned his experiences as an AIDS activist and physician into a book entitled *Genocide by denial. How profiteering from HIV/AIDS killed millions* (Mugyenyi 2008). For a personal account, see (Kinsman 2010: 113ff).

provided treatment to 900 patients by the year 2000 were part of this test run (Weidle, et al. 2002). Patients had to pay for the costs of treatment, which had come down to $40 per month for the cheapest generic antiretroviral combination therapy.[27] Still, this was beyond what most Ugandans could afford to pay at that time. Thus, health workers faced the moral dilemma of deciding which patients could cover the costs of these expensive therapies (Whyte, et al. 2006).

Scientists also drew significantly on patients' accounts of ART to underwrite claims for broadening access to treatment. From a social scientific perspective, this form of qualitative research is not to be mistaken with 'applied research.' Rather, it is exemplary for global public health and is concerned with the "injustices" and "ignorance" that deprive poor people from accessing medicines (e.g. Pogge 2002; Farmer, et al. 2007). Such patient-based research was a response to the refused funding of antiretroviral roll-out in Africa on the basis of an alleged inability of Africans to adhere to treatment and the consecutive risk of disseminating resistant viral strains. The chief administrator of USAID Andrew Natsios's statement that "Africans don't know what Western time is" (quoted in Crane 2007: 2), became notorious for the skepticism and ignorance of Western governments to provide aid for the antiretroviral roll-out in Africa. Public health science of ART at that time countered such racial prejudices by presenting data from the first structured ART programs, which showed that most patients were actually adhering to treatment extremely well (Katzenstein, et al. 2002). Patients had to struggle hard to do so, however, because of the expensive cost of treatment (Crane, et al. 2006). The cost of treatment and the "financial sacrifices" made in order to pay for treatment were identified as the "most important barrier to sustained adherence to treatment" (Crane, et al. 2006: 428ff). This science of ART was thus not limited to clinical questions, but as Katzenstein and others stated in an evaluation of the first structured initiative, the *Drug Access Initiative in Uganda*. Scientists, as they argued, had been from the very beginning engaged in "fundamental questions in *ethics and human rights* accompanied by *key logistic and technical issues* in medicine, immunology, virology, public health, macroeconomics and social development," which

[27] Triomune is produced by the Indian manufacturer Cipla.

"the immense tragedy and enormous challenge of global AIDS raised" (Katzenstein, et al. 2003: S1; my emphasis).

Questions of equity and the cost of treatment were a central issue in research on patients' adherence to treatment. For example after the antiretroviral roll-out, only treatment-naive patients, that are patients who had never received treatment, were enrolled into free ART programs. In contrast, patients who had started antiretrovirals before the roll-out of free antiretrovirals in 2005 continued to pay the costs for treatment (Colebunders, et al. 2005). Among many reasons why Colebunders and others waged against the preference of "treatment-naive" patients over patients who had already paid for treatment, was that this raised a human rights issue, namely, "can treatment be denied to those who have somehow found money to initiate therapy—often forestalling their demise—and who are now struggling to pay for ARVs?" (Colebunders, et al. 2005: 276). At that time, the costs for the cheapest triple therapy Triomune had already come down from more than $10,000 per month to $30 per month. Still, patients could barely afford to pay these costs and often relied on the extensive help of relatives (Colebunders, et al. 2005: 276; Crane, et al. 2006: 438). Even after the fees for antiretrovirals were completely abolished, other costs such as user fees (between $2 to $3 per visit) and transportation fees continued to pose a major barrier for patients to retrieve their antiretrovirals from clinics and, ultimately, to adhere to treatment (Hardon, et al. 2007).

Such research findings were quickly translated into practice and gave rise to Alex Coutinho's idea of what he described to the medical journal *The Lancet* as "adherence programs," which "seek not only to put people on ARVs but that have systems in place to make sure people adhere" (quoted in Bass 2005: 2077). Coutinho continued that ART provision would have to go far beyond ideas of free access to treatment and would have to substantially "*invest* into human resources, infrastructures, laboratories, logistics, and training" (Coutinho 2004: 1930; my emphasis).

The production of knowledge in the science of ART, propagating "adherence programs" as a model for effective antiretroviral therapy, largely took place in the global South and in countries like Uganda, rather than in Europe or the United States. More specifically, in the

early years of ART, it seems that the empirical field of research and professional expertise was concentrated in a limited number of sites such as Rakai or Kampala. Coutinho, who was then the leader of *The AIDS Support Organization* (TASO), was the one who put these ideas into practice. This model of an adherence program quickly travelled to other ART programs like Clinic U in Uganda. Clinic U, which I will describe in the next chapter, constitutes an ideal type of an adherence program with specialized chronic care. By integrating the findings from research Clinic U was also a visible demonstration of the epistemic and moral authority over the scientific progress expressed in the roll-out of antiretrovirals.

Clinic U, Kampala, and the pharmacy after *ART*

With the establishment of antiretroviral roll-out, exceptional places described by the larger body of scholarly literature where people with HIV once went to die have been replaced today by quite elaborate systems of chronic care (see also Biehl 2005). The advent of mass HIV treatment programs, and the successive emergence of a remarkable system of chronic care for HIV patients (though still absent for many other conditions) have enabled a relative control of HIV-related deaths. Today, HIV-related diseases rank 'only' third in terms of mortality, meaning that other diseases like Malaria, Tuberculosis, and so-classified Respiratory Tract Infections have replaced AIDS as the leading cause of death in most Ugandan hospitals. Like other African countries, Uganda has adopted international targets that provide universal access to treatment implemented by accredited treatment providers, including both NGOs and government health units. In 2009, approximately 360 providers were accredited to offer HIV treatment.[28] Pioneering organizations like *The AIDS Support Organization in Uganda* began to receive large amounts of donor funding and established themselves as internationally recognized organizations for HIV care and treatment, powerful human rights advocates, and key implementers of global public health programs.

[28] Interview OOT, Ministry of Health; 28.8.2009; Kampala.

Today, hospitals where numerous types of equipment and medicines are inadequate must be contrasted with new clinics like Clinic U, which are visible institutionalizations for the idea of an adherence program. Clinic U was explicitly built to provide "high-quality" care and treatment services free-of-charge. The statutes of this clinic envision "a healthy Africa, free from the burden of infectious diseases"; the clinic's official mission is "To build [the] capacity of health systems in Africa for the delivery of sustainable, high quality care and prevention of HIV/AIDS and related infectious diseases through training, research and advanced clinical services". Clinic U provides therapy for about 6,500 "active patients" on ART. In total, approximately 12,000 clients are registered here. In the language of the clinic, these clients are called "friends," and friends have a representative body known as the clients' council. Furthermore, Clinic U has a board of internationally renowned Ugandan HIV specialists whose publications on HIV care and treatment have been mentioned above. Due to the large number of patients, places like Clinic U are crucial sites for transnational medical research projects and are thus equipped with their own high-standard laboratory facilities. Many of the above-mentioned researchers, most notably Alex Coutinho, work at Clinic U or are senior board members, and all the clinic's doctors and researchers regularly publish scientific articles in peer-reviewed journals. In 2009 and 2010, the clinic had an output of more than 50 articles and a similar number of conference presentations. Finally, Clinic U has received several awards and prizes for its efforts in stepping up access to ART.

Everyday clinic routine consists of a therapeutic game oscillating between care and scientific work. On average, about 400 patients receive care or treatment at Clinic U. The patients arrive as early as 4 a.m. to register for the day. The clinic owns an elaborate data management system to handle its patient flow. A number of expert clients assist new patients to go through the procedures of Clinic U. Each day, the clinic prepares the patient files, which are stored in the archive and handed over to patients at the reception (see Figures 7 and 8). After each visit, the files are returned to the data clerk and travel to the data management office where clinical information is entered into the clinic's electronic database in order to monitor patients for administrative and scientific purposes.

Figure 7: Files are sorted at the reception
(picture taken with authorization of the clinic).

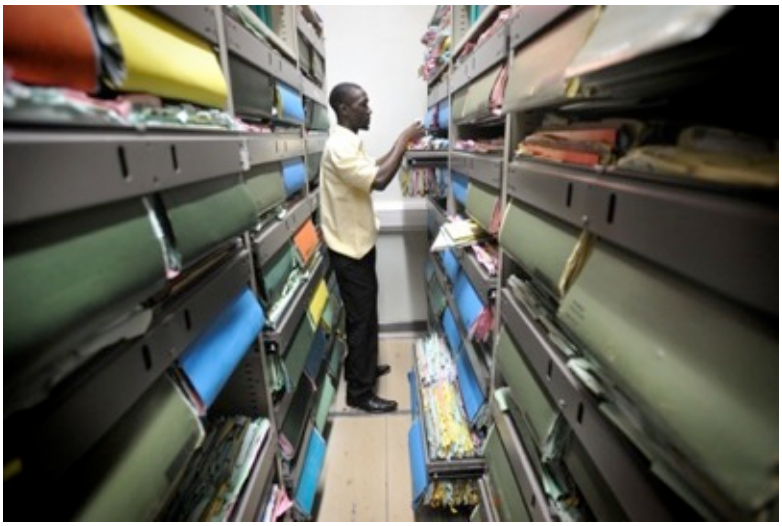


Figure 8: Patients' records at Clinic U.
Patient files are usually kept at ART clinics. After every appointment, information from the patient's record is put into a web-based electronic data management system before being returned to the archive (picture taken with authorization of the clinic).

Figure 9: Laboratory for measuring CD4-counts or viral loads.
The laboratory used for clinical services also serves a variety of international research projects conducted at Clinic U (picture taken with authorization of the clinic).

Figure 10: Dispensary for ARVs at Clinic U.
The dispensary's antiretrovirals, Septrin, and other medicines are supplied by PEPFAR (picture taken with authorization of the clinic).

Clinic U has numerous sources of funding, which is truly kaleidoscopic and representative of the prevailing projectification of AIDS mass treatment in Uganda. Pfizer, the Bill & Melinda Gates Foundation, the European Union, the U.S. National Institute of Health, and the Government of Uganda are the prominent agencies that enable the running of a

clinic of this size (Figure 7-10). Like other important treatment providers, it runs outreaches in two different districts in Central Uganda and, moreover, provides 'support' to six clinics in the realm of the Kampala City Council.

Money for antiretrovirals is provided by PEPFAR. The biggest portion of antiretrovirals, however, is supplied by NMS and paid by the Government of Uganda. These medicines are dispensed from two different windows (see Figure 10). This visible expression of the parallel supply of antiretrovirals within the Clinic U is also replicated in the organizational structure. Two different pharmacists manage the supply of antiretrovirals for Clinic U. Judith Hoyelah, introduced in Chapter 1, ordered her supply of antiretrovirals from NMS for the great majority of patients at Clinic U. The PEPFAR drugs, on the other hand, were managed by Morris Mutabaazi. Mutabaazi did not work at Clinic U but was employed as the logistic expert by an umbrella NGO called MJAP to run the pharmaceutical supply chain management for ten different clinics in Kampala and Mbarara with a total of more than 20,000 patients altogether. Morris Mutabaazi worked closely with the private not-for-profit supplier of ARVs, Medical Access that procures antiretrovirals on the global market for most PEPFAR programs in the country. Clinic U with its 1,000 PEPFAR patients, in fact, constituted a smaller faction of the larger PEPFAR funding arrangement.

The sheer size of Clinic U, its emphasis on high-quality care, and its involvement in transnational research makes it unique in Uganda and East Africa. On Mulago Hill, however, Clinic U is only one of the many clinics. Mulago Hill is densely populated with ART programs, and within a radius of few hundred meters, there are four more ART clinics, which are equally well-organized and well-funded. In addition to these clinics, other treatment providers have settled on Mulago Hill. From Clinic U, one can walk a few hundred meters over to the headquarters of *The AIDS Support Organization*. Here, Peter Obicho James manages the supply of antiretrovirals for about 33,000 patients at eleven treatment sites all over the country. Baylor College for pediatric ART is just next-door. Other major treatment providers and their headquarters are spread around Kampala city. The *Joint Clinical Research Center* in Mengo, which was the first clinic to introduce cheap, generic antiretrovirals in 2002 procures antiretrovirals with PEPFAR money and is supplied with antiretrovirals by the Ugandan government. Benjamin Mayanja is the chief

pharmacist at *Catholic Relief Services* (CRS) and he manages the pharmaceutical supply chain of antiretrovirals for about 32,000 patients at twelve faith-based hospitals in the country also with PEPFAR money. Farther South of Kampala is the *Mildmay* clinic on Entebbe Road, *Nsambya Hospital* is also in the South of Kampala, and also *Uganda Cares*, which are all among the pioneering ART providers in Kampala. These providers have been growing quickly due to the influx of donor funding and run outreaches and autonomous ART clinics in all major Ugandan cities. There are, of course, many more NGO projects in the country. PEPFAR, in turn, which funds most NGO projects in the country, employs a range of pharmacists working on different levels, but the main logistic experts are at USAID and CDC and order medicines from Medical Access Ltd. Furthermore, the NMS in Entebbe supplies about 77,000 patients at all government hospitals in the country (see also the mapping in Chapter 4).

In a few years' time, the number of patients has quickly grown at all these programs, and the following sections will describe the practices in scaling up access to treatment in more detail. As patient numbers increased, new problems also increased. Some of these problems, like space, were almost mundane but at most treatment providers a constant reason for rearranging the provision of ART. For instance, Clinic U with its 6,500 patients had reached the limits of its physical infrastructure. Thus Judith, the other pharmacists, and the doctors at Clinic U transferred 'expert patients' to Clinic U's six satellite clinics in order to "decongest Mulago". The lack of space was a perennial problem for the pharmacies at all TASO clinics as none of these clinics had been built to provide treatment for 4,000 patients or more. The workload for medical personnel at ART clinics had also grown considerably.

Pharmacists were not entirely convinced of the effects of projectification and AIDS money. Dr. Lyenyi Masereka, the principal pharmacist of Mulago Hospital and Judith Hoyelah's immediate supervisor, saw pharmacists' role in mass HIV treatment as being critical: "ART and ARV provision, these are things that came through projects. These projects usually come through doctors, pharmacists are taken on board by the way. The same thing, just come and manage my logistics and just dispense drugs. I don't know if this can be

considered as something initiated by pharmacists."[29] Pharmaceutical care meant that pharmacists would not just dispense medicines from the window; rather, like doctors or nurses, pharmacists would provide pharmaceutical care and follow patients' courses of illness. In contrast, as Dr. Masereka pointed out, the logistics of antiretrovirals and their implications on care are quite standardized and dominated by health economics, which turns a pharmacy into a "business."[30] Moses Muwonge who worked as an external consultant for a pharmaceutical supply management company put it more drastically, "If you trained me for four years and I end up in supply chain management [logistics], then you certainly wasted your time."[31]

In addition to the commodity-centered approach in projects, the huge amounts of funding pouring into the country for a single disease dragged pharmacists from the public sector into the private NGO sector. The implications of the projectification in ART were immense. One pharmacist explained:

> "Today when you are interviewing people, young pharmacists, they will ask you for big salaries, when they have zero experience. Without any experience they are asking for this. How much? What is your expectation? $2000. Because when their peers were working for these programs, that's what they earned, that's what they are asking for".[32]

In a short period of time, increasing patient numbers began to overburden 'infrastructural capacities' and 'personal capacities' at Clinic U and elsewhere. These number-problems resonate with Elly Katabira's[33] review on the scale-up of ART, which stated that "as the

[29] Interview with LM; 1.7.2010; Kampala.

[30] Interview with LM; 1.7.2010; Kampala.

[31] Interview with LM; 24.4.2010; Kampala.

[32] Interview BO; Senior Pharmacist, 13.7.2010, , Kampala.

[33] Elly Katabira is also a board member of Clinic U and the current president of the International AIDS Society.

number of individuals initiated on ART programs across the African continent grows, so do the challenges to maintain the momentum so far achieved and also sustain those already under care" (Katabira and Oelrichs 2007: S8). As these authors argued, to maintain this 'momentum' and continue to scale-up treatment access to an envisaged universal coverage, more health workers needed to be trained, robust infrastructures needed to be built, storage space for antiretrovirals needed to be expanded, and procurement mechanisms needed to be improved in order to increase the supply of antiretrovirals in the country.

6. Stock-outs and pharmaceutical government

"Nobody is going to die"

How does the stock-out of antiretrovirals at the Clinic U's pharmacy, which I introduced in Chapter1, fit into the wider landscape of free ART in Uganda? As Dr. Niwagaba said, Clinic U was one of the "pockets of excellence" in Uganda, well-funded by several organizations and with prominent Ugandan AIDS researchers as board members. This status did not spare the hospital from the countrywide stock-out of antiretrovirals. In fact, the stock-outs at Clinic U epitomized all the paradoxes in the scale-up of access to treatment in Uganda. About 1,000 patients were on so-called "PEPFAR-drugs." The great majority of about 5,500 patients at Clinic U, however, were on so-called "MoH-drugs," which were ordered through the main pharmacy of Mulago Hospital, supplied by the NMS, and paid from the national health budget (see also Chapter 7). When the NMS failed to supply antiretrovirals from June 2009 to 2010, the main pharmacy and Clinic U were running the ART program in "crisis mode" and rationing their supplies of antiretrovirals. Clinic U, like many other ART clinics in the country, started to borrow medicines when their supply of antiretrovirals became depleted. Clinic U could borrow antiretrovirals from its PEPFAR source first, but this borrowing had a ceiling of 30 percent. When the stock-out of antiretrovirals grew more permanent and severe, Clinic U started to ration medicines by reducing the threshold to start patient treatment. After several months of stock-outs, Clinic U even stopped enrolling new patients for treatment. Regardless, as Dr. Niwagaba insisted, the 5,500 patients at his clinic should be provided with "MoH-

drugs" not "PEPFAR-drugs." "This is a government hospital," he argued, and after all, "who should pay for Ugandans' treatment, if not this government."[34]

As patient access to treatment became increasingly delayed by stock-outs, I asked the staff of Clinic U how patients experienced the situation and how they were going about the uncertainties in getting antiretrovirals. Nelson Bahame, the chairperson of the client's council at Clinic U, suggested running focus group discussions and asking patients themselves. As Nelson Bahame explained, "this is the way we conduct research here." Dr. Niwagaba supported these focus group discussions because he thought people should know that patients were waiting for antiretrovirals. I was told to bring money to pay for transportation and to buy some "little eats." In turn, Nelson Bahame searched for patients in the patient management system who were not yet on treatment, which was no small feat. The clinic did not have a waiting list, as all patients should be initiated on treatment as soon as they became eligible. Nelson Bahame had to go to the data management department and ask the data clerks to search the database for people with a low CD4 count.

At the focus group discussion participants began the workshop by asking questions about life expectancies with antiretroviral therapy, before we even entered a discussion about the stock-outs.[35] "I would like to know the longest life span on ARVs" (R3). Participants mentioned "a man called Major Rubaramira[36] claims to live for over twenty years now and that he has an almost zero viral load" (R1). Many other popular figures taken from newspapers were quoted as examples for living a 'normal life.' In the discussion, a normal life emerged as a biological definition of life without HIV, expressed in terms of the viral load or average CD4 count of a healthy person, a measure for the strength of the immune system. More importantly, respondents reiterated during the counseling sessions that living a healthy live with antiretrovirals requires following the rules of ART and adhering strictly to treatment. "If you take the drugs regularly and take the right types at the right

[34] Interview AK; 19.3.2010; Kampala.

[35] I conducted five focus group discussions between 11.2.2010 and 19.4.2010 at various ART clinics in Kampala.

[36] Major Rubamira has been a prominent critique of Museveni's AIDS politics, who publicly declared his HIV status.

times you can live up to 62 to 70 years, which is normal like others" (R2). As none of these participants had been started on treatment, they all mentioned a range of other practices that would boost their immune system: "enough rest," "eating well," "eating fruits and greens," "avoid getting exhausted," "avoid stress," "always use condoms to avoid re-infections," "chew raw garlic and if somebody complains that you are smelling, don't worry for you it is your life." Most importantly, they all believed they should "take septrin[37] consistently."

These practices are considered to boost the immune system, which respondents expressed in terms of their personal CD4 count: "I know the reason why it [CD4 count 175] has gone below and I told the doctor that I will raise it up with my diet" (R5). However, as participants explained, these instructions are not always easy to follow. "You need money to eat properly, or husbands do not want to use condoms, or everyday life problems like paying school fees or fights with your co-wife are creating too much stress" (R3).

As will be described in more detail in Chapter 7, access to treatment is determined by the rules of ART. Rule-following includes a variety of other practices such as disclosure, living positively, having a treatment supporter to help, and so on—all of which are considered essential for living a normal life. Most importantly, these rules determine when to start treatment and prescribe strict adherence to treatment (Meinert, et al. 2009; Richey 2012). The beginning of therapy is based on a threshold defined by the CD4 count. In the course of an HIV infection, the number of CD4 cells continuously decrease, which means that patients' immune systems are getting weaker. According to the most recent treatment guidelines at that time, patients were supposed to start treatment at a CD4 count of 350. All focus group participants should have already been started on treatment, and we asked if patients were aware of the criteria that determined when they were supposed to start. Participant R5 explained, "There is something I cut out of the newspapers, you see this government of ours, this was 4th of September 2009, and they were saying 250 and the minister was saying differently, 350. I even asked the doctor and he said, 'Ah! The ministry

[37] Septrin is an antibiotic and prescribed as a prophylaxis before patients are started on antiretroviral therapy. Similar to antiretrovirals, patients are counseled to adhere strictly to Septrin, that is, twice a day and always at the same time.

does its things and for us we do our things'" (R5).

The stock-outs exacerbated the ambiguities by undermining the moral clarity that eligibility criteria should supposedly give. The participants of the focus group discussion, who were all eligible for treatment, recapitulated their last CD4 count and why the clinic had not initiated treatment

> R5: "My CD4 now is at 175. They told me that they give ARVs when you are sick and your CD4 is 50. The doctor said that I'm now ready for ARVs but they are not there and he told me that now they have reduced to 50, that is when I would start."
>
> R2: "They have again checked me and told me that the CD4 count has reduced. They told me it is 117. They told me that I had to start on ARVs, but the drugs were not available."
>
> R7: "I got ready long ago because I had to start in December but each time I come they tell me that I should have started on the drugs, but it is not yet available."

During stock-outs, doctors adjust the rules of ART, which are configured by a complex arrangement of logistical, technical, and bureaucratic elements and "what is available" at the pharmacy. How far can the rules of ART bended? How low is a CD4 count of 50? How does the stock-outs of antiretrovirals affect the idea of a normal life?

The participant whom everybody called the "young man" started to cry and asked, "Am I going to die?" (R7). He explained that his CD4 count was standing at 98. He had followed all the instructions given by the counselors. He had been living cautiously, eating properly, taking Septrin, and using condoms. Now, he said, he was ready for treatment, but the doctors told him there were no drugs. The group was silent. Although the situation was serious, everybody had been so far smiling, making jokes, or were stubborn in waiting for medicines to be started on treatment. Some participants like R5 were not eager to start treatment at all and preferred to stay healthy without antiretrovirals. "Nobody is going to die," Nelson Bahame responded, breaking the few milliseconds of silence. The tone was harsh but not insensitive. "Nobody has been dying at this clinic," he reminded everyone,

"because it takes care of its clients." He then reminded the young man that this clinic was about to launch its start-up program for young entrepreneurs. The young man could be in the first group of clients getting a start-up loan. Nobody should lose hope. It is not only a normal life, which is at stake during stock-outs. The lack of antiretrovirals in a highly standardized system of care also shows that a normal life implies a normal death: "Of course everyone is going to die at some point," Nelson Bahame said later on. I thought, "please, do not say that." But then, Nelson continued, "once you start on ARVs, you take them until God calls you."

Triage, rationing, and the ethical thresholds

After the focus group discussions, I reported back to Dr. Niwagaba, the head of clinical services at Clinic U. I did not have to raise the point that some patients were worried about the delays in starting treatment because of the stock-outs of antiretrovirals. Instead, I emphasized the uncertainties arising around the use of CD4 counts as measures of treatment eligibility. Furthermore, I suggest that delaying the beginning of treatment may undermine patients' ability to follow the rules of therapy. Each time patients and their "treatment supporters" are sent back without being started on treatment because the "drugs are not there," the more difficulties patients have convincing their supporters to join them for the next visit (R1).

Dr. Niwagaba countered that he would not officially announce that patients should only start treatment if they are severely ill with CD4 counts less than 50, 100, or anything else:

> "I don't want to frustrate our patients, such that they lose hope. We are not going to formalize the CD4 count of 50. It is scientifically and ethically wrong. What is the difference between 50 and 100? This is an arbitrary definition. This is our *ethical threshold"* (my emphasis).[38]

[38] Interview AK; 2.4.2010; Kampala.

What is the most ethical conduct when medicines are not there and nobody knows when they might arrive? As Dr. Niwagaba continued to explain, whether CD4 counts are at 50 or 100, clinically, patients are at great risk. Once you start these patients at 50, all kinds of opportunistic infections must be treated at the same time, which actually increases the cost of initiating treatment. Delaying the recruitment of patients, thus, might turn out even more expensive. But Dr. Niwagaba insisted as long as the supplies remain unstable and unpredictable, 50 was considered to be the clinic's ethical threshold. Furthermore, he stated, "it makes my life easier. I don't want to discuss each and every case with the pharmacist, who tells me that we do not have the drugs. We start at 50, whether the drugs are there or not, without any discussion."

CD4 counts constitute a technical device in mass HIV treatment that loses moral precision in determining who can access these life-prolonging antiretrovirals during stock-outs. Dr. Niwagaba's attempt to define an "ethical threshold" during stock-outs shows how ART produces ethical problems that must be situated in the consistencies and inconsistencies of the infrastructural, logistical, and economic circuits on the ART supply side. With regard to patient costs, it did not make sense to wait until patients developed severe opportunistic infections because this would require a range of other medicines that would make ART even more expensive. With regard to patients' rights, it did not make sense to have a national free treatment program if only a few patients could be provided with treatment.

Dr. Niwagaba's explanations might sound as if he were indifferent to individual patients' situations, demonstrating the not uncommon harshness of Ugandan doctors towards their patients; yet, his clinic maintained this "ethical threshold" in situations of great uncertainty when many other patients already on treatment were waiting for antiretrovirals, too. Dr. Kenneth and the pharmacists' challenge was weighing each patient's need to start treatment with the need of about 5,5000 other patients who had already started treatment and relied on the supply of antiretrovirals to maintain their therapy.

The way antiretrovirals and the techno-scientific arrangement of supplying these life-saving pharmaceuticals enact ideas of normal life and normal death resonate with ongoing debates on Foucault's notion of biopower (Foucault 1978). Foucault introduced the term

biopower to capture the shift in sovereign power, which he regarded to be constitutive for modern reason. Foucault charts the supplementation of sovereign power by biopower as the incorporation of life into the "calculated management and administration of bodies" (Foucault 1978: 140). Foucault argued that life became an object of government, and he provocatively captured this transformation as a shift from the exercise of sovereign power of "making die and letting live" towards the exercise of a biopower of regulation of what he provocatively phrased "making life and letting die" (Foucault 2003a: 247). The normalization of living and dying is both the result disciplinary regimes of the law and regulatory regimes in which society is economically modelled according to ideas of supply and demand (Foucault 2008: 240ff). According to Didier Fassin, the latter part of biopower— making life and letting die—has often been ignored (Fassin 2009). Instead, scholarly attention has been paid to the productive dimensions of biopower, aiming at the fostering of life (Fassin 2009). Fassin thus emphasizes that biopower is not only about the improvement of bodies and the health of a population, but that "to 'make live' actually supposes implicit or sometimes explicit choices over who shall live what sort of life and *for how long*" (Fassin 2009: 53; my emphasis).

In this regard, participants' questions in the focus group discussion reflect a biomedical definition of an average duration of life, which is achieved by taking antiretrovirals and is expressed in CD4 counts and viral loads comparable to a healthy person who lives in biomedical terms a 'normal life.' Ultimately, this understanding of a normal life, defined by an average duration, also entails the idea of a 'normal death.' That is, as Nelson Bahame explained, "you take these drugs until God calls." In contrast, Dr. Niwagaba's introduction of an ethical threshold was an explicit choice, arbitrarily putting peoples' health at 'risk' by determining who must receive medicines and who could continue to wait until the next supply of antiretrovirals arrived.

Lowering the threshold of the CD4 count from 250 down to 50, and later, as Clinic U continued to wait for supplies, even to 0 constitutes a specific form of triage in mass HIV treatment programs. According to Vinh-Kim Nguyen triage elicits novel forms of therapeutic sovereignty in deciding over "who should live from those who could go without treatment" (Nguyen 2010: 6). Throughout the 1990s, antiretrovirals were

extremely expensive and the few emerging treatment organizations had to prioritize and determine which individuals were most in need. According to Nguyen, such decisions were analogous to Foucault's notion of biopower and reflect the novel forms of therapeutic sovereignty in the context of scarce antiretrovirals (Nguyen 2010). The notion of triage in mass HIV treatment programs captures how "international and local organizations seeking to respond to the epidemic on humanitarian grounds unwittingly sorted those who should live from those who could go without treatment" (Nguyen 2010: 6). Triage is a medical term for allocating resources and "medical care to those who need it most urgently in order to save lives" (Nguyen 2010: 10). Such practices of prioritization of urgent needs, however, result in a social and economic valuation, ranking, and sorting out those who need to be more urgently saved over others.

In this system of triage, biomedical knowledge was used to categorize and govern populations, simultaneously giving rise to a biopolitics of mass HIV treatment and to new forms of "therapeutic citizenship" (Nguyen 2010: 108). This type of citizenship is a "thin form of citizenship," which reflects how access to life-saving technologies is conditioned upon both biomedical knowledge and social calculations to determine who will be and who will be not rescued (ibid.). These forms of triage dramatically revealed the "politics of life as such" in contemporary biopolitics that is inflicted upon inequalities and poverty (Agamben 1998: 135; see also Rose 2001; Rabinow and Rose 2006; Fassin 2009). In this regard the "politics of life" expresses the concern that rationing antiretrovirals makes normal life and biological definitions of survival indistinguishable.

This politics of life is more pointed in so-called resource poor countries as the public health experts Ronald Bayer and Gerald Oppenheimer suggest. According to these authors, rationing in the scale-up of antiretroviral therapy is imposed by scarcity of antiretrovirals and correlates to a lack of funding, such that

> "very poor and relatively impoverished nations will by definition involve rationing decisions. Where HIV treatment clinics are first located will determine who will live and who will die. So, too, will rules about who within clinics is treated. [...] Only when *access to ART is available to all who can benefit will the need for scarcity-*

imposed rationing vanish" (Bayer and Oppenheimer 2009: 305; my emphasis).

I want to pose the question of rationing in a slightly different way: What if rationing is intrinsic to practices of government in the scale-up of free access to antiretroviral therapy? Also, to what extent are the respective practices of rationing expressions of a *rationalization* of the scarcity of antiretrovirals? In other words, what if the introduction of free ART is not only a story about the scale-up of access to treatment, but is also about the continuous rationalization of scarcity? I suggest that this rationalization of scarcity is concomitant to what Peter Redfield describes as "minimal biopolitics", which captures the reductionism and the fleetingness of the mobile infrastructures to supply life-saving commodities to any humanitarian crisis (Redfield 2013: 18).

Rationing sheds light on the bureaucratic and technological administration of scarce resources like antiretrovirals. These technologies show how ultimate values to save life are translated into a concrete treatment decision by deploying a diversity of practices in rationing and moreover rationalizing the use of pharmaceuticals. The rationing of pharmaceuticals is a well-explored topic in various public health contexts in Uganda (Mburu 1985; Jitta, et al. 2003). Still, pharmacists' simple answer to situations of stock-outs is "You do what? You ration."

The stock-out of antiretrovirals is indeed not an entirely novel phenomenon in Uganda and other African countries. The availability of medicines in general builds on the concept the "essential medicines concept", which the public health sector should prioritize. However, since the inception of the essential medicines concept, these medicines were short in supply. In fact, practices of rationing like sharing and borrowing originate from the persistent shortage of essential medicines in the public sector. One of the first evaluations of UNICEF's essential drug programs in Uganda in the 1980s showed that district health officers were borrowing medicines from the UNICEF kits as the drugs from the Central Medical Store were always "short in supply" (Mburu 1985: 88). Furthermore, the medicines supplied through the UNICEF kits, though being the only regular supply, still had to be rationed. As Mburu notes "some district medical officers divide UNICEF kits

into small kits and give an "equal share to all health facilities in the district" (ibid.). For essential medicines this situation has not changed so much over the years. In contrast to essential medicines, antiretrovirals are broadly funded both by the government and large amounts of international aid. Moreover, they are supplied through an encompassing logistical apparatus, which is designed to prevent the emergence of stock-outs and avoid the kind of stock-outs described by observations in the realm of essential medicines, which would lead to poor adherence. Thus, in principle, they should be never out of stock. Due to the large amount of patients, the government's budget allocation for the procurement of antiretrovirals was slowly 'eating' into the budget for essential medicines, enforcing the stock-out of antiretrovirals in the country.

As the introduction of the ethical complexities at Clinic U demonstrated, this routinized response becomes complicated in the case antiretrovirals. The stock-outs of antiretrovirals raised the questions in what way and how far one can ration drugs that are meant to rescue lives and are supposed to be taken for a lifetime? Rationing antiretrovirals is closely interrelated to practices of triage. Triage is a form of rationing, and rationing turns into triage. Disease-specific layouts that prioritize certain diseases, like HIV, mean that funding for other diseases is lacking and that medicines for these diseases must be rationed. Likewise, pharmacists' decisions to ration medicines mean that the receiving doctors must triage. In the case of rationing ARVs, this means that triaging is necessary at some point along the supply chain of pharmaceuticals and determines who is most in need.

Triaging requires a social and economic valuation to enable a comparison between different things. It is essentially a decision about individuals or groups and is an example for calculation techniques that ultimately determine who can go without treatment under conditions of limited resources. It is inherently a political decision as it always prioritizes one individual against others (Nguyen 2010: 175). Triaging and rationing are closely interrelated, but I suggest for the purpose of developing an account of pharmaceutical government in mass HIV treatment, it is helpful to assume that they speak to a different social theoretical understanding of sovereignty and domination and that this also yields a different account of the biopolitics of mass HIV treatment.

Rationing does not necessarily single out individuals and groups for treatment on the basis of comparisons of worth. Rather, resources as a whole, say a fixed amount of funding or pharmaceuticals, is retained or divided such that everyone has an equal chance of access. As in the above-mentioned focus group discussions, everyone has to wait until the supplies arrive or the CD4 count falls below the ethical threshold of 50. In extreme cases, nobody receives any medicine at all. Such situations of rationing medicines are never absolute, but there are always ways to jump a queue, either because the urgency of needs is recognized, or because one is prepared to pay for less waiting time. These exception to the rules of rationing, show that rationing primarily refers to the idea of fairness and the authority in controlling fairness through distributive mechanism. It is less concerned with distinguishing, comparing and ranking the worth of individual lives to be saved.

According to Mary Douglas, the "object of rationing is to ensure a fair distribution of necessities, necessities being a culturally defined concept meaning goods which ought to be and usually are freely available. Rationing is applied when something restricts the supply of necessities" (Douglas 1967: 127). That is, in contrast to triaging, rationing is less a decision than a calculative practice of retaining resources according to principles of fairness, or, as Douglas puts it, according to what is culturally defined as a necessity. This characterization of rationing resonates with Weber's analysis of different types of rationality, which underlie any provisioning of goods and services. According to Weber, the provisioning always needs to be expressed both in terms of what he distinguished as "formal rationality" and "substantive rationality" (Weber 1978: 85). The provision of needs is formally rational if it "is capable of being expressed in numerical, calculable terms, and is so" (ibid.). Material needs, by contrast, are in principle independent of what counts as formally rational, though they might coalesce, for example, in the case of market economies.

What counts as materially worthy, for Mary Douglas essentially a cultural decision, belongs for Weber to the realm of substantive rationality. Weber does not explain how these substantive rationalities are produced but specifies them as a set of "ultimate values," which can be of egalitarian, ethical, or of utilitarian nature (Weber 1978: 85).[39] These substantive

[39] Egalitarian, ethical, or utilitarian values are not easily distinguished from each other, which the institutionalization of ART shows in particular.

rationalities are nonetheless crucial as they determine what form of supply and what provisioning of goods and services rendered to "given groups of people" are considered to be right, which is partly independent of the correctness of the formal calculations (ibid.). Weber's political sociology, which describes the tensions between formal and substantive rationalities in determining what counts in the provisioning of any services, can be made useful in developing a conceptualization of stock-outs and rationing practices as the continuous rationalization of scarcity. The following sections will situate the conceptualization of practices of rationing in a theoretical discussion of Foucault's use of 'government' in the analysis of biopolitics in relation to Weber's political sociology of domination. Based on this comparative reading, I will attempt to elaborate on the pharmaceutical government and ask what notion of sovereignty can be inferred from the rationalization of scarcity. My discussion of this rationalization of scarcity by taking recourse to a Weberian social theory aims at putting questions of predictability, the management of uncertainty, and the production of order at the center of the analysis of a biopolitics of population in mass HIV treatment.

5. Pharmaceutical government of mass HIV treatment

A treatment crisis?

Foucault's notion of biopolitics, and most notably its subsequent elaborations and interpretations, has been extremely influential in reconstructing the 'politics of life itself' into a field of inquiry (e.g. Rose 2001). Agamben's provocative interpretation of biopolitics as "thanatopolitics", that is a politics of death, has both positively and negatively inspired scholarly work on HIV and ART (Agamben 1998; see also Comaroff 2007). This thanatopolitics centers around the power of contemporary science and politics to make live or let die and has appeared to be particularly attractive for conceptualizing the AIDS epidemic as a global humanitarian crisis (see also Agamben 1998: 122). Against this background, stock-outs and the shortage of antiretrovirals exacerbating the AIDS crisis may perhaps confirm Agamben's description of a permanent state of exception, in which humanitarian interventions to save lives have become indistinguishable from the politics to let die (Agamben 1998: 144; see also Comaroff 2007).

Treatment decisions based on ethical thresholds can be considered exemplary practices of triage. This form of triage raises the question of whether or not these thresholds can be generalized to confirm Agamben's proposition that the separation of normal living from normal dying through a quantitative "threshold" for triaging marks the exercise of contemporary sovereign power (Agamben 1998: 181). To rephrase Nguyen's question on triage in mass HIV treatment, is the deployment of ethical thresholds at Clinic U to enable treatment decisions a general form of therapeutic sovereignty that is no longer limited to specific contexts and situations? Are these manifestations of sovereign power a "historical aberration that will wither away" (Nguyen 2010: 110)? Or, are the stock-outs of antiretrovirals in Uganda, which make people decide over life and death, harbingers of more profound organizational predicaments, presaging, like public health experts frequently warned, a global treatment crisis?

Such hypothetical questions lead to more systematic inquiry. Are the stock-outs of antiretrovirals a result of the broken public health system in Uganda, where stock-outs of all kinds of pharmaceutical commodities are common and almost taken for granted?

Concomitantly, is the breakdown of the supply of antiretrovirals a result of the disease-specific layout of global health interventions that have failed to build "stronger health systems" (Frenk 2010)? Is the unprecedented flow of funding in global health slowly drying out (see Chapter 7)? Are Uganda and other African countries not only the frontlines of the AIDS crisis, but also of the globally expanding neoliberal crises (Comaroff 2007; Hilgers 2012)? How long will treatment be provided in the contemporary projectified and organizationally fragile landscape of free ART? These are all both empirical and theoretical questions, which center around the question, how do we get from a series of observations of the stock-outs of antiretrovirals and the practices of rationing in Uganda to more general conclusions about contemporary forms of pharmaceutical government in global health? More than triaging, models of rationing carry the belief that the provision of limited resourced needs to be *rationalized* in order to realize a minimum of these goals. But how far can one ration free access to antiretrovirals?

To answer these questions it is necessary to look in more detail at the global pharmaceutical politics and the calculative practices to make antiretrovirals accessible—producing, selling, and distributing antiretroviral generics—which have come to articulate a standard of truth for governing access to antiretroviral therapy and the conduct of a normal life (Foucault 2008: 33). This standard of truth, as Foucault reminds us, expresses not only a life value (a healthy life and treatment numbers) and a scientific truth-value (the costs and efficiency in treatment). As the following sections want to elaborate, the standard of truth emerges out of calculative practices to enable a normal life with HIV. These calculative practices combine techniques of control, in the forms of the "rules of ART" as it is called with regulatory techniques of the circulation of antiretrovirals. These calculative practices are visible as indicators, which measure and monitor objects like the decrease of drug prices and patient numbers to continuously scale-up access to treatment. Thus practices reflect a distinct economic rationality, to which material objects like antiretrovirals refer to as 'cheap' generics. These economic rationalities determine, next to legal and trade-oriented definitions of antiretroviral generics, the 'therapeutic market' of life-prolonging antiretrovirals and its consumers in Uganda, which would not exist without such generics. These economic rationalities and the humanitarian burden that free ART

programs are expected to carry are based on the argument that 'cheap' generics are pivotal for the scale-up of access to treatment. In this pharmaceutical politics, antiretrovirals generics articulate a standard of truth, which enable the calculated administration of scarcity.

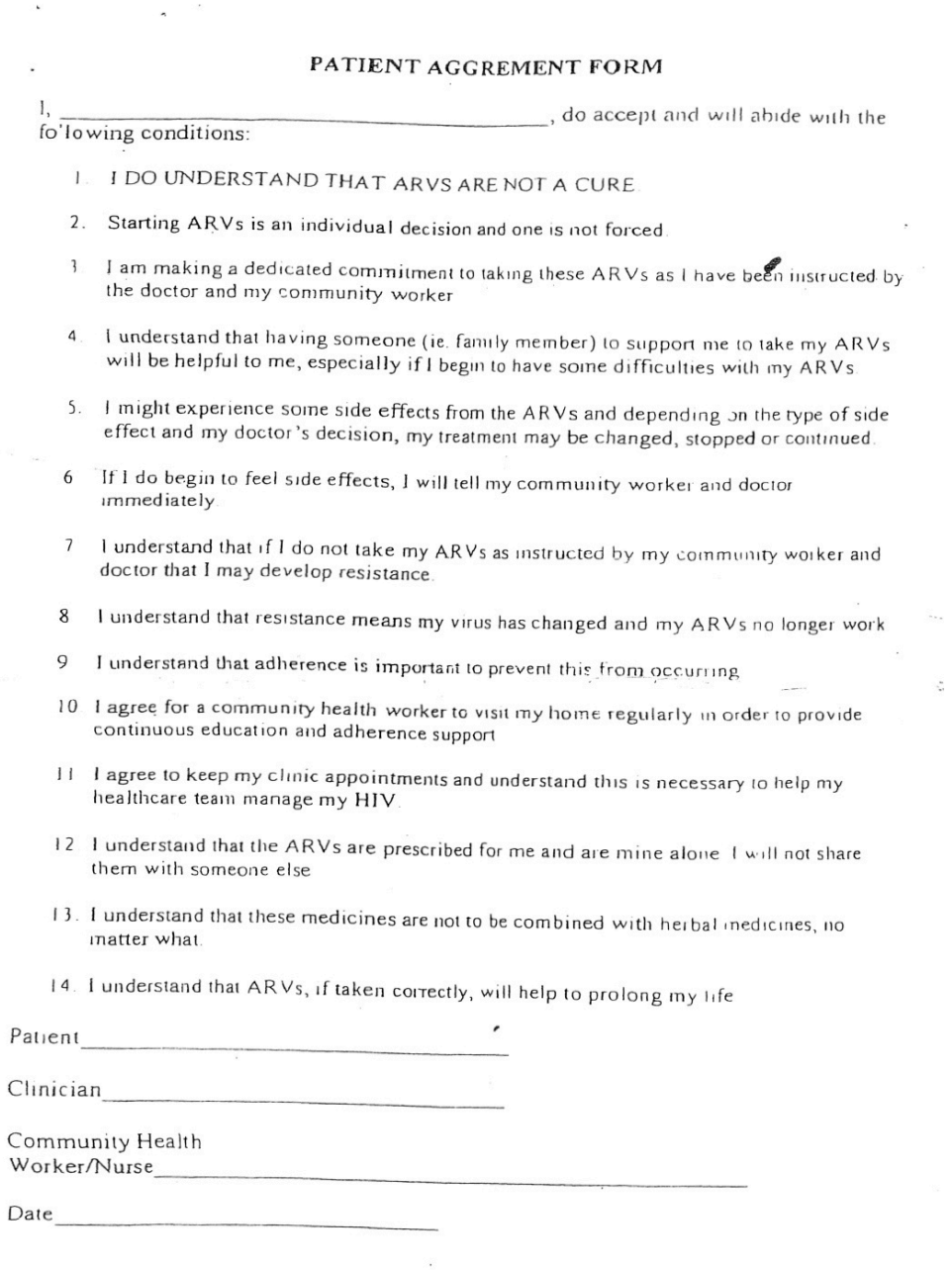
The "rules of ART" and the conduct of a normal life

Antiretrovirals are "drugs with rules," as people in Uganda say (see also Meinert, et al. 2009: 205; Richey 2012: 835). The rules of ART are usually defined by treatment guidelines that have been adopted from the WHO's *Rapid Advice: Antiretroviral therapy for HIV infection in adults and adolescent* (WHO 2009). These treatment guidelines give recommendations for when to start patients on ART, which today, is largely based on CD4 count.[40] According to these treatment guidelines the CD4 threshold to start treatment is 350. But, as the rationing and triaging in the previous chapter showed, this can vary, particularly during stock-outs.

These guidelines, which express the rules of ART, are codified in the form of patient agreement form. Signing a patient agreement form is a requirement to start treatment (see Figure 11). The patient agreement form renders the rules of ART as a contractual agreement, which defines the responsibilities of patients and, more importantly, of the clinic in the provision of lifelong and effective therapy with antiretrovirals. These patient agreement forms include basic clarifications such as: "I do understand that ARVs are not a cure" (Agreement 1), and "I understand that ARVs, if taken correctly, will help to prolong my life" (Agreement 14). Taking the drug correctly means strictly adhering to treatment. In the case of AZT/3TC/NVP, the standard first-line regimen, patients must take one pill every 12 hours, exactly at the same time every day. That is, one in the morning and one in the evening. Further, the patient agreement form also defines the implications of a treatment failure, which may lead to resistances and requires a switch to a more expensive second-line therapy. This is explicitly stated in the agreement form: "I understand that if I

[40] The CD4 count refers to the number of CD4 cells per cubic millimeter of blood.

do not take my ARVs as instructed by my community health worker and doctor that I may develop resistances" (Agreement 7), and "I understand that adherence is important to prevent this from occurring" (Agreement 9). Other rules refer to a range of behavioral requirements such as "always following doctors instructions" (Agreement 3) or "keeping appointments" (Agreement 11).



PATIENT AGGREMENT FORM

I, _____, do accept and will abide with the fo'lowing conditions:

1. I DO UNDERSTAND THAT ARVS ARE NOT A CURE
2. Starting ARVs is an individual decision and one is not forced
3. I am making a dedicated commitment to taking these ARVs as I have been instructed by the doctor and my community worker
4. I understand that having someone (ie. family member) to support me to take my ARVs will be helpful to me, especially if I begin to have some difficulties with my ARVs
5. I might experience some side effects from the ARVs and depending on the type of side effect and my doctor's decision, my treatment may be changed, stopped or continued
6. If I do begin to feel side effects, I will tell my community worker and doctor immediately
7. I understand that if I do not take my ARVs as instructed by my community worker and doctor that I may develop resistance
8. I understand that resistance means my virus has changed and my ARVs no longer work
9. I understand that adherence is important to prevent this from occurring
10. I agree for a community health worker to visit my home regularly in order to provide continuous education and adherence support
11. I agree to keep my clinic appointments and understand this is necessary to help my healthcare team manage my HIV
12. I understand that the ARVs are prescribed for me and are mine alone. I will not share them with someone else
13. I understand that these medicines are not to be combined with herbal medicines, no matter what
14. I understand that ARVs, if taken correctly, will help to prolong my life

Patient_____

Clinician_____

Community Health Worker/Nurse_____

Date_____

Figure 11: Patient agreement form for the initiation of antiretroviral therapy.

Patient agreement forms make patients themselves accountable for treatment and responsible for the conduct of a normal life with ART. The definition of a normal life, by contrast, is predicated upon comprehensive infrastructural apparatus to manage the supply of antiretrovirals to a large number of patients.

As Nelson Bahame remarked (see Chapter 6), everybody is going to die at some point, but dying and living is normal with ART. Stock-outs show in more drastic way that definitions of a normal life and normal death are configured by a set of logistical, technical, and scientific conditions, which are cobbled together into a therapeutic apparatus. The stock-out of antiretrovirals points toward the incompleteness of this apparatus supposed to make antiretrovirals available and enable a normal life with ART. As the participants of the focus group discussion recapitulated, it is the conduct of life according to the "rules of ART" (Meinert, et al. 2009; Richey 2012) such as the proper adherence to antiretrovirals that defines what normal life and, more importantly, normal death mean. This idea of a normal life and normal death appears so incredibly simple when antiretrovirals are in the store such that patients can be provided with the monthly dosage for taking pills twice a day. By contrast, the conduct of a normal life appears complex in regards to the range of logistical and technical conditions that must be in place and managed in order to provide a constant supply of antiretrovirals.

In his discussion of Foucault's notion of biopolitics and governmentality, Fassin proposes that the notion of biopower should be revisited, putting greater emphasis on "the construction of the meaning and values of life instead of the exercise of forces and strategies to control it" (Fassin 2009: 52). Based on this Wittgensteinian take on the meaning and value of life as the use of the rules of ART, Fassin suggests making "use [of] the Foucaultian metaphor [and] move from the 'rules of the game' to its *stakes*" (ibid.; my emphasis). What is at stake in mass HIV treatment is not only a decision about who should and who can go without treatment. In the context of an enormously standardized system of HIV care and treatment, biomedical technologies like ART also define what is normal life and normal death, if the antiretrovirals are in stock. The following discussion pursues

Fassin's suggestion and asks what is at stake in mass HIV treatment by situating the discussion of the rules of ART in a wider social theoretical analysis of contemporary techno-scientific forms of government. More specifically, it will develop the notion of pharmaceutical government in contemporary biopolitics of mass HIV treatment by returning to the discussion of Weber's political sociology.

Following Weber, the conduct of a normal life by following the rules of ART can be understood as a quasi-legal agreement, exemplified by the patient agreement forms. In this way the rules of ART relate to the wider process Weber reckoned, namely the scientization and rationalization of societal organization or "*Beherrschung durch Berechnung*" [ruling by prediction] characteristic to modernity (Weber 1992). "*Berechnung*," following Weber, encompasses different forms of modern techno-scientific reasoning that render "*Naturvorgänge*" predictable in their respective sphere of precision and accuracy. The polysemy of Weber's German notion, however, also allows for a more narrow interpretation of "*Berechnung*"—referring to forms of numeracy, calculative reason, or, what has been more recently called "ruling by number" (e.g. Cruikshank 1999). "*Lebensführung*"—conduct of life—was a crucial problem for Weber and his discussion of an irreversible rationalization of life worlds. Weber was in fact skeptical about the unquestioned commitment to instrumental rationality, a rationality driven only by the question "what should we do if we wish to make use of technology to control life" (Weber, et al. 2004: 18),[41] which ignores more fundamental questions concerning the substantive ends that such undertakings should realize. That is clients are made to follow the rules of ART, without being required to know why the use of technologies should control life or have any alternatives.

Weber's question of how individuals come to subject their life as autonomous individuals to legal and instrumental rationality is closely related to Foucault's notion of technologies of the self (see e.g. Foucault 1978). For Foucault the validity of a contractual agreement,

[41] The German original text is "*Was sollen wir tun, wenn wir das Leben technisch beherrschen wollen*" (Weber 1992). The German word "*beherrschen*" is more comprehensive than the English translation stipulates with 'control'; it means "to rule," "to master," or "a self-conduct of life" and "*Lebensführung*."

like the patient agreement form, is not exhaustively captured by its juridical nature, but in addition requires an examination of practices of teaching, counseling, teaching, monitoring and even drill to create conduct (Foucault 2003: 249). Anthropologists like Nguyen or Dilger draw on Foucault's notion of biopower to describe these pedagogical and disciplinary practices in mass HIV treatment programs as "technologies of the self" (Nguyen 2010; Dilger 2012). According to them, these technologies of the self entail confessional practices and self-disciplining techniques to foster adherence to treatment and undergird claims to scarce resources, which according to Nguyen, can be understood as "therapeutic citizenship" in ART (Nguyen 2005). ART exemplifies a new configuration of sovereignty and citizenship in which claims to resources are governed and articulated in bodily conditions. The way these rules of ART create conduct is thus not only a result of disciplinary regimes of government in treatment programs, but also of patients sharing a system of "conduct of conduct" (Foucault 2003: 138).[42]

In the Ugandan context, this sharing of conduct is expressed as a desire for belonging to one of the numerous ART programs in the country, which according to anthropologists studying ART in Uganda, is better understood as the production of "therapeutic clientship" (Meinert, et al. 2003; Richey 2012; Whyte, et al. 2013). According to Lisa Ann Richey, the way the rules of ART are enforced suggests that access to treatment is based less on rights-based claims to resources than on the patron-client relationship between health workers and patients (Richey 2012: 837). According to Richey, counseling practices in Ugandan mass HIV treatment programs are manifestations of a "biopolitical pedagogy" (Richey 2012: 829). If patients do not seem to follow the rules properly, counselors scare or threaten them with sanctions (Richey 2012; Whyte, et al. 2013). As Richey argues, clients "are made up through personal interactions in which the rules of AIDS treatment are both taught and negotiated" (Richey 2012: 829). Patients consider themselves to be good clients of a treatment program if they strictly adhere to treatment. As Whyte and others elaborate, the notion of client also has a "neoliberal tinge" as it elicits an idea of consumerism and a search for quality treatment (Whyte, et al. 2013a: 150).

[42] This phrase is borrowed from Katharina Schramm, see (Schramm, [forthcoming]).

Notions of therapeutic citizenship and therapeutic clientship shed different lights on the way the conduct of the rules of ART is created. In illuminating different facets of the creation of a conduct of rules of ART, they provide a crucial point of departure for the analysis of antiretrovirals as technologies of pharmaceutical government in mass HIV treatment. This analysis can furthermore benefit from a comparison of Foucault's analytics of biopower and a Weberian sociology of domination (see also Chapter 1). In contrast to Foucault, Weber's typology of legitimate domination, did not attempt to answer how legitimacy is actually produced; rather, his outline of domination implies that a particular type of domination is legitimate by the obedience to it.[43] By definition, all forms of domination are legitimate, but they differ in their appeal to different forms of authority, namely charismatic, traditional, and legal-rational authority. The legal and instrumental rationality expressed in the 'rule by reasoned anticipation,' or more narrowly, the 'rule by numbers,' captures the third type of legitimate domination, in which legitimacy is institutionalized in formal—meaning impersonal and decontextualized—techno-scientific procedures, organizational principles, and legal regulations (Weber 1978).

For Weber, predictability to foster public life has been a central matter of concern in identifying rationality as the core of the modern institutions like the state. Weber was convinced that modern rationality is complete in governing every aspect of individual life, which cannot be avoided. This Weberian understanding of institutions of the modern state is crucial to clarify the use of Foucault's notion of biopower as an analytic concept. In brief, Foucault's analysis of discipline and biopower and governmentality is concerned with how legitimacy of the government of modern life is produced, whereas Weber took for granted that any kind of domination is legitimate and instead analyzed different types of legitimate domination (see Chapter 1). Foucault's attention to technologies as a practical rationality in the government of individuals and population has been often narrowly associated with an understanding of modern institutions as disciplinary regimes of power. In his later work Foucault pays more attention to the regulatory dimension of biopower (Foucault 2003a, 2007, 2008). In this respect, access to treatment expressed in the form of patient

[43] For an elaboration of Weber's definition of legitimate domination in comparison to Foucault, see (Gordon 1987; Gordon 1991; Lemke 2007).

agreement forms is not only a matter of legal rights and entitlements. But it is also determined by regulatory models to organize the AIDS epidemic according to costs of life-saving antiretrovirals and moreover by developing a set of calculative practices necessary to make lives and costs calculable. These calculative practices demonstrate how technologies of the self intersect with what Foucault termed "the biopolitics of population" in which technologies of the domination of the individual intersect with the government of larger populations (Foucault 1993; see also Hacking 1982). Following Foucault, though, one needs more thorough interrogations of the relationship between particular forms of rationality and specific forms of conduct. The term government describes the intersection of "technologies of the self" and coercive "technologies of domination", "where the [way] individuals are driven by others is tied to the way they conduct themselves" (Foucault 1993: 203).

This biopolitics of population is expressed in the production of data and knowledge, for example, in the calculation of the supply for and the demand for antiretrovirals of a large number of patients. These calculative practices intersect with technologies of the self, which foster conduct and adherence to treatment. The calculative practices for ordering medicines build on the trust that patients will (and must) take antiretrovirals two times a day as the patient agreement form states. These practices in governing antiretrovirals underwrite the distinct therapeutic apparatus in global health, in which ideas of a normal life with HIV as a chronic illness depends on the continuous supply of free antiretrovirals. To manage a steady and reliable supply of antiretrovirals, pharmacists like Judith and many other pharmacists regularly calculate the demand, routinely order antiretrovirals, and distribute these pharmaceuticals every month, again and again.

One governs things. But what does this mean?

—(Foucault 2007: 96)

Technologies of pharmaceutical government and the rationalization of scarcity

What is pharmaceutical government in mass HIV treatment? What are the rules of

antiretrovirals in mass HIV treatment? How to understand antiretrovirals as technologies of government? And what are the contours of the government of scarce antiretrovirals? These questions are closely interrelated and I will address these questions by engaging a discussion about the rationalities, which are characteristic for the technologies of pharmaceutical government in mass HIV treatment.

To approach this notion of rationality it is helpful to return to Weber's sociology. The previous section described the tensions between formal and substantive rationalities are inherent to any practices of rationing. For Weber substantive rationality "may be of great variety" (Weber 1978: 85).[44] That is, any system of distribution used to address social problems struggles with the pursuit of substantive goals, which, in the case of ART, are ideas of social justice, fairness, and humanitarian ethics, while at the same time has to follow principles of formal rationality expressed in calculative practices. Stephen Collier in his ethnography on post-socialist budget reforms emphasizes that Weber understood this tension to be fundamental for capitalist irrationality: "As Max Weber observed long ago, the substantive orientation of the state, introduces an 'avoidable element of irrationality' into allocation decisions. The process of weighing the relative importance of different ends—and of choosing different courses of action that prioritize one rather than the other—cannot be a matter of purely quantitative calculations" (Collier 2011: 166).

In this regard, rationing pharmaceuticals and, more generally, managing scarce resources are paradigmatic instances of the incongruity between substantive goals to provide life-saving treatment and the goals of formal rationality to distribute antiretrovirals. Although the distribution including the rationing of antiretrovirals is rational in an instrumental sense, it is never entirely moral as these decisions undermine humanitarian ethics to save lives. Thus, an actual decision always carries a sense of arbitrariness of whose lives count and whose do not. Yet, for Weber, resolving this arbitrariness was precisely the goal of rationalization expressed by the modern state by establishing a legal-rational order to

[44] Stephen Kalberg suggests more generally that Weber did not reduce modern 'rationalization' to the formal and bureaucratic rationalization, but understood it to be multiple: a multiplicity of rationalization processes that variously conflict and coalesce with one another at all levels of society and civilization (Kalberg 1980: 1147).

"foster greater certainty and predictability at a systemic level" as Richard Jenkins and others argue in their Weberian discussion of the management of uncertainty in contemporary public health systems (Jenkins, et al. 2005: 18). The institutionalization of care and treatment are in this regard technologies of government to manage illnesses as conditions of existential insecurity.

I will return to this point in Chapter 9 and 10, which discuss the institutional responses to prevent stock-outs, which phrase the production of predictability as the building of 'stronger' health institutions. Here, I want to provide a provisional characterization of the use of pharmaceuticals as technologies of government that attends to the conceptualization of the stock-out of antiretrovirals. Stock-outs are a breakdown of the supply of antiretrovirals, which inhibit the conduct of a normal life. Ideas of normalcy in ART are abruptly replaced by ideas of crisis when antiretrovirals are out of stock. Stock-outs as acute shortages of antiretrovirals, if understood as crisis, are rather "crisis embedded in crises" (Vigh 2008: 13). That is stock-outs reflect a breakdown of the institutional mechanisms to address the AIDS crisis. But once these stock-outs occur as a result of more systemic instabilities in these institutional mechanisms of problem solving, they also demonstrate that crises, like the AIDS crisis, are better understood as conditions (Vigh 2008: 10). Vigh suggests this understanding of chronicity for several kinds of prolonged crises that counters the prevailing meaning of a crisis as a "rupture" from the normal order of things (Vigh 2008: 8).

Vigh does not explicitly address HIV or the AIDS crisis as examples of the chronicity of crises, but his proposition is useful to situate the stock-out of antiretrovirals in the relationship between chronicity in the AIDS epidemic and the persistent scarcity of resources in public health care settings, which are more pointed in the Ugandan setting. Moreover, as I will show below, stock-outs are an acute shortage of antiretrovirals, which reflect that these pharmaceuticals are in principle scarce in regards to existing and projected needs in the Ugandan AIDS epidemic.

This long-term crisis challenges a Weberian perspective on expectations of predictability, which Weber attributed to the modern state and its institutional mechanisms to create

stability, including the management of crises. AIDS crisis differs in many ways from this modernist understanding of social order. The AIDS epidemic as a crisis is largely concentrated in countries of the global South and the subsequent roll-out of mass HIV treatment constitutes an emblematic instance for novel figurations of science, politics, and the market (Rottenburg 2009b), which are usually captured by the term neoliberalization. African countries have been often regarded to be at the forefront on this neoliberalization (Hibou 2004; Hilger 2012), entailing austerity measures, deregulations, and privatization, with detrimental effects on public health (Turshen 1999, for the case of HIV/AIDS see Dilger 2012). Respectively, the Weberian question on the relationship between substantive rationalities and formal rationalities must be rephrased: how are substantive goals, like fairness, humanitarian values, and equity made to accord to the formal quantification of the material demand for life-prolonging antiretrovirals, which will always exceed the supply? What kind of substantive goals can be inferred from the current quantification of the crisis? How does one conceptualize the response to the AIDS crisis, like the roll-out antiretrovirals, which are principally limited and scarce? How can predictability be expected when "formally correct calculations" contradict any substantive value?

Moreover, in contrast to a Weberian sociology, the provisioning of needs in contemporary global public health is not a function of an aggregation of ideal-typical nation-states. Rather it is a complex organizational field comprising governmental agencies, international institutions, philanthropic organizations, and humanitarian organization for which Fassin suggests the term "nongovernmental government" (Fassin 2007). However, the calculative practices that are used do not differ from the principal irrationalities that arise in pursuing substantive goals through formally rational calculations.

To discuss the rationing of antiretrovirals and the emergence of stock-outs in mass HIV treatment, I will consider the discrepancies between humanitarian ideas of saving lives and the formal calculations of needs and supplies by drawing on Foucault's lectures on *Security, Territory, and Population 1977-78* (Foucault 2007) and *Biopolitics of Population 1978-79* (Foucault 2008). This comparison is helpful to depict the different rationalities of government, which are oriented towards the production of predictability or security. Moreover, they also mark a crucial transformation from technologies to control

uncertainties in modern biomedicine (Jenkins, et al. 2005) toward the management of scarcity and controlling insecurities and crises. This conceptualization will be part of a provisional account of the pharmaceutical government of mass HIV treatment, which will continue to be elaborated upon in the chapters below.

According to various commentators, Foucault's use of the term 'government' in these lectures is an attempt to include the modern state in the analysis of power, a point missing in his previous work (e.g., Lemke 2007b). In contrast to Weber's distinction between substantive and formal rationality, which were both oriented toward the idea of 'Western civilization', Foucault's notion of government sought to describe a more specific form of political rationality that continuously reflects and reorganizes itself by techno-scientific means. In these lectures, Foucault returns to the examination of the biopolitics of populations, which were described as the regulatory power over populations in *History and Sexuality 1* (1978) and the lectures on *Society must be Defended 1975-1976* (Foucault 2003a). Here, Foucault locates the fundamental transformation from a juridical-disciplinary form of government to a regulatory government of human conduct in the discovery of scarcity as an economic problem of eighteenth-century political thought (Foucault 2007). As Foucault argues, by rendering scarcity into an economic problem in governing the supply of food *and* food shortages, scarcity is turned from collective misfortune into a calculable event. This form of government of scarcity is, according to Foucault, characteristic of the emergence of a *dispositif* of security, which should prevent an event like mass hunger from taking place and amount instead, to a *crisis* of government (Foucault 2007: 30). As Collier summarizes (2009), scarcity became subjected to sovereign controls in a very particular way, namely in the way that it became the object of "modulated interventions [...] into the field of autonomous and mutually corrective decisions by growers, buyers, consumers, and traders" (Collier 2009: 87). This regulation, therefore, refers to the appearance of an economized and managerial 'art of government,' which continuously rationalizes political technologies referring to designated matters of collective concern. In this analysis, much attention is paid to the economic valuation of population health and the way such valuations go along with a rise of statistical methods and economic models in governmental quantification, evaluation, and *optimization*

measures (Foucault 2008; see also Hacking 1982). These practices of government constituted and organized the 'population' as the object of government and governmental reflection. As a result, Foucault restates the idea of the transformation from a sovereign power to a biopolitics of population, which 'makes life and lets die':

> "there will no longer be any scarcity in general, [but] it may well be that *some* people die of hunger after all. But *by letting these people die of hunger* one will be able to make scarcity a chimera and prevent it occurring in this massive form of the scourge typical of the previous systems (Foucault 2007: 42; my emphasis).

As Foucault continues to explain, this biopolitics of population necessarily entails the reality that some people are left to die, but scarcity itself will be made calculable as the management of a crisis that can occur any time. In contrast to Weber's notion of the bureaucratic organization of the modern state, this calculated management does not necessarily foster predictability but displays a continuous rationalization of technologies of government to prevent crises that can never be fully anticipated.

Foucault's rationalization of scarcity implies biomedical, economic, and organizational technologies that make a distinction of between erroneous and appropriate practices of governing populations and scarcities. In this regard, biomedical and economic markers—indicators—constitute 'sites of veridiction' or, rather, sites where the truth-value of governmental practice is put on trial (Foucault 2008: 32). While 'normal prices' have been an indicator for the measurement for some time, other assessment-indicators have proliferated over the centuries. Today, a range of numerical representations and statistical methods provide simple and complex indicators for calculations and judgments in global public health (Merry 2010; Sangaramoorthy 2012; see also Chapter 10). The normal price for antiretrovirals is for instance itself subject to a variety of practices to monitor and control the development of the price to meet humanitarian goals to save lives as I will describe below.

Considering contemporary figurations and recalibrations of sovereignty, Andrea Mennicken and Peter Miller have pointed out that calculative practices are "inherently territorializing activities" (Mennicken and Miller 2012: 20) that redefine the relationship between government, populations, and territories. According to these authors, it is "a state of government that is no longer essentially defined by its territoriality, by the surface occupied, but by a mass: the mass of the population, with its volume, its density, and, for sure, the territory it covers" as Mennicken and Miller put it (Mennicken and Miller 2012: 21; see also Foucault 2007: 110).

In the following chapters, I will follow a variety of mundane calculative practices of pharmaceutical government in order to capture the contours of the rationalization of antiretroviral scarcity. In the case of mass HIV treatment and its large number of patients, technologies of the self that make patients adhere to treatment are intricately linked to such calculative practices that govern antiretroviral supplies of each and every individual. In this respect, practices of calculating drug distribution and of measuring its impact, constitute government technologies that 'make up' a diseased population (see Foucault 2007: 105-6).

In order to illuminate the (re-)territorializing activity of pharmaceutical government, the following sections will discuss in more detail the calculative practices, organizational models, and regulatory regimes that structure the global supply of life-saving antiretrovirals. Such an analysis must dwell for a moment in questions of calculative practices. First, what is scarcity in ART? How should we understand the portrayal of an abundance of resources? How much money has been spent on ART, and how much money is needed? What role do drug prices play in organizing treatment? Secondly, how is funding translated into treatment numbers? How is normal life with HIV produced in these calculative practices? How are antiretrovirals bringing HIV as a chronic condition into being?

Again, studying the technologies of government are in the first place methodological choices of what to study. The following sections will first exemplify these questions in discussing the relationship between the supply of antiretrovirals and the rules of ART. The subsequent chapters will then elaborate on the specific forms of rationalities in the supply

of antiretrovirals and how they determine the rules of ART. In these sections I will focus on calculative practices in managing pharmaceuticals and people and counter conventional portrayals of an abundance of resources in the scale-up of access to treatment and propose to focus on the rationalization of scarcity.

The logistic question of the AIDS crisis

The idea of a normal life depends on the pharmacy of ART, which manages the continuous and reliable supply of antiretroviral stocks. Supplying life-saving antiretrovirals, though, is not solely a logistical question, but an organizing principle of the AIDS crisis under conditions of scarcity. In the case of AIDS, scarcity is intricately linked to the chronicity of the disease. Tony Barnett and his colleagues noted in the 1990s, long before ART became recognized as an effective treatment that the AIDS crisis should be understood as "long-wave event" (Barnett and Blaikie 1992). These authors argued even then that if the mobilization of resources to provide treatment was delayed, the AIDS epidemic, because of the biological specificities of HIV pathogens, would gradually rise to a large-scale humanitarian disaster.

As Barnett and his colleagues continued to emphasize (Barnett 2004; Nixon, et al. 2011), attempts to stop this disaster had to take into consideration that "long-wave events" require different responses than "short-wave" ones. "[B]y the time we become aware of [the event's] presence, dynamic and effects," they argue, "it takes a long time to slow down the process or to stop it—and in many cases the event may turn out to be unstoppable" (Barnett 2004: 34). Introducing the term "long-wave event" was supposed to highlight the fact that "most political and administrative capacities are not established to deal with such events—that is why they confront us with particularly testing challenges" (Barnett 2004: 35). In this respect, AIDS articulated novel challenges for humanitarian intervention, which had, up until that point, usually focused on limited interventions in circumscribed disasters.

In his ethnography, Redfield recounts how Médicins-Sans-Frontières' (MSF) venture into AIDS treatment required the organization to rethink its notion of humanitarian emergency in order to incorporate the AIDS epidemic as a "slower moving crises" (Redfield 2013: 182). The experiences of MSF with the provision of antiretroviral therapy are emblematic of the infrastructural and logistical apparatuses that have emerged around the question of how to supply ARVs to mass populations. The importance of MSF as a paradigmatic example for humanitarian relief cannot be separated from the development of a mobile infrastructure to provide urgent medical care during emergencies. Over time and through its experiences with refugee camps, natural calamities, and other emergencies around the globe, MSF had developed a standardized "kit" comprised of medicines and other life-saving equipment that could be transported to any disaster site or places that suffered from a complete collapse of their health infrastructure. Because MSF's logistics had to be mobile, quick, and flexible, the list of items had to be finite and had to contain a standardized set of elements that met the most basic needs of any disaster setting (Redfield 2013: 81). According to Redfield, AIDS as a crisis and the demands of HIV treatment revealed the limits of humanitarian "kit culture" (Redfield 2013: 88). The AIDS epidemic "illustrated the elasticity of the concept of crisis and its increasing extension beyond medical understandings of emergency" (Redfield 2013: 27). In particular, the chronicity of the condition and the requirement of providing a permanent supply of antiretrovirals did not "fit easily into a delimited timeframe or invited techniques of rapid, mobile response" (Redfield 2013: 27). MSF's focus lies on urgent health problems in emergencies, which by the organization's definition are limited in time. HIV as a chronic disease requires a lifelong therapy with antiretrovirals and, more importantly, where demand in numbers is high, it exceeds the mobile logistics of the kit. Thus, AIDS challenged MSF's own conceptualization of emergencies and more importantly its understanding of how to organize relief for a long term crisis like AIDS.

The nexus of humanitarian medicine and new forms of humanitarian aid in the roll-out of antiretrovirals demonstrate the way the organization of a response to crisis is intricately linked to a particular conceptualization of the crisis. HIV treatment with antiretrovirals is not a cure—even when a range of technical, logistical, and scientific conditions are

properly in place. In the language of public health interventions, preventing a long-wave event like AIDS from turning into a disaster requires a long-term and multi-layered approach for the provision of treatment. Thus, a reliable supply of medicines was needed to provide antiretrovirals as a chronic treatment. In addition, in order to continuously put new patients on treatment, the supply of antiretrovirals had to steadily increase. Managing a 'pipeline' of antiretrovirals needed large amounts of funding and even more administrative capacities and logistical infrastructures capable of distributing and accounting for the expensive pharmaceuticals. The latter were especially hard to imagine in settings like Uganda, where public health systems were "run down" after years of political turmoil (Katabira and Oelrichs 2007). Most importantly, scale-up efforts depended on the decrease of drug prices to broaden access to antiretrovirals through the elevation of competition by instituting mechanisms for the procurement of generic antiretrovirals (see T'Hoen 2009; T'Hoen, et al. 2011).

In contrast to the way humanitarian kits are provisioned—which are, in logistical terms, 'pushed' down the pharmaceutical supply chain—antiretrovirals are 'pulled,' meaning ordered according to demand. The first ethnographic example on Judith Hoyelah in Chapter 1 demonstrates this very idea. As pharmacists explain, a pull-system is more accurate and avoids waste. At the same time, a pull-system is also more complex and technical than a push-system, which is common in the field of essential medicines and humanitarian aid. Furthermore, the pulling of antiretrovirals presupposes that organizational structures are stable and have the technical capacities to supply these pharmaceuticals of the right type, at the right time and in the right quantities. Thus, the moment Judith, the senior dispenser at Mulago Hospital, and other pharmacists like her finish their calculations for the drug requisition forms, other pharmacists continue to calculate. They collate these numbers, forecast needs, select the products, and place large bulk drug orders that are supplied by antiretroviral manufacturers. In the language of pharmaceutical supply chain management, this step is called procurement and is considered to be a crucial instrument for introducing a competitive element in purchasing generic antiretrovirals from the lowest-bidding supplier. This competition has been

particularly crucial to lower the expensive prices for antiretrovirals in the early years of the roll-out of antiretrovirals (T' Hoen 2009).

Most funding agencies have established their own logistic infrastructures of spending money and distributing antiretrovirals. In the beginning, pilot projects like the MSF project in Northern Uganda demonstrated that access to antiretrovirals could be effectively provided in the developing world (Redfield 2013). Nowadays, most funding agencies have established their own logistical infrastructures and financial channels to supply and distribute antiretrovirals. Today, pharmaceutical supply management systems like PEPFAR SCMS procure antiretrovirals on the global market and transport antiretrovirals from any producer in the world to regional hubs in Accra, Johannesburg, and Nairobi. From these hubs, the antiretrovirals are delivered to the various recipient countries and, ideally, are taken to all the health centers that need them, even the ones in the most remote villages. This system became possible because large donor organizations such as PEPFAR SCMS, MSF Supply, the Clinton Foundation's Access Initiative, and the Global Fund, fostered the global circulation of pharmaceutical supply chain models for the management and logistics of antiretrovirals.

Figure 12: The supply chain network of PEPFAR SCMS.

[http://scms.pfscm.org/scms/where].

This vertical architecture created by pharmaceutical supply management means that large amounts of pharmaceuticals and donor aid money are stove-piped, circumventing the public health sector (Garrett 2007; Nguyen 2009; Dilger 2012; Pfeiffer 2013). According to Uganda's Ministry of Health's 2009-2015 Health Sector and Strategic Plan, donor aid for health is termed "off-budget," that is, money spent outside the public health budget. In 2009/10 about $440 million was accounted as "off-budget" in contrast to the overall health budget of $626 million (MoH 2010: 28). Off-budget includes about $255 million by PEPFAR and another $152.9 million by USAID for antiretrovirals (Jjemba 2010; MoH 2010: 28).

The funding arrangements for antiretrovirals have instituted novel forms of pharmaceutical government in global public health (see also Biehl 2006). This form of government takes pharmaceuticals and people as objects in mass HIV treatment programs and sets the techno-scientific conditions for the production of evidence in the global health of mass HIV treatment. In this pharmaceutical government, knowledge technologies like indicators are used to determine and measure the biological characteristics of a population, which will be the object of specific interventions. Therapeutic interventions and their health experts seize the physical and symbolic space in which collective life transpires. Not only nation-states, but also their governments and administrations act as sovereigns and define territorial and legal orders. Therapeutic interventions carried out by hybrid networks of state and non-state actors articulate the abstract space of global health infrastructures and bureaucracies, epistemic orders of humanitarian biomedicine, or normative orders of human rights, which essentially are cross-territorially defined entities like nation-states and, in fact, interfere with conventional forms of state sovereignty. In the case of the pharmaceutical supply chain for antiretrovirals, funding, information, and pharmaceuticals are often managed outside the state apparatus of countries like Uganda. Mariella Pandolfi thus suggests the term "mobile sovereignties" (Pandolfi 2002: 33) to capture how during emergencies, the performance of key functions of the sovereign state is taken over by a mobile humanitarian relief apparatus. The apparatus includes a range of protocols,

standardizations and models, like pharmaceutical supply chain models in ART, which cobbles together a broad set of social, political, and biomedical technologies (Nguyen 2010).

This therapeutic apparatus constitutes a "deterritorialized" form of mobile sovereignty, which migrates from one humanitarian disaster to the next and are legitimated by a humanitarian claim to save the lives by providing relief to a population in need (Pandolfi 2002: 370). As these apparatuses travel, they are retorritorialized in new places and create new problem-spaces. In this respect, mobile sovereignties expressed in logistic and infrastructural apparatuses of mass HIV treatment may even give rise to new territorial designations for the social and scientific orders that are crafted by respective interventions. It may not have only been a slippage that the immunologist Anthony Fauci, head of the U.S. National Institute of Allergy and Infectious Diseases, spoke with remarkable ease about the "PEPFAR nations" to designate the fifteen countries, where PEPFAR's mass HIV treatment program takes place.[45]

More funding, patients, and projects

Since the political declarations of the UN Special Session on HIV/AIDS (UNGASS) in 2001, global funding for ART has sharply increased to enable an "urgent, coordinated, and sustained response" to the AIDS epidemic. Subsequently, a range of programs and novel funding mechanisms were launched: the WHO initiative which was to provide 3 million people with antiretrovirals by 2005, and the UNAIDS Drug Access Initiative, which was later expanded towards the UNAIDS Accelerated Access Initiatives. More importantly, the Global Fund to fight against HIV/AIDS, Tuberculosis, and Malaria was established in 2002 and was followed by the U.S. President's Emergency Program for AIDS Relief

[45] Anthony Fauci "Ending the HIV Epidemic: From Scientific Advances to Public Health Implementation"; 19th International AIDS Conference, Washington DC. July 22-27, 2012. The transcript of the plenary session "Ending the Epidemic: Turning the Tide" can be accessed on [http://www. globalhealth.kff.org].

(PEPFAR) in 2003. The graph below provides a rough illustration of the increase of funding over the last decades.

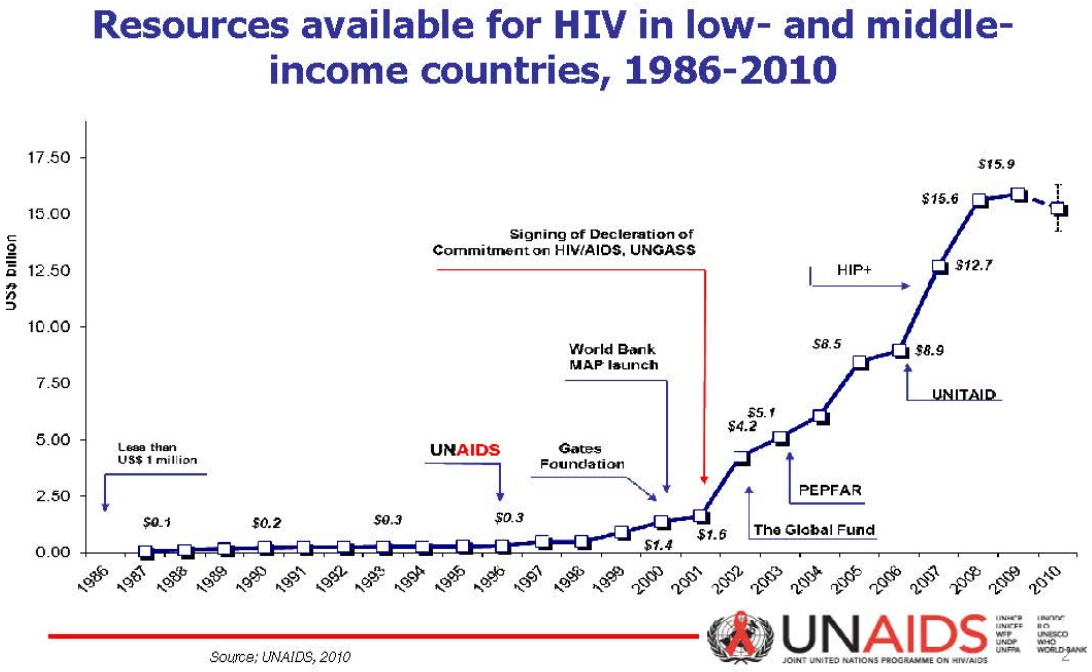


Figure 13: "Financing ART in low and middle-income countries"; UNAIDS; 2011. [http://www.who.int/hiv/amds/forecasting_meeting2011/en/index.html].

Two-thirds of the funding for antiretrovirals was supposed to be attributed to sub-Saharan African countries. PEPFAR, which regards itself as the largest global health intervention, disbursed $1.8 billion in Uganda between 2004 and 2011.[46] The Global Fund also committed at least more than $400 million mainly for the procurement of antiretrovirals, but the release of this funding was delayed because of a corruption scandal.[47] In addition,

[46] PEPFAR committed $18.5 billion for 15 focus countries in its first phase [http://www.pepfar.gov; accessed 6.5.2013]. The Global Fund committed about $11 billion worldwide. The chapters below will discuss in more detail how donor funding relates to national health budgets.

[47] See also Chapter 8 for a discussion of the discursive reconstruction of the corruption scandal in mass HIV treatment.

the Ugandan government introduced its own national ART program to provide free access to ART at various clinics.

The idea of universal access means that 80 to 90 percent of all eligible patients will enjoy treatment. This target further depends on the particular eligibility criteria defined in terms of the CD4 count. In 1997, when patients still had to pay for treatment in Uganda, it was estimated that about roughly 450 people had access to antiretroviral medicines. The treatment numbers for the year 2002 probably stood at 10,000 people. With the advent of free ART in 2004 treatment numbers edged closer to 45,000 people. By 2005, numbers increased to 67,000 patients, according to various accounts (e.g., Katabira and Oelrichs 2007: S6). Between 2009 and 2010 when I conducted my first field research in Uganda, treatment numbers had reached nearly 220,000 people. Since then, the rate of scaling-up access to treatment has not been as fast as in the previous years.

In terms of measures like treatment numbers, however, caution is warranted. As various commentators note, health is difficult to come by in Uganda and in other African countries and often does not arrive at the centers of global health policy in the expected quality. Edith Musisi, the general manager of one of the major supply organizations in the country, whom I asked for the most recent treatment numbers, told me that she had checked the data just before we met for our conversation. "[I]n Uganda" Edith said, "out of the one and a half million people that are living with HIV/AIDS, nearly 220,000 have access to ART. That number [in] Uganda keeps changing. Sometimes depending on whom you speak to, you know, you may have a different number. You can take whatever you have—okay?"[48] Edith knew the exact number of patients her company supplied with antiretrovirals; however, she could not tell how the supply related to the overall treatment numbers in the country.

The inaccuracy of treatment numbers was remarkable, especially considering the huge amount of donor aid flowing into Uganda and needing to be accounted for in terms of patients. Or, perhaps accurate numbers were less important as long as they were increasing.

[48] Interview MS; Medical Access; 1.7.2010; Kampala.

"Money did not matter" Edith Musisi said, recounting her experiences of the early years of rapid scaling up:

> "You know, I mean, I call it insane amount of money. HIV has been always in the area (Uganda), but it's been crazy amounts of money, which have been coming in. Like in the beginning, there was the Bush administration; there was pressure on these institutions to spend money and to put pills in a patient's mouth. Money did not matter at the time."[49]

Similarly, Morris Mutabaazi recalled the haste in scaling up access to treatment through the numerous NGOs in the country: "A few years ago, Uganda was so prominent for its AIDS response and there was so much money available, we just turned everything into an ART clinic. 'Take the toilet; turn it into a store. You have a veranda? Transform it into a dispensation area. Here is money.'"[50]

These large amounts of funding are not less subject to principles of accountability and efficiency, which are increasingly tied to performance measurement systems in the broader arena of international aid and other fields of economic and political organization. As Morris Mutabaazi cautioned, grant applications and project management have become stricter over the years. "It has become more competitive," he said. "There are so many organizations in the country, and we are competing for lesser money and fewer drugs to help our patients."[51] All organizations needed to develop research capacities and adopt scientific principles in order to account for pills and to measure impact. They had to innovate so they would not be cut off from the flow of international aid—an essential precondition for a stable supply of pharmaceuticals, both in terms of maintaining patients on treatment and for continuing the expansion of their HIV treatment projects.

[49] Interview MS; Medical Access; 1.7.2010; Kampala.

[50] Interview JO, pharmacist; 8.11.2009; Kampala.

[51] Interview JO, pharmacist; 8.11.2009; Kampala.

Even though the funding for HIV treatment appears to be unprecedentedly high compared to any other disease, the amount of funding is relative, and it is necessary to ask more specific questions regarding the use of funding: what are the costs of HIV treatment as a lifelong therapy for mass populations, and who should bear these costs? How is this money to be spent and, moreover, how does one provide an equitable distribution of pharmaceuticals? How are these calculative practices bringing HIV as a chronic illness into being? Most notably, how are patients counted and how do they get access to treatment? To understand who gets when access, how a normal life with ART is produced, I will examine how technical devices such as 'treatment slots' to monitor and control treatment numbers participate in the translation of rules of ART into a therapeutic option. Treatment slots remind of Douglas discussion of coupons as an instrument in rationing access to goods (Douglas 1967: 127). Like coupons, treatment slots are instruments to control the distribution according to the limits of financial resources for a particular good (Douglas 1967: 128), which requires both information on a population's demand, market values and financial resources. In this regard the pharmaceutical supply chain management of antiretrovirals can be understood as am apparatus that functions as a *biopolitical repository* of free ART to calculate and manage the supply of antiretrovirals.

Treatment slots

How is normal life produced in this therapeutic apparatus? How are antiretrovirals translated into free access to treatment How is the supply and the demand of antiretrovirals configured? After a positive HIV diagnosis, people are first registered as clients of a treatment program but are not immediately initiated on treatment. ART programs have a "pool" of clients from which only a minor group of clinically eligible patients is recruited into free ART. Therapy is based on the CD4-count. The CD4-counts are monitored every six months in order to see if patients fall below the official threshold of 350, which is set by the treatment guidelines. However, not all clinics have the same technical means to run a CD4-machine on a regular basis and sometimes must use the clinical staging recommended by the WHO. Other clinics send their patients to the nearest clinic with a

CD4-machine. Clinics in urban Kampala often run extensive liver and kidney tests before patients are put on treatment, which rarely happens at rural HIV treatment programs. Some programs use the most recent threshold of 350, while other programs stick to a CD4-count of 250 or even 200 as the threshold to initiate patients on treatment. The enrollment in ART does not only include medical eligibility criteria and the respective technologies to measure them (CD4-count machine), but also social technologies like HIV counseling to teach patients the rules of strict adherence before they start treatment. Counseling, particularly pre-ART counseling, is a social technology, which teaches patients to disclose their HIV status, spread models of 'living positively,' or demonstrate the way patients improve by being adherent to the strict treatment regimens and arranging a treatment supporter.

HIV treatment programs in Uganda use the term "treatment slots" to calculate the recruitment of new patients into a program. Statements like "we still have 100 slots for this month," "others still have free slots," or "we exhausted our slots" are common ways to talk about medicines and patients. The slots can be understood as calculative devices mediating patient numbers and 'demand.' Such mediations, in turn, are used to quantify the required supplies for free ART (Callon and Muniesa 2005). As calculative devices, the slots constitute the material relations that determine the technical and logistical conditions of scaling-up ART.

Treatment slots are hybrid objects and do not easily fit into the framework of the sciences or the social (see Jasanoff 2004). Treatment slots reflect the budget and the targets in HIV treatment programs. They are tools that calculate and account for pharmaceuticals. But also, "slots are human beings" enrolled or needing to be enrolled, as pharmacists explain.[52] Slots represent what lifelong treatment means to patients. Once patients are enrolled into free HIV treatment, programs are responsible for the continuation of treatment—for the rest of a patient's life. Filling slots, keeping patients on treatment, and more importantly the lack of slots all have significant implications for patient's access to treatment and health. In this

[52] Focus group discussion on "Pharmaceutical Supply Management" with pharmacists and program managers; 7.8.2009; Kampala.

respect, hybrid objects like slots reflect the idea that "increasingly, the realities of human experience emerge as the joint achievements of scientific, technical, and social enterprise: science and society, in a word, are co-produced, each underwriting the other's existence" (Jasanoff 2004: 17).

Treatment slots are usually set by donors and by the Ministry of Health. In the case of the Ministry of Health in Uganda, they will always say, "we are ready." Based on the clinic reports' information, they will replenish the number of slots. Whether clinically eligible patients can be put on treatment depends on the number of "open treatment slots," which in turn, depends on the commitment of the Ministry of Health to supply pharmaceuticals for these slots. Ultimately, slots determine the threshold for recruiting patients. As Judith Hoyelah explained, "at one time you may find anyone with a CD4-count of 250 is recruited and at another time one of 200 is rejected. So it depends on what is available."[53] Yet, what is available or not in free ART, as drug stock-outs demonstrate, exposes the contingencies and the complexities inherent in the therapeutic apparatus of life-saving pharmaceuticals.

In contrast to the public sector, where the pharmaceuticals were short in supply, the slots for NGO-run ART clinics are allocated by various donor agencies, most importantly PEPFAR. As Morris Mutabaazi the pharmacist managing the PEPFAR supplies for Clinic U described: "For a particular period of time, based on the resources we have and what we can handle, they [PEPFAR] are just giving you 900 slots, meaning that you can only recruit up to 900 patients in that year. Your ceiling is 900 and if you have lost some patients you can only replace those ones."

Similar to the public sector, the allocation of slots for Clinic U by PEPFAR knows its unpredictibilities and dynamics very well. Treatment slots are flexible and reflect the way complex entanglements in antiretroviral supply structure mass HIV treatment programs, as Morris Mutabaazi explained:

> "In the middle of the program, they tell you of additional slots from 'Kalongo' and then you have to rush to recruit more patients. If you have 900 slots and you recruit

[53] Interview EL; 17.8.2009; Kampala.

only 300, then the fear is that next year they may reduce them. Slots can be a double edge. You may be just implementing and suddenly they tell you 'stop recruiting' because they say, we cannot afford to sustain. So the pressure is to get more or it is pressure that you cannot absorb more".

Treatment slots establish the rules for recruitment of new patients into treatment and vary considerably according to the source of funding and pharmaceutical supply channels. As Van der Geest, Whyte, and Hardon's work on the social life of medicines suggests, differences in free ART can be understood as an effect of the different biographical life stages medicine can take (Geest, et al. 1996). The same pharmaceuticals can travel through different channels, leave different paper trails, pass through different organizations, and take different geographical routes to reach their patients. As Ian Harper says, the different itineraries ultimately constitute different things, reflecting a diversity of rules of ART and a multiplicity in ART itself (Harper 2005: 137).

Infrastructural multiplicities and diversity in the rules of mass HIV treatment programs are exemplified by the way scaling-up and stock-outs of ARVs take place side-by-side. In 2010, when Clinic U ran the pharmacy of ART in constant crisis mode, *The AIDS Support Organization* (TASO) became the largest non-governmental HIV treatment program in Uganda by increasing its treatment target from 27,000 to 31,000 patients. These additional numbers referred to the number of patients receiving the standard first-line AZT/3TC/NVP combination, which patients must take twice a day for the rest of their lives. Any scale-up is thus a difficult calculation of financial resources, patient numbers and more importantly price reductions for generics to generate more slots.

I asked how TASO could add 4,000 additional slots and whether funding had increased. Peter Obicho, the senior pharmacist at TASO, responded:

"No, not at all. In fact, our funding for drugs has remained stable since we started, we were only realizing savings through price reductions. We started with 500 patients in

2005. We only ask our funders, if we can increase the number of patients, when we make savings, then we set our new targets".[54]

Saving lives was about making financial savings to procure more pharmaceuticals. "Realizing savings"—small and large savings—reflects the way 'every pill counts' in the organization of ART. Before TASO dispenses ARVs to patients, pharmacists remove 2 pills from each bottle, which usually contains the monthly dose of 60 pills. The next refill appointment for patients is usually scheduled 28 days later, which leaves 2 to 4 extra pills. The pharmacy retains and accumulates the leftovers in order to recruit additional patients.

TASO's scaling-up of access to treatment was remarkable because at the time when Peter Obicho added 3,000 new treatment slots, most pharmacists and doctors in the country were concerned with heavy stock-outs that put various programs at the brink of a treatment crisis. During the same period of time, many clinics had stopped the recruitment of new patients or even turned patients away. As Obicho explained, price reductions for the many different regimens that are on the global market have to be regularly computed for any possible savings. Calculative control over treatment numbers, furthermore, builds on a "good working relationship with our supply chain management partner, who regularly solicits for further price reductions from the multinational pharmaceutical companies." A switch from branded to generic regimens, for instance, can produce considerable savings and "lots of slots." Translating savings into possible extra patients requires a close monitoring of developments in the wider pharmaceutical market (price reductions, new generics, etc.) as well as creating reliable, computerized records of existing and possible patients.

Slots are not only the result of global health funding but in addition also the result of the pharmaceutical politics to lower the prices for antiretrovirals by raising the competition through the procurement of generic antiretrovirals (Biehl 2006; Hayden 2007). Price reductions for antiretrovirals have been enormous over the last few years and are largely

[54] Interview IM; 14.1.2010; Kampala.

limited to first-line regimens developed in the so-called pre-TRIPS era. The TRIPS agreement was introduced in 1994 by the WTO to standardize intellectual property rights on an international level. Among many other advantages, the TRIPS agreements ensure originator companies a twenty-year protection on their patented products. This international standardization, however, included a transition period until 2005 for countries like India, where cheaper generics could be produced without asking for permission from the originator companies. In 2001, the Indian generic producers Cipla thus offered a combination therapy for $350 per patient per year. Since the price for a drug cocktail of originator products ranged between $10,000 and $15,000 per patient per year, Cipla's advances led to a massive price drop (T' Hoen 2009; T' Hoen, et al. 2011). Social movements like the Treatment Action Campaign and MSF's Access Campaign began to vehemently challenge pharmaceutical companies who were trying to prevent developing countries like Brazil, South Africa, and Thailand from producing or importing cheap, generic antiretrovirals (T' Hoen 2009: 25). Today, the cheapest generic combination therapy, Duovir -N costs $199 per patient year; this price is the result of the competition between generic and originator producers.

This generic competition and the respective price reductions have been essential to generating 'savings.' For treatment providers like TASO, cost savings were essential for scaling-up access to treatment quickly. At TASO, a shift from original products to generics enabled the organization to scale-up from 500 to 7,000 patients. Each year, further price reductions led to more savings such that targets were continuously increasing to 12,000, 20,000, 31,000, and finally to 33,000 patients in 2009. The scale-up of access to treatment was thus largely a result of price reductions and the competition with generic producers.

Treatment slots are technical devices that account for the funding and procurement of relatively expensive antiretrovirals and enable the scale-up of treatment. Scaling up of access to treatment is not necessarily the result of continuously increasing amounts of funding, but of projects making 'savings.' Treatment slots are calculative tools to keep calculative control over the demand. Slots are limited. If slots have been exhausted, new slots come in only through patients who have been lost, or from other projects who did not reach their targets.

In contrast to the frequent portrayals of an abundance of resources in HIV treatment in global health interventions, the previous chapter showed that resources in ART programs are highly insecure and that the demanding and vulnerable treatment provision infrastructures do not immediately lead to a permanent provision of treatment, an increase of treatment numbers, or the achievement of the wider goal of universal access. Rather, access to treatment is predicated upon technical devices like CD4 counts and calculative practices that manage treatment slots. These calculative practices are oriented toward making savings as a way of increasing slots.

The economics of cheap generics

The calculative practices to increase treatment slots in the government of mass HIV treatment programs also have their limitations. Most of the donor aid for antiretroviral therapy today is spent on cheaper first-line regimens, which are no longer protected by international patent laws. Nearly 80 percent of all antiretrovirals in the world are procured from Indian generic producers today (Waning, et al. 2011). Even PEPFAR, after buying only expensive originator products in its first years, claims to spend 89.33 percent of its overall budget for generics, which is $202 millions annually (Holmes, et al. 2010; but see Ingram 2012).

Edith Musisi, the general manager of the private not-for-profit antiretroviral supplier for all PEPFAR programs in Uganda still negotiates for price reductions. The price reductions are today smaller and have come down to about $0.5 per pack. Thus, the prices for first-line regimens are very stable, and the price drops are less dramatic than in the past. As she explained, more savings could have been made if the U.S. Food and Drug Authority (FDA) would have approved generic regimens earlier and if the FDA-approval had been implemented faster in Uganda.[55] According to PEPFAR's procurement policies, only antiretroviral medicines approved by the FDA can be purchased with PEPFAR money. However, the FDA-approved generics came rather late compared to WHO's

[55] Fieldnotes and interview MS, Medical Access; 15.6.2010; Kampala.

Prequalification Program. As an effect, suspicions were raised that the pharmaceutical industry was influencing PEPFAR's procurement policies (Kapstein and Busby 2010; Ingram 2012). According to Edith Musisi, switching from originator products to generics indeed led to remarkable savings—but not before 2007. Before 2007, PEPFAR funded ART programs could not purchase generics. At that time Musisi had also run a parallel calculation of what she termed "missed opportunities for savings" due to delays in procuring FDA-approved generics. Between 2005 and 2007, TASO also missed savings of about $4.5 million, and all PEPFAR programs in the country had missed the opportunity to save about $9.5 million. This calculation even suggests that if programs had switched patients to generic antiretrovirals earlier, more patients would have access today.

Savings reflect the general scarcity of antiretrovirals, a situation where the demand for antiretrovirals permanently exceeds the actual supplies. But how much funding and pharmaceuticals are needed to provide treatment? In principle, the calculation of the *long-term* costs of treatment is not very different from the calculations that Judith Hoyelah taught me in her pharmacy. Moreover, like the other pharmacists pointed out, a crucial element in the calculated management of antiretrovirals is price reductions for antiretrovirals to generate savings. Such assumptions can be utilized in long-term projections of treatment costs. The enormous standardization of ART and adherence models to treatment is what reduces the number of variables in calculating the costs of treatment. Such models can rely on the assumption that the demand of ARVs will increase but will also stay constant as it can be assumed that all patients take 1 to 2 pills every day, depending on the regimens. John Stover and others' projects presented in *Long-Term Costs and Health Impact of Continued Global Fund Support for Antiretroviral Therapy* (Stover, et al. 2011; see also McCoy 2011) are one example. These authors estimate the costs for antiretrovirals will continuously decrease from $1.9 billion to $1.7 billion by 2020 for a cohort of 3.5 million patients. Although such models have a number of obstacles, such methodologies are based on data coming from countries like Uganda and on a "commodity approach" that equates pharmaceuticals with patients' life years to determine the impact of ART. Thus, a common interpretation would be that every year, ART yields 2.3 million 'life years' saved. What can be inferred from such calculations? A typical question in this realm

would be: How much money must be invested in order to provide treatment to more than 3.5 million patients?

The enormous standardizations of the demand enables the identification of the major factors, which will drive the overall costs of treatment —in this case, the costs of second-line therapies. These calculations are based on estimations for an average price reduction for first-line and the more expensive second-line therapies and, in addition, factor a migration rate from first-line to second-line therapies. However, since the laboratory capacities are lacking, it seems that a higher migration would be more realistic. If that were the case, however, annual costs for treatment would, instead of decreasing, climb up to $2.3 billion to keep patients alive (Stover, et al. 2011). Although this model is limited to a cohort of 3.5 million, whereas the number of people eligible for ARVs is, of course, much higher, Stover and others' calculations are broadly in line with other global estimates. These estimates range from a minimum requirement of $7 billion in funding to provide universal access to treatment to more ambitious targets that seek an overall reduction of infection rates, which would require $22 billion annually for all patients (Schwartländer, et al. 2011: 2031).

These projections use in principle the same calculative practices like the pharmacists in Uganda. They build on the encompassing standardization of life-long antiretroviral therapy. With this standardization of therapy, antiretrovirals can be easily translated into financial costs and calculate the impact of antiretrovirals in terms of patient life years. All these elements are necessary for projecting the need for antiretrovirals. The simplicity of these calculations rests on the trust that patients can and will take pills everyday for the rest of their lives. In addition, like the pharmacists mentioned above, these projections work with the assumption that the costs for antiretrovirals regimen will continuously decrease. I will return to the discussion of the pharmaceutical politics of price reductions in Chapter 9.

8. Improvising therapy

Managing the shortage of antiretrovirals

Let me return to Judith Hoyelah and the shortages at Clinic U in Kampala where Duovir -N, the trade name for the recommended standard first-line treatment regimen AZT/3TC/NVP, was almost out of stock to the point where new patients could only enter the program if their CD4 count was very low. In addition, about 5,500 patients already on treatment were waiting for these medicines as well. These 5,500 patients were enrolled in the national free treatment program and received "MoH drugs" from the Ministry of Health, which were procured and distributed by NMS in Entebbe. In contrast to the stock-out of "MoH-drugs," about 1,000 patients were on "PEPFAR drugs," which were regularly supplied through the private not-for-profit company Medical Access, a company that supplies all treatment programs funded by CDC with PEPFAR money.

The distinction between "PEPFAR drugs" and "MoH drugs" spoke to the complex entanglements of supply channels in the therapeutic AIDS economy in Uganda (see Table 1). Both sources supplied the clinic, and the majority of the clinic's patients had the same fixed-dose combination of AZT/3TC/NVP. In the previous months, stock-outs had become prevalent at the clinic because NMS had not supplied the ordered Duovir -N. If NMS does not supply Duovir -N, Judith Hoyelah borrows from "PEPFAR-drugs"— the same AZT/3TC/NVP fixed-dose combination—which will eventually be replaced. In the last months of this time period, when NMS' supply of medicines became extremely irregular, Judith Hoyelah was forced to constantly borrow from the "PEPFAR- drugs" without replacing them.

The borrowed "PEPFAR-drugs" were the same—the composition was the same, the therapeutic management was the same, and they even had the same trade name Duovir –N. The PEPFAR-drugs were bought with PEPFAR dollars from manufacturers in Southeast Asia, such as Cipla or Aurobindo in India, or Matrix in Pakistan, and so on. In contrast, "MoH-drugs" were procured by NMS from the local manufacturer Quality Chemicals, 20 miles south of Kampala. In 2005, Quality Chemicals together with the Indian generic producer Cipla established a pharmaceutical plant that manufactured

antiretrovirals in Uganda. The local production of antiretrovirals was regarded to be crucial to ensuring a reliable supply and meeting growing demand for ARVs in Uganda. However, Cipla and Quality Chemicals' investments into a plant for antiretrovirals required an "off-take purchase agreement" by the government of Uganda to "purchase all the antiretroviral drugs and anti-malarial drugs manufactured by the manufacturer."[56] Since the producer had not been prequalified by the US Food and Drug Administration (FDA) nor by WHO, foreign donor aid could not be used for these pharmaceuticals. The only buyer was the Ugandan government who committed its budget for ARVs and antimalarial medicines to Quality Chemicals for its national free ART program.[57]

	"MoH drugs"	"PEPFAR drugs"
Trade name	Duovir -N	Any FDA-approved regimen, including Duovir -N
Patient numbers	5,500 patients	1,000 patients
Ownership of ART program	Public Hospital	NGO
Supplier	National Medical Stores	Medical Access Ltd.
Producer	Quality Chemicals in Uganda	Any FDA-prequalified producer in the global pharmaceutical market, like Aurobindo, Matrix, Cipla, etc.
Funding	Government of Uganda	US Government through PEPFAR/CDC

Table 1: The multiplicity of AZT/3TC/ NVP at Clinic U.

[56] Memorandum of Understanding between the Government of Uganda and Quality Chemicals Industries Limited and Cipla Limited Mumbai India; December 14, 2005.

[57] As the chapters below will discuss in more detail, the pharmaceuticals procured from Quality Chemicals were twice as expensive as the international price level indicated, and, according to the off-take purchasing agreement, the Government of Uganda and the National Medical Stores could procure fewer antiretrovirals with the budget for ARVs. See also Chapter 8.

Patients who received the AZT/3TC/NVP fixed-dose combination might have noted some material differences, for instance, the packaging or the color of the pills. Perhaps they also would have noticed differences in the names, depending on which particular product had been purchased. Doctors, pharmacists, and counselors would have to explain that these medicines were the same. Pharmacologically speaking, "MoH-drugs" and "PEPFAR-drugs," which were shifted during stock-outs, were equivalent. Yet, the differences between them were neither superficial nor insignificant. Rather, they revealed underlying logistical, infrastructural, and political specificities that mattered most when it came to stock-outs.

Judith Hoyelah first borrowed medicines from the clinic's PEPFAR source, but this borrowing was limited to 30 percent. For months, Judith "crunch[ed] on her buffer stock," which was supposed to cover two months' supplies. As Judith continued to wait for the supplies, she and the other medical personnel had to adjust the treatment guidelines.

Over a period of about six months, the threshold for starting patients was reduced step by step from the recommended CD4 count of 350 to 250 down to 50. This reflected a necessary precaution for dealing with uncertainties and ensuring treatment for all existing 6,500 patients. As the antiretrovirals still did not arrive and Judith exhausted the limit of borrowing from PEPFAR sources, she stopped enrolling new patients completely and, in addition, she reduced the monthly dosages for her patients. Instead of the usual one-month supply, patients received medicines for two weeks. After several months of stock-outs, she ordered the delay of new patient recruitment. There was nothing much Judith could do, she explained, because she had to ensure continued drug supplies for patients who were already on treatment.

After the supply of Duovir -N was exhausted, Judith moved on to Aluvia, which also ran out, and later, National Medical Stores failed to supply Truvada (TDF/FTC), a more expensive treatment regimen. The stock-out of Truvada forced Judith to abruptly switch approximately 1,000 patients to a different regimen, which was TDF/3TC (see Figure 14). For Judith, this meant that it was necessary to drive to Entebbe once again, and again, urge NMS to give her the supplies. Eventually, NMS was able to deliver Duovir -N —the primary "MoH-drugs" —but in lesser quantity than what the clinic had ordered.

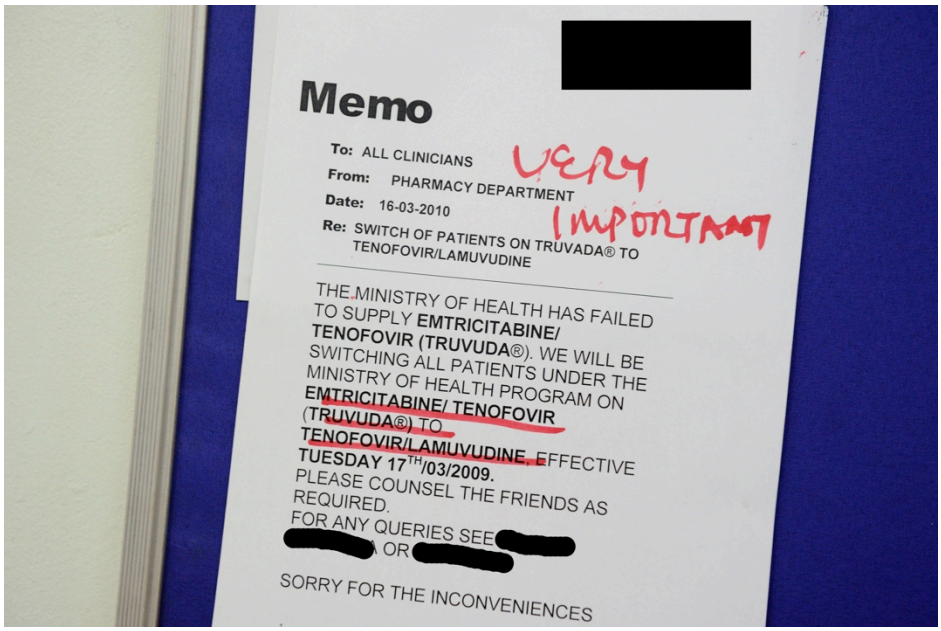


Figure 14: After the stock-out of Truvada, Clinic U switches patients to TDF/3TC. In principle, this switch is regarded to be medically equivalent. What is crucial, however, is the fact that this switch is not based on a clinical decision but is an attempt to manage the stock-outs.

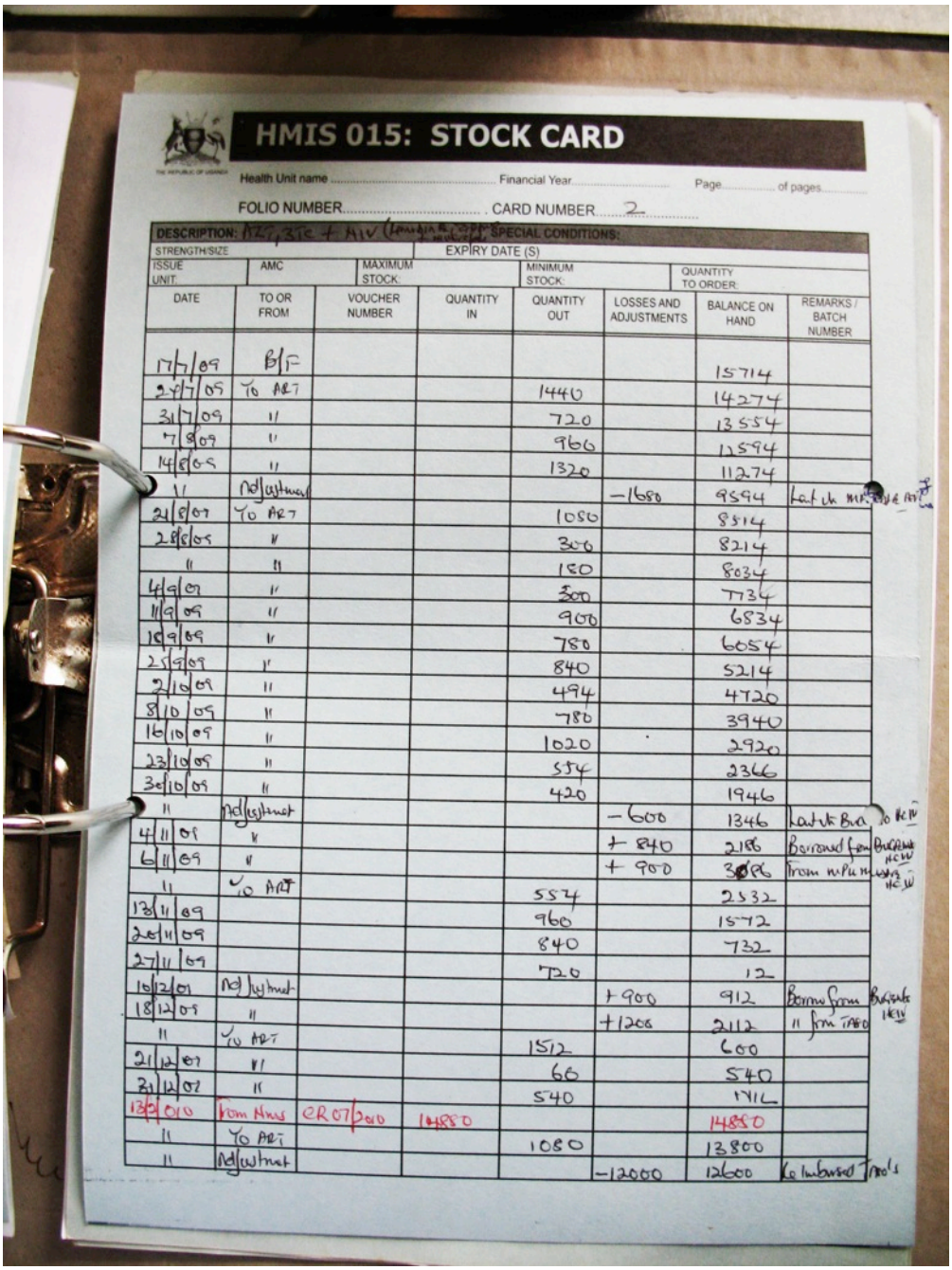
Dilemmas in rationing and sharing antiretrovirals

Like Clinic U in urban Kampala, the stock-out of ARVs also hit various hospitals in the districts in rural Uganda. Esther Birabwa, a friend's sister who had been working in HIV counseling, invited me to visit a few health centers in Eastern Uganda with her, where she knew most of the staff. The administrative structures in these districts are part of the tiered public health system in Uganda. A main hospital and the district health office can be found in the district capital, which is surrounded by a number of NGOs with names and acronyms like TASO, CRS, Family Hope, JCRC, Mildmay, and many more. Farther away are several smaller government health units. In addition, NGO-run outreach services bring treatment and care closer to the villages in order to reduce patient transport expenditures. Here, the coverage of HIV treatment programs and the numbers of NGOs and public health facilities are less dense than in Kampala, where at least a dozen larger clinics are close to one other.

The health centers we visited differed remarkably from the sophisticated architecture of Clinic U in Kampala. Rationing practices also differed from the crisis management at Clinic U. In contrast to Clinic U, these health centers did not receive any support from an NGO that could loan them antiretrovirals. Moreover, patients on treatment went without any treatment at all during the stock-out. The following excerpt from my field notes captures how patients tried to adhere to treatment and how health workers rationed and borrowed medicines there.

January 2010—Borrowing antiretrovirals

The health center in Walukuba has about 150 'active patients' on treatment. Once a week, this health center schedules an "ART-clinic day" for clients to come for their CD4-counts or to pick up their monthly refills. First, it was Duovir -N that ran out of stock. During the stock-out of Duovir -N, some patients received medicines for a month and then missed taking their medicines for another two months; other patients had to go without their medicines for three months. One patient tells us, "I still had a 'balance' from the previous months, but of course they could not take me through all three months." Another patient was able to share antiretrovirals with her friend who was registered at TASO. When her friend was switched to a different regimen, she, in turn, shared the leftovers with her. Thus, this patient only missed two weeks and managed to take the medicine regularly during the three months' stock-out. All the patients were worried when the doctors told them that the ARVs were not there. For some patients, this was the first time they had experienced such shortages. They recalled that their first thoughts were, "Are we going to die?" It was not clear throughout the three months why some patients had received more ARVs, while others had received none. One patient explained to us that whenever she had an appointment at the health center, she would come and pick up a new bottle and then go home and finish her old bottle first. In this way, she managed to make "some savings." Other patients, she explained, stayed at home if they had enough leftovers, but then when they returned to the health center, the ARVs might not be available. She remarked, "how can you miss to pick the drugs, it is your life."



HMIS 015: STOCK CARD

Health Unit name ..... Financial Year..... Page..... of pages.....

FOLIO NUMBER..... CARD NUMBER 2

DESCRIPTION: AZT, 3TC + NVP (Combivir & NVP) SPECIAL CONDITIONS:

STRENGTH/SIZE | EXPIRY DATE (S)

ISSUE UNIT | AMC | MAXIMUM STOCK: | MINIMUM STOCK: | QUANTITY TO ORDER:

DATE	TO OR FROM	VOUCHER NUMBER	QUANTITY IN	QUANTITY OUT	LOSSES AND ADJUSTMENTS	BALANCE ON HAND	REMARKS / BATCH NUMBER
17/7/09	B/F					15714	
24/7/09	To ART			1440		14274	
31/7/09	"			720		13554	
7/8/09	"			960		12594	
14/8/09	"			1320		11274	
"	Adjustment				-1680	9594	Lost in MR
21/8/09	To ART			1080		8514	
28/8/09	"			300		8214	
"	"			180		8034	
4/9/09	"			300		7734	
11/9/09	"			900		6834	
18/9/09	"			780		6054	
25/9/09	"			840		5214	
2/10/09	"			494		4720	
8/10/09	"			780		3940	
16/10/09	"			1020		2920	
23/10/09	"			554		2366	
30/10/09	"			420		1946	
"	Adjustment				-600	1346	Lost in Bus
4/11/09	"				+840	2186	Borrowed from Buddondo HC IV
6/11/09	"				+900	3086	From MPH HC IV
"	To ART			554		2532	
13/11/09				960		1572	
20/11/09				840		732	
27/11/09				720		12	
10/12/09	Adjustment				+900	912	Borrow from Buddondo HCIV
18/12/09	"				+1200	2112	" from TASO
"	To ART			1512		600	
21/12/09	"			60		540	
31/12/09	"			540		NIL	
13/1/010	From NMS	ERO7200	14850			14850	
"	To ART			1050		13800	
"	Adjustment				-12000	12600	To be reimbursed from PEPFAR

Figure 15: Stock-cards for AZT/3TC/NVP at Walukuba HC3.

The pharmacist at this clinic in Walukuba explained that Duovir -N was only out of stock for one month. At first, when NMS delivered less than what they had ordered, he borrowed ARVs from other health centers such as Buddondo or Bugembe. His stock-cards reflected

what he meant by "borrowing." The amount of drugs the pharmacist borrowed from which hospital was written on these cars, as well as the amount of drugs he lent to other hospitals.

In the entries from October 30, 2009 onward, the pharmacist recorded the amount of drugs borrowed and lent. On the right-hand side of the entry, the pharmacist noted where he had received these drugs from, or to which health center he had given drugs, since other health centers in this district were running short of ARVs, too. These loans were noted under "adjustment" as "-600," "+840," "+900," and so on. These numbers reflect amounts of pills, so the pharmacists had borrowed 10 packs, returned 14, and borrowed 13 more. According to the stock-cards (see Figure 15), the National Medical Stores supplied 250 packs of AZT/3TC/NVP on December 13, 2009—seven months later than scheduled! The last consignment delivered 60 packs on December 5, 2009, and would only last two weeks. In addition, this clinic had borrowed antiretrovirals from other health centers in the district, and at some point, the pharmacists here decided to retain all ARVs for a month. As one pharmacist explained, they did this "because it would not be fair to give medicines only to some and not to all." He went on to say that patients went without treatment for only one month; at an earlier point, he was still able to borrow antiretrovirals.

* * * *

During our conversation with the patients and pharmacists, it was not entirely clear how long antiretrovirals were rationed for or how many patients had to go without treatment. The pharmacists had rationed medicines to ensure a fair distribution, and, at some point, this meant that nobody would receive any medicines at all. Esther insisted "there is inequality where there is scarcity." In fact, some patients were still receiving antiretrovirals while others were told "there are no drugs." As Esther surmised, they either "pa[id] the nurses" or "the did somebody a favor."

After the supply of Duovir -N resumed and became stable again at Walukuba and other neighboring health centers, antiretrovirals were running out of supply elsewhere.

February 2010—Moral dilemma

Now it is Efavirenz that is out of stock. One patient pulls out a bottle of TDF/3TC to show us what the clinic gave her. "But they didn't give me Efavirenz," she says. This patient has been asked to return on Monday to see if they managed to get some Efavirenz. Later, she adds that she has some leftovers that will last her for a week. Other patients ask if the medicines will be there when they come next week. This clinic is the nearest clinic for patients coming from one the islands in Lake Victoria, and these patients would like to know if the drugs will be there next week, since they are not sure if they will be able to return every week, again and again. Our interlocutors have more questions for Esther, who has been trained in HIV counseling: "If we miss the dose at 9 a.m. and we are already somewhere else, should we still take the treatment or wait for the next day?" It seems patients had, in fact, missed taking some of their pills—so, this is where the leftovers are coming from—the patients would probably not tell the health workers at the clinic as this would be interpreted as poor adherence. Esther reminds me that there are only a few counselors around who patients can talk to, unlike at the NGOs like TASO. It takes time and the right attitude for the patients to speak to the counselors, but when they do, "they open up and ask so many questions." Esther is happy to do a bit of counseling, which she did not do for some time, and starts to talk about the types of disclosure and the right time for disclosure. She explains the difference between self-stigmatization and public-stigmatization and gives tips on breast-feeding.

Later, we visit the clinical officer to ask her many of the questions the patients had. We also investigate the missing Efavirenz and tell the clinical officer that patients were asking about what they should do if they missed their dose of Efavirenz. The officer at this clinic tells us that she has not figured out where to borrow more drugs. The neighboring health center is only left with ten bottles, so they will also run out of stock very soon. She says it is sad because she has to tell patients to strictly adhere to treatment, and then she has to tell patients that "there are no drugs." She continued to give patients on Truvada a bottle of TDF/3TC, however, without the "evening pills" (Efavirenz), although she had been advised differently: "There were some U.S. doctors who gave us a lot of help. They told us, 'if you do not have Efavirenz, you stop the whole treatment for a month.'" Even so, Esther

did not stop treatment, saying, "We counsel them to adhere to treatment, and then we are telling them to stop treatment? This is difficult. So this is our challenge. What should we say to the patients? What is clinically right or wrong is difficult to say."

* * * *

Stock-outs in this district, like in Kampala, raised moral dilemmas in rationing ARVs. To resolve these dilemmas, nurses and clinical officers had to figure out which ART clinics and NGOs still had ARVs, so that they could issue a referral letter for these clinics. They had to have a sense of where ARVs could be found throughout the country— but how was one to know?

Fragmentations and Uncertainty

Stock-outs emerged within an infrastructural multiplicity of supply channels. Although mass HIV treatment programs have undergone remarkable expansion, they still operate within very narrow economic, technical, and infrastructural arrangements. Some of the reasons for the stock-outs were due to these arrangements, and others were very specific to the Ugandan context. Most notably, the Global Fund had withdrawn its grant in 2005 because of a misappropriation of funds. Although the Ugandan government had established its own national free ART program, the 'funding-gap' for AIDS treatment left by the Global Fund 'ate' into the overall budget for health in Uganda, which had already been insufficient for many years.

May 2010—Fragmentations

Dr. Isaac and Ruth Namagunga, both working in central bodies on the supply side of ART, explained:

> "When the Government of Uganda was offering $30 million for ARVs, when we computed it, we saw that we could put 50,000 new patients on treatment. So with $30 million we can do everything. In other words, if PEPFAR would have maintained their patients and Global Fund would have maintained their patients, it meant we could have the funds of the Government of Uganda for one year to add 25,000 patients; the same amount of patients would be added the next year".

Ruth added:

> "After the Global Fund withdrew its grant, we had to make an emergency procurement to cover at least 50 percent of what we require for a quarter with some of [the] emergency funds that Global Fund nevertheless gave us. And then, they do not even cover that quarter, namely October, November, and December. ARVs only arrived on Christmas Day. What did NMS distribute in October, November, December—nothing."

In 2005, the Global Fund suspended its grant because of the mismanagement of antiretroviral money. Although a new Memorandum of Understanding was signed in the same year, it took more than two years to establish a new LTIA—the "Long Term Institutional Arrangement"—and another two years until the disbursement of all grants could be resumed. About $1.4 million had disappeared. While the rumors quite explicitly stated that the president's larger family network had been involved, everyone expected that only the small fish would be punished (in 2010). The Global Fund for HIV/AIDS, TB, and Malaria had committed $426 million. However, in 2005, the Global Fund suspended its 5 grants because the Program Management Unit at the Ministry of Health in Uganda had mismanaged funds.[58] Until 2007, only half of the total amount of Global Fund grants had been disbursed. This was about $102 million out of $200 million for three grants from round 1 to round 3 (MoH 2011: 8). In addition, the local ARV-factory, Quality Chemicals

[58] Global Fund Report No. TGF-OIG-09-005; [http://www.theglobalfund.org].

in Luzira, had been producing the common first-line regimen Duovir-N since 2009. The National Medical Stores, the public agency that procured health commodities for its health sector program, exclusively purchased ARVs from Quality Chemicals. However, Quality Chemicals charged a much higher price and was almost two times more expensive than other therapies on the global market. As Ruth explained "With the new prices, where the Government of Uganda buys drugs for $19 per pack from Quality Chemicals, twice as expensive as elsewhere, it came actually only to [medicines for] 24,000 patients in total." Thus, the amount of antiretrovirals, which could be purchased with the national health budget, decreased dramatically.

In principle, the stocks and stock-level of ARVs should have been easily estimated by examining the records of the central drug supply agencies. Ideally, the Ministry of Health should have known how many drugs were in the country and, more importantly, how many drugs were still missing. But stock-outs were extremely difficult to localize. Reports on stock-outs were scattered across different organizations and regions. In fact, during the meetings and workshops of AIDS organizations that followed-up on the treatment crisis, it became clear that nobody could provide an accurate and comprehensive picture regarding the extent of stock-outs in the country. Ruth explained:

> "We had a lot of PEPFAR coverage in the country. Even within a facility, if the drugs were running out, they were even borrowing from within. Like I understand, up to now PEPFAR money has not even been approved by the U.S. congress. There is no money. They are using the little money that was left over. And yet it was supposed to start on October 1. I even suspect they use some savings and they can borrow internally from USAID. But now we don't know where the 'PEPFAR drugs' are. We don't know. Where are they? Who buys them? Where are they stored? We don't know. This is some silly question. But I am telling you, we don't know. I am going to the IRC and I have been seeing some ARVs, but I don't know where they are coming from. JCRC, which supports so many Ministry of Health sites, where do they buy and how do they distribute, we don't know. They are managing their own system. And all are having the same problem with drug shortages. I don't even know whether

the PEPFAR supplied sites have better stocks than the non-PEPFAR supported sites. We don't know".

* * * *

Like other interlocutors, Ruth claimed that "these PEPFAR arrangements, they have thoroughly disorganized us." According to her, because of this uncertainty, organizations and ART clinics had to resolve stock-outs on a day-to-day basis. In Ruth's opinion, central organizations that coordinate the supply of ARVs like the one where she worked "need someone to tell [them, that] at PEPFAR for January and at NMS for January, Efavirenz is enough for the whole month, or for the next three months. We need someone who rings the bell for us and says after February 2010, there will be now Nevirapine in the country."

After the shortage of Duovir -N, Aluvia, then Efavirenz, rumors spread that the standard first-line regimen might again be out of stock. Judith Hoyelah knew that I was interviewing managers of supply organizations, public officials of the Ministry of Health, and employees of donor organizations and continually asked if I had "any news from National Medical Stores? Did they receive stock? Did they release the Global Fund money?"

Informants repeatedly said that Brian, who worked at one of the donor agencies in Uganda, should know because his organization was extremely well-connected to most organizations in the supply side of ART. But even he did not know exactly what needed to be ordered next before it might be stocked-out again:

Park: "Duovir -N is again running out at NMS, can you tell me if that is correct? I have heard so many different stories in the last week."

Brian: "Let me see in my emails. I have one from the 24th of May 2010, fairly recent, and it says that NMS has 71,000 packs of Duovir -N. This might last for one month. But you know that the consumption numbers are distorted. Further, there are about 12,000 packs of Combivir left at NMS, so this is very critical."

Park: "So what is going to happen?"

> Brian: "I don't know, it is difficult to say. In theory, there are two big orders in the pipeline. A government order of 150,000 packs of Duovir -N and Quality Chemicals says they have them in stock at their factory. That money has been earmarked for Quality Chemicals, but it seems that the Ministry of Finance has not released the funds. We put a lot of pressure on the government to do it as soon as possible. But this government ... Then there is another Global Fund order of about 560,000 packs of Duovir -N, but nobody knows when this will arrive. 65,000 packs of Efavirenz and 50,000 packs of Nevirapine have been ordered. But we don't know which one is going to arrive first and when."[59]

These complex and unstable entanglements in mass HIV treatment programs contrast with claims of access to free ART as a fundamental human right. Pharmacists working in pharmaceutical logistics know very well that the quantities of all kinds of essential drugs they allocate to health centers are insufficient. As an official at the National Medical Stores explained, it is "not enough for running a clinic more than two weeks." Usually, when medicines run out, dispensers write an "S/O" on the prescription forms and send patients to a private pharmacy to buy the medicine, which requires patients and their families to raise money. In contrast, HIV patients cannot be turned away without serious moral difficulties. ART is a life-long therapy and patients are disciplined to adhere to treatment to avoid resistances to the cheap first-line regimens. Patients find it impossible to pay 30,000 Ugandan Shillings a month (about $12) for the cheapest fixed-dose-combination. Moreover, ARVs cannot be bought at any pharmacy in Uganda.

Chronicity and Scarcity

The scale up of free access to ART posits a distinct logistic question, namely, how to supply these pharmaceuticals to the large number of patients in need. Other questions follow: how will aid money be spent? How can a reliable and permanent supply of pharmaceuticals be

[59] Interview KE; 30.5.2010; Kampala.

established? How is the demand for pharmaceuticals determined? How is the circulation of funding, pharmaceuticals, and information to be controlled and governed? For organizations to make things, like pharmaceuticals, information, and capital, too, they must rely on the existence of institutions that work according to general principles of rationality and scientific objectivity. However, as Rottenburg points out (Rottenburg 2009a: xxi), in emergency situations in particular—the very reason for the global circulation of models like pharmaceutical supply chain management—such principles cannot be presupposed to exist.

In the case of mass HIV treatment, organizations like PEPFAR (Nguyen 2009) or MSF (Redfield 2008) have over the years developed their own infrastructures and therapeutic apparatuses, which take decisions over life and death in the provisioning of life-saving treatment. But infrastructures and apparatuses are not exactly the same as institutions, which, in the conventional understanding, should make important decisions, as they have legitimacy that individuals or single organizations cannot have.

To return to Weber's distinction of rationalities that orient the supply of goods, as all goods are scarce, institutions are essentially interpretations of what counts as a necessity and moreover define techniques to distribute these necessities fairly, which includes the rationing of these objects. As the anthropologist Douglas highlights, this conventional understanding suggests that "letting institutions do the thinking" is better for difficult decisions and that one should rely on the institution's provision of categories of thought and its protocols to guide individual decisions (Douglas 1986: 124). But, as Douglas notes, this conventional understanding is more difficult for a "brand new invention", e.g. in her case kidney dialysis, where institutions for setting priorities in allocation do not exist and cannot do the "choosing" (Douglas 1986: 125). But this may be the general point of departure for political institutions' provisioning life-saving inventions, whose legitimacy will always be doubted, as Douglas suggests.

It is then perhaps less surprising that global public health experts now increasingly suggest building "stronger health institutions", as the transfer of ideas, models, and biomedical technologies in the scale up of access to treatment does not yield the expected political and

material results (e.g., Balabanova 2010; Frenk 2010). This demand for stronger health institutions tries to go beyond the 'hit and run'-approaches in humanitarian relief and move toward 'holistic approaches', which presumably should have been addressed in the first place. However, the notion of stronger health institutions begs difficult questions such as: What are institutions? How are institutions related to the ideas of order (stability) and disorder (chaos, crisis) that these commentators have in mind?

The stock-out of antiretrovirals contrasts with expectations of normality associated with these pharmaceuticals and conveyed by a range of technical, political and economic conditions to ensure a reliable supply of antiretrovirals. The antiretrovirals enable the normal life, which participants of the focus group discussion had been interrogating. The lack of access to antiretrovirals has different meanings to patients. It is experienced as threat to life. Additionally – and less explicitly – , the stock-out of antiretrovirals questions the way normality and the idea to return to a normal situation is usually contrasted with the notion of a crisis. More importantly, they raise questions about the uncertainties and dilemmas that revolve around the stock-out of antiretrovirals. These stock-outs are the result of a more general shortage, and even the calculated administration of scarcity, of antiretrovirals in the country. The acute shortages of antiretrovirals in the form of stock-outs which result from the general scarcity in the country might be considered as a "crisis embedded in crises" (Vigh 2008: 13). This phrase pays particular attention to situations where crises are a condition or, as Vigh writes, a chronic condition (Vigh 2008: 9). Vigh suggests that this understanding of chronicity for all kinds of prolonged crisis, which counters the prevailing meaning of crisis as a "rupture" of the order of things, distinguishes the crises from the normal (Vigh 2008: 8). But like most crises in African contexts, the lack of all kinds of essential goods is of recurrent nature, which should not be taken as an absolute chaos. Guyer's study on the supply of food in post-colonial Cameroon points to the lack of predictability surrounding the institutional transformation, rather than a complete breakdown of social and natural orders (Guyer 1987a: 115). The recurrent nature of such crisis and its continuous problematization by administrators and experts' ideas for quick technical solutions (Rottenburg 2009a), suggests, according to Vigh, "that though crisis is fragmentation, it is, in a social scientific perspective, not a short-term

explosive situation but a much more durable and persistent circumstance. Not a moment of decisive change but a condition" (Vigh 2008: 9). In this regard stock-outs rather express how crisis and normality are both embedded in crises and demonstrate the persistence of insecurity expressed in various forms of institutional uncertainties and fragmentations about the future of the supply of antiretrovirals.

Insecurities are crucial in order to understand how HIV is brought into being as a chronic condition. Vigh does not explicitly address HIV or the AIDS crisis as examples for the chronicity of crises. Chronicity as a property of both HIV as an illness and the AIDS crisis illuminates how scarcity and fragmentations are interlinked. A long-wave event treatment requires predictability, but that is undermined by a fragmented and disorganized supply system. Yet such unpredictabilities are not an exception. In the public health system, which is based on the essential medicine's concepts, all kinds of medicines are in short supply and unpredictable.

The last chapters discussed a systematic set of issues in making antiretrovirals available in contemporary mass HIV treatment, ranging from the financing of ART, intellectual property rights regimes, and novel forms of global health governance. Further I examined how these issues hang together in the calculated administration of scarcity. Despite of frequent portrayals of an abundance of resources, by both the proponents of ART and the critiques of a disease-specific layout, I have been describing a range of practices, like making savings, borrowing and sharing pharmaceuticals which express the economic rationality expressed in the scale-up of access to treatment under conditions of scarcity. These practices are particularly visible during stock-outs, but nevertheless they have been from the beginning pivotal for the introduction of free ART.

Moreover, I suggest that these practices of rationing have been fundamental for understanding how HIV is brought into being as a chronic condition. Mol suggests that diseases are literally done by being "performed in a specific way" through practices and routines (Mol 2002: 32). Rules coordinate practice through which a disease is performed. Resonating with a Wittgensteinian notion of rule, Mol argues, if there are no rules, "actors

improvise" (ibid.).[60] Following Mol's elaboration on practices, I will use the term 'to *enact,*' instead of 'to perform,' in order to avoid a distinction between the rule and its actual performance. Rules exist in enacting an entity (Mol 2002: 33); thus, in the case of the rules of ART, they do not only describe how to use antiretrovirals, they enact HIV as a chronic illness through a range of practices like counting, measuring, and monitoring pills and people. In the multiplicity of projects, sources of drug supplies, and a variety of ways of organizing access to treatment in Uganda, HIV is enacted differently at different sites. This raises the question how difference is produced in the multiplicity of logistic and infrastructural arrangements through which antiretrovirals are supplied into the country. As practices of treating a disease differ between different sites, the question of how the diversity of objects is held together under one single name through various modes of coordination of practices arises. The suggestion I wish to put forth is that we should not only ask to what extent ART saves lives, often in quite selective ways, but also ask how the supply of antiretrovirals organizes the AIDS crisis and brings a distinct notion of chronicity in terms of a normal life and death into being.

As practices which handle objects like diseases are always in the plural, the entities brought into being are "slightly different one each time", as Mol points out (Mol 2002: vii). Considering HIV as a multiple entity is the result of an infrastructural and infrapolitical multiplicity of free ART programs in Uganda—a multiplicity of projects, sources of supplies, and a variety of ways organizing access to treatment—enact HIV treatment at different sites differently. As practices handling a disease differ between different sites, the crucial question is how the diversity of objects is held together under one single name through various modes of coordination (Mol 2002: 84)? Stock-outs reflect in more drastic ways how the multiplicity of HIV has been resulting out of a massive projectification of

[60] If a particular situation – in this case the stock-out of antiretrovirals – escapes rules, practices give rise to new rules through improvisations and adjustments. As Wittgenstein emphasized "we make up the rules as we go along" (§§83). Wittgenstein's *Philosophical Investigations* (2003) are full of such vivid examples to demonstrate that rules are not learnt through formally defined rules, but by training, instructions, drill, and more importantly by imitating practices. The correct application of a rule, however technically and morally clear it may appear, cannot be logically inferred from the rules themselves, but depend on the particular circumstances. That is rules are always underdetermined and the possibility "to do it differently" according to the circumstances is inherent to the imitation of practices.

treatment in the country (Whyte, et al. 2013), which epitomizes novel figurations of market, science and politics (Rottenburg 2009b). The infrastructural apparatuses of global public health are poorly coordinated arrangements as various commentators have repeatedly pointed out (e.g. Fidler 2007; Pfeiffer and Nichter 2008; Pfeiffer 2013).

To expand Mol's argument, the modes of coordination in free ART suggest that chronic conditions like HIV are better understood as entities, which are better understood as the continuous of *re-enactment* of the AIDS crisis. My elaboration of Mol's argument toward the examination of the reorganization of the AIDS crisis draws on the article "Enacted sense-making of crisis situation" by Karl Weick (Weick 1988). The continuous re-enactment creates what the organizational sociologist Karl Weick can be understood as an "enacted environment" in the managing of a crisis, in this case the stock-out of antiretrovirals (Weick 1988:307). In enacting a crisis, actors do not only manage a crisis, but "to sort out a crisis as it unfolds often requires action which simultaneously generates the raw material that is used for sense-making and affects the unfolding crisis itself" (Weick 1988: 305). The enacted environment of a crisis is in this regard an „orderly" crisis, which is continuously re-enacted in a range of practices to represent and manage the crisis and the collective perception of it (Weick 1988:307).

In this respect the stock-out of antiretrovirals suggest to understand the enactment of HIV as a chronic condition as the continuous re-enactment and moreover the permanent reorganization of the AIDS crisis. The last section described how the multiplicity in free ART described with words like fragmentation, overlapping, duplications, redundancies and inefficiencies, gaps became subject to new interventions to rationalize the complex entanglements in the supply of antiretrovirals. In the following chapters of Part 3 I will turn to the continuous reorganization of institutional the framework of ART after the stock-outs of antiretrovirals in the country. In these chapters I will ask how pharmacists, researchers and administrators responded to the stock-outs. I will thus argue that the organization of access to treatment requires a constant adjustment and adaptation to situations of extreme uncertainty and is better described as the permanent reorganization of treatment.

PART 3: AFTER THE STOCK-OUT

The following chapters describe the reorganization of the supply side of antiretrovirals after the stock-outs in 2009 and 2010. "The ARVs are there" as pharmacists put it. But what does it mean that antiretrovirals are there? How were the stock-outs resolved and which reasons were identified as the cause of these stock-outs? In the previous Chapters 6 and 7, I argued that stock-outs and the respective practices of rationing are intrinsic to the rationalization of the supply of antiretrovirals to reach the large number of patients in the country. In the following chapters, I will describe the permanent reorganization of the AIDS crisis by focusing on the way the "harmonization" of the supply side of antiretrovirals was staged as a response to the stock-out of antiretrovirals.

I will first describe how the stock-outs sparked intense controversies about the organizations representing the 'public sector' in the provision of free ART. I will point out how stock-outs brought what Cori Hayden terms the pharmaceutical public into being, which questioned the official contours of the public sector (Hayden 2007). According to Hayden, this pharmaceutical public needs to be understood against the opaque pharmaceutical politics of the state and the industry, which the media and so-called civil society organizations try to unravel (Hayden 2007). The public is not only after the real story *behind* the stock-outs. The public is constituted in battles over the very identity of the public sector and the performance of key functions of the sovereign state expected of this 'public sector' in the context of the projectification of antiretroviral therapy. The stock-out of antiretrovirals raises a number of intriguing and interconnected questions: how are the 'publics' in the form of the public interest reasserted in the delivery of antiretrovirals? How are the NMS, the Ministry of Health, or the Ugandan government reasserting sovereignty in the public sector against the flurry of global health interventions? How do these organizations delineating and constructing institutional boundaries over the supply of antiretrovirals? Finally how are the state and the public fitting into the pharmaceutical politics of generic antiretrovirals? 'Behind' is a provisional metaphor and will be later rephrased as the 'backstage' of scientific advice to analyze the harmonization of the supply

of antiretrovirals in the public sector (Hilgartner 2000). The word 'behind' gives a better sense of the public critique of pharmaceutical politics, which produced expensive instead of cheap pharmaceuticals in Uganda and exacerbated the shortage of antiretrovirals in the country.

I will then discuss the role of scientific advice from a consultancy project with the fictive name *Ensuring Access to Medicines in Uganda* (ENSURE) in stabilizing the idea of a harmonization of the supply side as an explanation and solution for the stock-out of antiretrovirals. How did this ENSURE-project address the story behind the stock-outs? Stephen Hilgartner's work on the staging of scientific advice suggests that the search for the "real" politics behind the official story is misleading (Hilgartner 2000). Instead Hilgartner proposes to bring Erving Goffman's metaphor of the backstage to bear on the analysis of science advice as a performance. This performance means giving the public controlled and selected insights into the backstage of stock-outs. That is the "real" story behind the stock-outs. Credibility and authority are not "preexisting property" of scientific advice but are produced by publicly performing science in front of an audience (Hilgartner 2000). The dramaturgical analysis of scientific advice as a theatrical performance of knowledge, as Hilgartner writes, "fits neatly with a world in which debates about expert advice are often played out in the mass media, and is well suited to analyzing debates in which the identities of the actors are among the central issues at stake" (Hilgartner 2000: 7). In my discussion of a workshop organized by ENSURE I attempt to illuminate the practices and discussions in advancing a particular problematization of the stock-outs to stage the epistemic authority of 'global health pharmacy.' The staging of global health pharmacy is part of the re-enactment of the AIDS crisis in mass HIV treatment. Following Rottenburg, this staging of global health pharmacy can be understood to amplify the evidence-base of the science of ART with new findings on the supply of antiretrovirals. In turn this new evidence-base justifies the experimentation with new models to stabilize access to treatment (Rottenburg 2009a).

Chapter 10 will then ask how scientific advice staged by ENSURE is put into practice. In this chapter I will explore the shift in the production of scientific knowledge after the AIDS crisis in more detail and discuss the experimental design of the intervention to improve

access to treatment. This experiment does not consider the stock-out of antiretrovirals separately, but uses a comprehensive set of indicators to improve good pharmaceutical practices. I suggest that this experiment is an attempt to fix the economy of global health by optimizing and further rationalizing the scarcity of pharmaceuticals.

9. Harmonization

"The drugs are there"

Judith Hoyela tells me "the ARVs are there" after I return to Kampala in 2011 for a few days. I had left the country before the supply of antiretrovirals became more stable and consistent from 2010 onwards. I am curious what it means that the drugs are "now there", as Judith and other pharmacists have remarked. Where did the antiretrovirals come from? I had attended a series of workshops before I left in 2010, which grappled with the complexity in the supply side of antiretrovirals. How was the availability of antiretrovirals related to the planned defragmentation of the supply side?

I decide to contact Dr Akol from the AIDS Control Program. She is busy and on her way to another workshop but sends me a text message, telling me to contact Dr. Isaac. He invites me to the workshop on the harmonization and rationalization of the supply lines.

20th January 2012—"Harmonization and Rationalization"

Dr. Isaac gives a powerpoint presentation on the topic. He first shows two slides that visualize the idea of rationalizing the supply lines for antiretrovirals and how this rationalization should resolve the infrastructural fragmentations (see Figure 16):

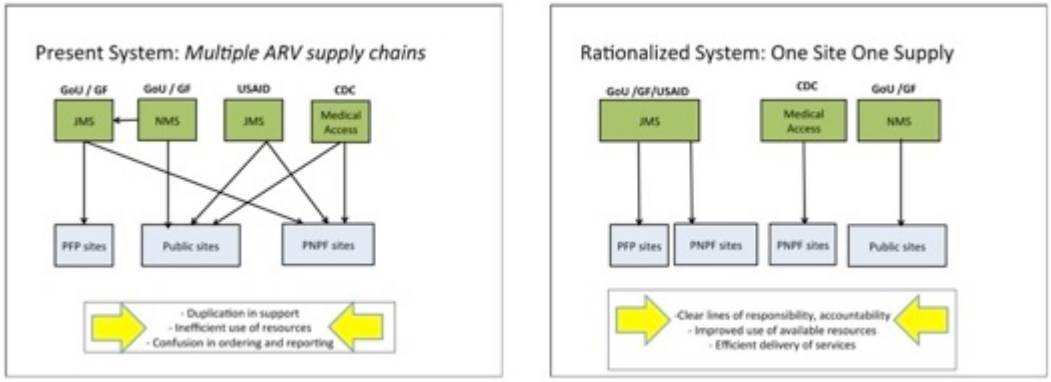


Figure 16: Presentation "Rationalization of Supply Lines".
AIDS Control Program Uganda.

The first slide gives an abstract picture of the present situation (left hand side), where HIV treatment programs receive antiretrovirals from at least three different sources. Dr. Isaac and myself have been discussing this over the last years. As the slide concludes, the duplications in the supply lines lead to "inefficient use of resources". The second slide suggests that rationalization—"one site - one source" as it says—will reduce the "overlappings", "fragmentations", and ultimately the "confusions" in ordering medicines. During the stock-outs of the last year, treatment sites had been borrowing and sharing HIV medicines with other programs, and moreover a "double dipping" at various sources. This was an inefficient use of resources according to Dr. Isaac. Both, the stock-outs and the practices of borrowing and sharing antiretrovirals during these stock-outs eventually enforced the fragmentations by undermining the rigid reporting system instituted to yield precise monthly calculations of the demand and the supply. Dr. Isaac explains:

"From a technical point of view this is a necessary precondition to increase accountability for all involved parties. Moreover mechanisms that enhance accountability lead to clear assignments of responsibilities, which is particularly important to manage such a complex and uncertain domain like free ART. There is no alternative in this complex setting other than all parties knowing about what the others parties do and can rely on their commitments and their responsibilities. So far, all parties have difficulties to be accountable to the public due to the complexities in the supply of ARVs. The streamlining

would help to improve accountability and ultimately the responsibility of parties, which is politically so important in the delivery of health services. In turn, if all fail to agree on the ways to make the supply side of ARVs more accountable, then ultimately all parties, not only individual parties, will fail to be responsible, if problems like stock-outs occur again. But this holds also in the opposite direction: if all parties are efficiently supplying ARVs, then individual organizations' performance are disappearing in the current complexities in the supply of ARVs. So, one important result of the harmonization would be that each organization's efficiency in supplying drugs would be made more visible."[61]

All major stakeholders—all major suppliers in the country (the National Medical Stores, Joint Medical Stories, Medical Access), major donor organizations (PEFPAR, the Clinton Foundation, USAID), and government agencies (the AIDS Control Program, Ministry of Health)—are participating in this workshop (see also Figure 4 in Chapter 3). To paraphrase Collier, the shortage of these medicines has turned the mundane practices in supplying antiretrovirals and the heterogeneous field of organizations into a "unit of collective fate" (Collier 2011: 7). Dr. Isaac recapitulates after the meeting "everybody is happy and even surprised that we reached an agreement. They were asking three times 'do we all agree?'—Now it is agreed."

* * * *

The Ministry of Health had even produced a list of all treatment providers, all treatment sites, and their respective patient numbers, which reflected a fascinating accuracy. Such a list was remarkable, as none of us had seen such a list before. The list showed that exactly 274,789 people had access to antiretroviral therapy in 2011. These figures had a practical purpose. The harmonization would not have been possible without accurate numbers. All supply organizations had to know how many patients they would have to supply after the harmonization. Clinic U for instance would put all its PEPFAR-patients either on "MoH-drugs" or all MoH-patients on "PEPFAR-drugs" (see Chapter 7). Either way, the shift

[61] Interview Dr. A; 20.1.2012; Kampala.

would depend on an agreement between PEPFAR and the Ministry of Health on the overall number of sites and patients they would like to supply.

The agreement was later formalized as the model for the 'Quantification and Procurement Planning Unit'. According to the model, all supply organizations would send patient numbers to this unit, which would then quantify the demand across all organizations and develop a procurement plan to scale-up access to treatment (see Figure 17).

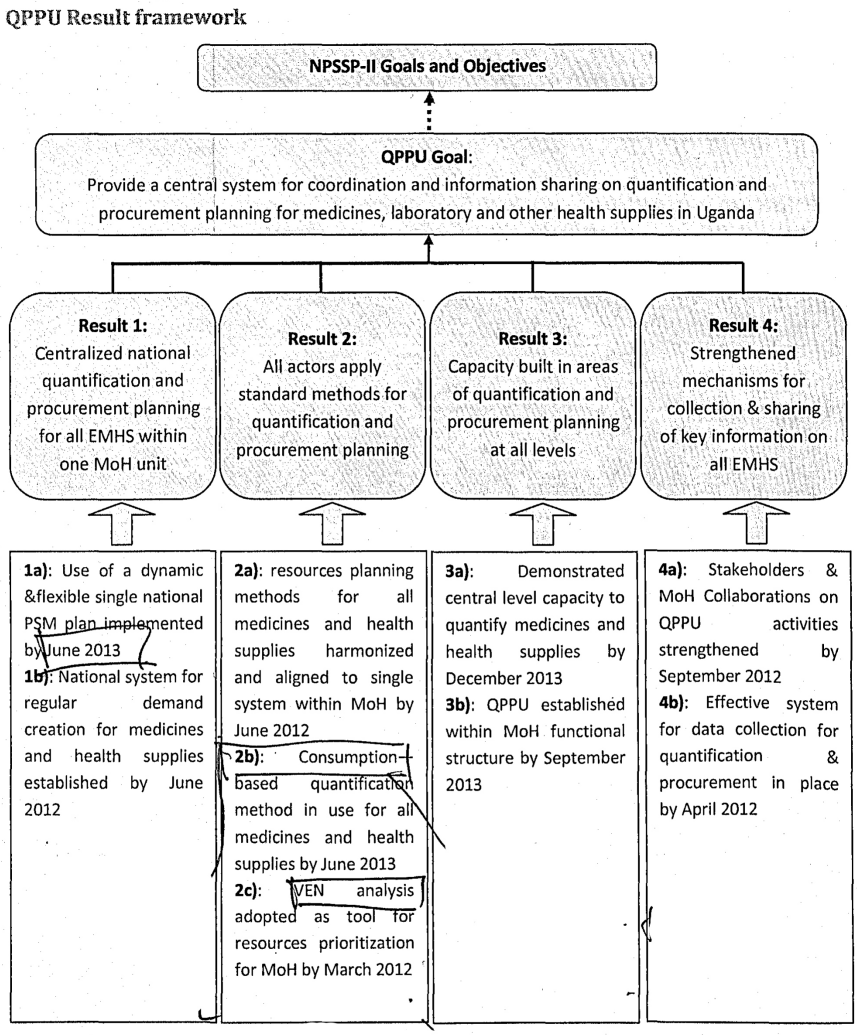


Figure 17: The model for 'The Quantification and Procurement Planning Unit.'

Moreover, such a unified quantification was necessary to make mass HIV treatment more effective and further prioritize the needs, as resources are always scarce:

> "The country continues to experience inability to effectively determine national needs and produce timely and accurate supply plans for essential medicines and health supplies. This inability continues to create challenges in planning, management and coordination of national needs leading to wide fluctuations of supplies at user levels. The scarcity in resources coupled with ineffective needs estimate and supply planning has made it difficult to *prioritize* needs" (Draft Report, Quantification and Procurement Planning Unit, Result Framework, 2011; my emphasis).

This harmonization was put forth as part of what Hilgartner describes as the performance of science (Hilgartner 2000; see also Rottenburg 2009b). Like Annemarie Mol (2002), Hilgartner suggests that "science advisors use a variety of dramatic techniques to create and—or better *enact*—the basis of their authority as experts" (Hilgartner 2000: 6). In addition to Mol's analysis of the enactment of a disease in a hospital (Mol 2002), Hilgartner's proposal for a dramaturgical analysis of staging science suggests including the enactment of diseases by studying the production of reports and scientific advice. In the case of staging the harmonization of the supply side of ART, the enactment of an entity like the AIDS crisis differs from everyday practices of clinical care in a hospital setting as described in Mol's work (2002). The performance of scientific advice in global public health includes a range of social practices in organizing workshops, producing situation analyses and running interventions. Organizing a successful workshop begins with inviting the important stakeholders, having the right speakers who can tell a story, and literally creating a performance of statistical evidence in the form of powerpoint-presentations. Organizational practicalities also matter, like the provision of transport, refund or food (see also Geissler 2012), or the choice of the appropriate venue. All this contributes to staging a new project and a new scientific experiment. Performing science does not mean that the presented findings and the respective recommendations lack a scientific evidence base. Understanding the production of evidence as an event suggests that the validity of claims to knowledge is temporally and spatially bounded. Moreover, the credibility of this evidence is the result of social actions and the use rhetorical devices, which, according to

Goffman, are elementary practices in "information control" (Goffman 1956: 82; see also Hilgartner 2000: 9).

Following Hilgartner's proposal, on "front stage" these actors present the model for the Quantification and Procurement Planning Unit as a collective agreement. The workshop in turn is the backstage, where the 'drama' of harmonization is played and global health pharmacy is staged as scientific discipline. This harmonization constitutes a "drama of agreement" as Hilgartner notes (Hilgartner 2000). Interestingly the legitimacy and credibility of the model for a 'harmonized quantification' literally depends on the representation of "a single, unified voice performatively forged out many, diverse ones" in a fragmented supply side of antiretrovirals (Hilgartner 2000: 53). The model spoke in one voice and the agreement was not only sharing a scientific opinion, but it was literally about the establishment of one central quantification unit 'forged out of many'.

However, there is usually not one single backstage, but a series of workshops and conversations preceding and following what may be for a moment considered to be the decisive backstage where far-reaching policy decisions are made. Each staging of science and politics is the backstage for the next workshop. The analysis of the staging of harmonization does not illuminate what the ultimate backstage of the politics in science is really like. One should resist the belief that the political reality of the state and global public health are hidden and that important decisions are taken behind the stage, in the form of top-secret meetings and confidential reports. Such reports and meetings of course do exist, particularly on the supply of antiretrovirals and contrasts with the lack of an official explanation of the reasons of stock-outs. Stock-outs do not only incite the public's demand for more stability, but also ask who has scientific and political authority over stock-outs. That is who determines what is an objective account of the stock-outs and who takes responsibility for this stock-outs (Rottenburg 2009a: 79ff).

In contemporary participatory and democratic understanding of science, scientific explanations and recommendations decisions have to be staged publicly. In this public staging of science, ideas like harmonization travel between workshops or any other public event. This travel can be understood as a "chain of translation" connecting a series of

workshops in the production of scientific objectivity necessary to agree on an explanation and solution for problems like the stock-outs of antiretrovirals (Rottenburg 2009a: 189). At each workshop the story of stock-outs is told differently, explained with new facts and confronted with new problems, which means that the problem of stock-outs is constantly transformed until it is "translated" into practice. As Rottenburg emphasizes, each "act of translation is inevitably also an act of performative omission and addition; otherwise the translation chain would break. Every act of translation is thus also an act of creation, producing something that did not previously exist" (Rottenburg 2009a: xxxi). In this chain of translation, harmonization is stabilized as a dominant explanation for the stock-out of antiretrovirals, while other explanations are destabilized in staging global health pharmacy as a scientific discipline. Staging this scientific discipline requires presenting a "line-up" of actors and facts, to support the scientific authority necessary to run an experimental intervention in global health pharmacy. Ideas that do not travel and reach the stage to attract the attention of the public are quickly forgotten and fail to provide the institutional basis for implementing new models to improve public health.

'Behind' the stock-outs

Who are the publics of antiretrovirals addressed by the staging of global health pharmacy? Which public did the news about the stock-out of antiretrovirals incite? The public's response to the stock-outs staged by the media and activist organizations representing the civil society in the AIDS crises elicits a particularly vexing question: who represents the public in the 'public sector' of health and who is responsible for the stock-out of antiretrovirals?

As soon as the first stock-outs were reported, the main Ugandan daily newspapers, *New Vision* and *Daily Monitor*, promptly began to inquire about the reasons for the stock-out of antiretrovirals and probed into the politics of pharmaceuticals *behind* the stock-outs. The media coverage furthermore called the public of pharmaceuticals into being as a critical voice (see also Hayden 2007; Biehl 2006). Against this background, staging global health pharmacy has to present a different 'backstage,' where the public can be involved in

developing a solution to stock-outs. Constructing this backstage of scientific advice on the harmonization of the supply side must be dissociated from the arenas where pharmaceutical politics and rumors take place. This place of collective participation in the backstage of global public health is the workshop, where the scientific authority of the harmonization of the supply side of antiretrovirals is built by controlling information on stock-outs.

How did the bewildering story behind the stock-outs start to spread in the public? In August 2009, *New Vision* published an article about the shortage of ARVs under the unsettling headline "HIV/AIDS - No more free drugs" (*New Vision*, 30.08. 2009, Figure 18).


THE New Vision
UGANDA'S LEADING WEBSITE

HIV/AIDS- No more free drugs

Publication date: Sunday, 30th August, 2009

People Living with AIDS at an urgent meeting to discuss the drug shortage in Mengo recently

By Elvis Basudde

PEOPLE Living with HIV/AIDS (PHAs) have pleaded with the Ministry of Health and National Medical Stores to tackle the drug shortage or face a social disaster.

Figure 18: Headlines "HIV/AIDS - no more free drugs". *New Vision*; 30.8.2009.

New Vision cautiously quoted the concerns of a local NGO, which

> "plead[ed] with the Ministry of Health and National Medical Stores to tackle the drug shortage or face a social disaster. Accusing the ministry of negligence, the activists said they do not understand why the ministry cannot start new patients on antiretroviral therapy, yet drugs are expiring in stores" (*New Vision*, 30.8.2009).

A few days later, articles in *Daily Monitor* carried the headlines "The disturbing mystery of missing HIV/AIDS drugs in Uganda" reporting on the "moral and medical dilemma as patients old and fresh are suddenly left without drugs for months" (*Daily Monitor*, 3.9.2009, see Figure 19). The newspaper considered a range of factors exacerbating the shortage of antiretrovirals: the global financial crisis and the corruption of Global Fund money, which led to the "dwindling of money for AIDS treatment leaving patients reeling as stock-outs". Yet, as the article pointed out, none of the major government agencies could give a proper account for the breakdown of the supply of antiretrovirals. These articles surmised that "the Ugandan authorities have no control over", both the scale-up of access to treatment and the stock-outs. As the *Daily Monitor* explained, "a glance at the plethora of organizations involved in HIV/AIDS management and the mangled distribution network for drugs cannot qualify the success of treatment program nationally. It is to the broken health care system that some point for most of the problems that Uganda is facing" (see Figure 19).


DAILY MONITOR TRUTH EVERY DAY

Wednesday June 2, 2010

NATIONAL

The disturbing mystery of missing HIV/Aids drugs in Uganda

Kampala

The news from around the country is not good; in some places we are hearing of people with access to anti-retroviral treatment succumbing to the Aids condition because they do not have food to eat (healthy eating is an essential factor in managing the condition), while in other places HIV/Aids sufferers with food do not have access to therapy partly because the high incidence of infection, has outstripped the financial resources currently available to make ARVs available.

Figure 19: Headlines "The disturbing mystery of missing HIV/AIDS drugs in Uganda". *Daily Monitor*; 3.9.2009.

The reports on the stock-out of antiretrovirals across the entire country resulted in a more provocative public critique of the fragmented and chaotic public sector. In the months that followed, the newspapers regularly published articles with headlines like "ARVs shortage:

Is it a symptom of a failing health system?" (*Daily Monitor*, 9.9.2009) or "ARVs shortage: who is fooling who?" (*New Vision*, 14.2.2010) and discussed the complicated relationship between the National Medical Stores, the Ministry of Health and the many donor organizations in the country, which are officially called "development partners."

International humanitarian news service *PlusNews* also discussed the stock-outs in Uganda. The discussions were related to questions of international aid. *PlusNews* quoted PEPFAR officials, stating that "We now have a flat budget for Uganda, since the first phase of PEPFAR ended in 2008" (IRIN *PlusNews*, 1.12.2009). The PEPFAR decision to cap the budget at $280 million for Uganda was proclaimed to be a result of the corruption scandals with Global Fund money. As *PlusNews* quoted, "cabinet-level Ugandan ministers had been caught stealing from other donors and, though forced to repay the money, were not jailed. The government, hasn't shown the leadership or commitment to transparency to earn additional funds" (IRIN *PlusNews*, 1.12.2009).

Unsurprisingly, most of these accounts would lead to the NMS in Entebbe. Most antiretrovirals entering the country pass through the NMS in Entebbe, where they are stored before they go on route to supply all health facilities in the country. In response to the press reports, NMS, as the official procurement organization for antiretrovirals of the Ugandan government, emphasized that antiretrovirals were in sufficient stock. Instead, NMS accused health workers of negligence and being irresponsible by placing incorrect drug orders (*Daily Monitor*, 24.2.2010).

As soon as the major stock-outs were reported, the Ugandan civil society organization NAFOPHANU—National Forum of People Living with HIV/AIDS Network in Uganda—raised its concerns about an ARV crisis. Over months it went on its own fact-finding mission and discovered a number of issues, like "patients are switched to other regimens without prior notice". Many patients are clinically "eligible to be started on ART but are not." Those patients on treatment received antiretrovirals for two weeks "instead of monthly or 2 months supplies. Yet transport is a very big issue for those in far away places from the health centers," as the organization found out.

In order to clarify these issues and gather more evidence about the stock-outs by treatment

providers, NAFOPHANU convened a workshop, which it aptly entitled "Harmonization Meeting on the status of ART treatment in the country" (27.1.2010). As the invitation letter put it "as partners we need to keep up the struggle. Let us harmonize our ideas since today it is me and tomorrow someone else." To this workshop officials from the Ministry of Health were also invited to give an official response over the future of the ART provision in the country. NAFOPHANU's sent an invitation letter stating the objectives of this harmonization:

- "We call upon the government to meet the commitment of universal access by 2010.
- Transparency in the distribution and supply chain.
- Misallocation of funds for ARVs should stop.
- Corruption in the AIDS industry should stop" (Invitation letter; NAFOPHANU; June 2012).

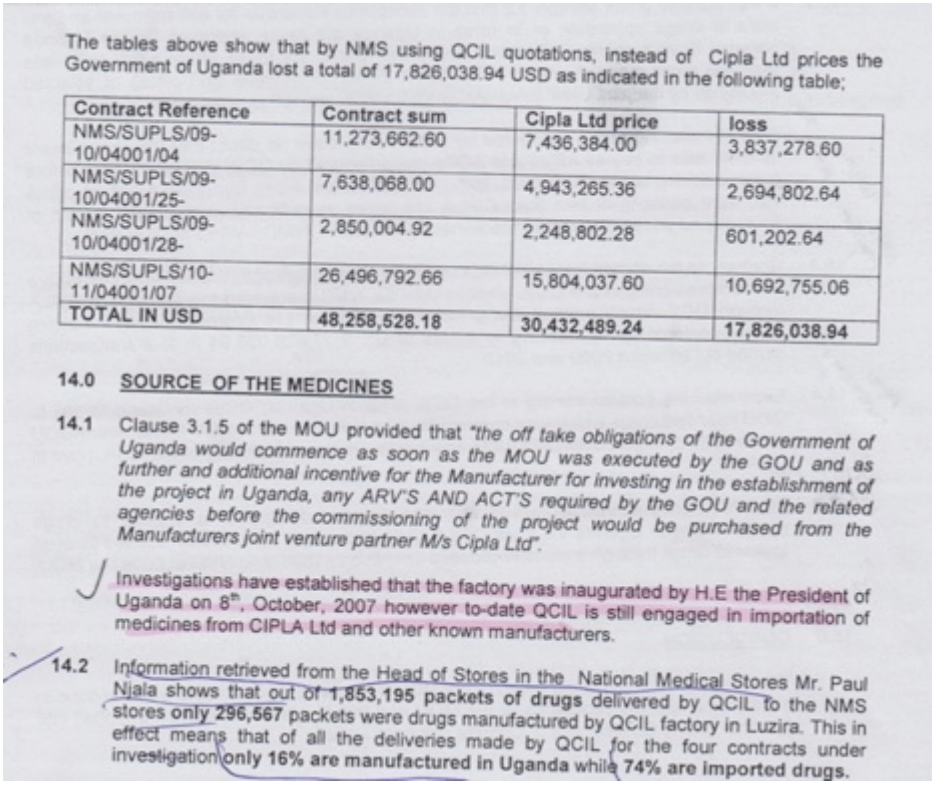
Civil society organizations like NAFOPHANU had been supporting HIV patients in the "period from no drug to now available cheap drugs". It was thus particularly concerned about rumors and whether "Quality Chemicals [the local manufacturer for antiretrovirals] will produce cheap drugs to cater for the number of clinically eligible patients in Uganda" (NAFOPHANU; 27.1.2010). However, none of the participants provided an explanation of the accusations.

Quality Chemicals was established as local plant to produce cheap generics to address the scarcity of antiretrovirals in the country. The government justified a $17 million grant for the "take-off" of the plant located in the South of Kampala by beginning with the production of cheap antiretrovirals for the public interest: "life-saving remedies [which] are in short supply, especially given the fact that the available world manufacturing capacity

is not enough to meet the fast growing demand as the rest of Africa adopts antiretroviral therapy as a strategy in the fight against HIV/AIDS."[62]

The antiretrovirals coming out of the local plant Quality Chemicals, however, turned out to be twice as expensive than those on the global pharmaceutical market. In fact, the evidence was later delivered in the form of an audit report, which leaked to the media. The subsequent investigation by the Inspector General of Government (IGG) discovered more worrying irregularities around the high prices that the local ARV manufacturer Quality Chemicals had charged NMS. Quality Chemicals was established through a joint venture with the Indian manufacturer Cipla. For the construction of the plant, Cipla had demanded a "guarantee for a market" from the Ugandan government. Both thus signed a Memorandum of Understanding on the exclusive procurement of ARVs and ACTs from the new plant for a period of seven years. This agreement also included a subsidy in the form of a mark-up of 15 percent for the local production of these pharmaceuticals.

[62] Statement by the President of Uganda, quoted in Report of the Inspectorate General of Government, December 2011.



The tables above show that by NMS using QCIL quotations, instead of Cipla Ltd prices the Government of Uganda lost a total of 17,826,038.94 USD as indicated in the following table;

Contract Reference	Contract sum	Cipla Ltd price	loss
NMS/SUPLS/09-10/04001/04	11,273,662.60	7,436,384.00	3,837,278.60
NMS/SUPLS/09-10/04001/25-	7,638,068.00	4,943,265.36	2,694,802.64
NMS/SUPLS/09-10/04001/28-	2,850,004.92	2,248,802.28	601,202.64
NMS/SUPLS/10-11/04001/07	26,496,792.66	15,804,037.60	10,692,755.06
TOTAL IN USD	**48,258,528.18**	**30,432,489.24**	**17,826,038.94**

14.0 SOURCE OF THE MEDICINES

14.1 Clause 3.1.5 of the MOU provided that *"the off take obligations of the Government of Uganda would commence as soon as the MOU was executed by the GOU and as further and additional incentive for the Manufacturer for investing in the establishment of the project in Uganda, any ARV'S AND ACT'S required by the GOU and the related agencies before the commissioning of the project would be purchased from the Manufacturers joint venture partner M/s Cipla Ltd".*

Investigations have established that the factory was inaugurated by H.E the President of Uganda on 8th, October, 2007 however to-date QCIL is still engaged in importation of medicines from CIPLA Ltd and other known manufacturers.

14.2 Information retrieved from the Head of Stores in the National Medical Stores Mr. Paul Njala shows that out of **1,853,195 packets of drugs** delivered by QCIL to the NMS stores **only 296,567** packets were drugs manufactured by QCIL factory in Luzira. This in effect means that of all the deliveries made by QCIL for the four contracts under investigation **only 16% are manufactured in Uganda** while **74% are imported drugs.**

Figure 20: IGG Report on the financial losses made by procuring ARVs from Quality Chemicals.

As Chapter 7 describes, the higher price, which Quality Chemicals charged, drastically reduced the volume of antiretrovirals purchased for the national free ART program. The stock-outs raised the question if Quality Chemical's price was immoral and probably even illicit in regards to public interest in increasing the supply of cheap antiretrovirals as civil society organizations, like NAFUPHANO, claimed.

In fact, the investigation by the Inspector General of Government found that Quality Chemicals had produced only 16 percent of all antiretrovirals and ACTs supplied to NMS. According to this report, the price was illicit because the rest were imported from Cipla in India and repackaged in Uganda. A report from the 20th December 2011 reasoned that "the 15 percent price mark-up, which was negotiated and agreed to apply to drugs manufactured in Uganda vis-a-vis Cipla Ltd's price was erroneously applied to even imported drugs through a *creative* process invented by Quality Chemicals and NMS outside the "Memorandum of Understanding" (Report IGG 2011: 18; my emphasis; see also Figure 20). That is, the imported drugs were sold to NMS at a price, which were

meant to apply to locally produced antiretrovirals—and not imported ones. Indeed, procuring these pharmaceuticals directly from Cipla in India would have been much cheaper. According to the report, procuring pharmaceuticals directly from India would have saved Uganda about $17.8 million between 2009 and 2010 (Report IGG 2011: 17). The IGG-report thus demanded that the Ministry of Health immediately recover these $17.8 million from NMS, who had erroneously procured these pharmaceuticals from Quality Chemicals (Report IGG 2011: 19).[63] As the report reasoned, "abuse of office and causing financial loss are serious offences under the Anti-Corruption Act 2009".

The recommendation to refund the loss, in fact, raised a more intriguing question: who should be responsible for the loss and which government agency could be attributed financial authority in this matter. Officially, it was the Ministry of Health, which signed the Memorandum of Agreement, on request by the president's office. The audit report quoted a presidential order explaining to the Ministry of Justice, the Ministry of Health, Ministry of Finance and Economic Development and the Ministry of Trade and Industry that the procurement of antiretrovirals from Quality Chemicals was a matter of "life-saving products" and a "public service". Thus, these governmental agencies were asked to consider suspending the legal requirements for "competitive bidding process". The president's office moreover instructed to

> "Please, expeditiously cause the Ministry of Health to sign the guarantees required and ensure that all government department render all the necessary assistance to the project and the required investment incentives are granted. Revert back to me in case of any problem in the implementation of this project."

In principal none of these governmental agencies could be attributed to be responsible for the higher price at which Quality Chemicals had sold its generics. The NMS was not involved in this contractual agreement signed by the Ministry of Health and thus refused to

[63] It took two years until the Minister of Health demanded from NMS to pay the loss of $17.8 million in 2013. See also "Uganda government under pressure to boost ARV funding"; *Irin News*; 14.3.2013 and "Who was swindling global fund money"; *The Independent*; 5.7.2013.

pay back any money. But the Ministry of Health could not recover this money, as it had lost the financial authority over the procurement of pharmaceuticals a few years ago to NMS. Money for the procurement of pharmaceuticals was transferred to NMS and not the Ministry of Health.[64] Moreover, none of these bodies seemed carried any authority in this matter. Furthermore, it was difficult to produce additional legal evidence about the illicit nature of Quality Chemical's prices. In fact, another internal memo that was leaked to the media stated "On the second perusal and in consultation with investigators, I realised that there are some challenges in identifying the officers to be prosecuted and the sufficiency of evidence to implicate them. However, it might be hard convincing court of any wrongdoing on the side of NMS and QCIL given the fact that even the Solicitor General's opinion is suspicious." (*Daily Monitor*, "IGG intends to embarrass NMS over missing funds"; 17.11.2011).

These interrogations into the relationship between expensive generics and the stock-outs of antiretrovirals show how the public is called into being over the pharmaceutical politics behind the stock-outs. In Uganda, such interrogations are not particularly successful in lifting the curtain to reveal the "real" story of stock-outs. More than revealing a presumably illicit transactions in the procurement of antiretrovirals, the story of stock-outs demonstrates that boundaries between financial authority and political authority in the

[64] The supply of pharmaceuticals through NMS had always been a weak point even before the roll-out of antiretrovirals. However, in the more recent past NMS had undergone a number of restructuring processes. The latest restructuring process strengthened the role of NMS in the supply of medicines by the creation of "Vote 116" in the financial year 2009/10. The vote replaced the former decentralized primary health care system, where hospitals, district health offices, and health centers received their own budget to procure medicines from NMS. Vote 116 entitled/enabled NMS to directly received the budget for medicines from the Ministry of Finance and allocated medicines to the health centers.[64] For the financial year $34.1 million (UGX 74.9 billion) were allocated to Vote 116 and to NMS. About $21.5 million were meant for the procurement of antiretroviral and ACTs (See also Chapter 9). In the terminology of pharmaceutical supply chain management, instead of health centers "pulling" medicines, it was NMS "pushing" medicines down the supply chain. This shift was a response to the alleged mismanagement of funds by the health units. NMS would pay the pharmaceutical producers with the money from Vote 116 instead of accumulating debts because health centers were not paying for the medicines. But Vote 116 was introduced in an ad hoc manner, without any guidelines. As a result DANIDA retained its annual contribution of $3 million. It put the money into a properly 'ring-fenced' basket funding system for NMS to procure essential medicines.

pharmaceutical politics of antiretroviral generics are blurred.

Against this background, the workshop mentioned above was an attempt to reassert financial and political authority by harmonizing and more importantly rationalizing the supply side of antiretrovirals. 'Harmonization' is a buzzword in the donor world. In global public health discourses it refers more specifically to the "exceptionalisms" of antiretrovirals in mass HIV treatment, which have been frequently described as a "vertical approach" in funding disease specific interventions (Frenk 2010: 2; Balabanova 2010: 6). In fact, the critique of such vertical approaches arises around the lack of clear political authority in the public sector financing. It is thus less surprising that public health experts often depict stronger health systems as a matter of 'leadership', 'stewardship', or 'participation' in the recipient countries of AIDS funding to assign political authority over questions of health care financing.

The ample discussion of vertical structures and stronger health systems suggests that the constitution of political authority is deeply entangled with the constitution of scientific authority over financing health care and ART. Such entanglements suggest that institutions emerging out of the harmonization of the supply side are better understood as the co-production of social and scientific orders. In the following chapter I will ask how the authority and scientific credibility of harmonization is constituted over the fuzzy financial and political authority in public health financing in Uganda? How is scientific evidence asserted into the pharmaceutical politics behind the stock-outs of antiretrovirals? How are scientific disciplines performed to involve the public and constitute the epistemic authority of pharmacy in staging a response to the fragmentations and instabilities in the supply side of antiretrovirals?

Staging a "new project"

With the stock-outs in 2009 and 2010, the fragmentations in the organization supply of antiretrovirals had come to the attention of the Ministry of Health and a range of international organizations in Uganda. These "development partners", en emic term in

global health, had just recently launched a "new project" to address the pharmaceutical supply chain in Uganda. I will refer to this project with the fictive acronym ENSURE, which stands for "Ensuring Access to Medicines in Uganda." The overall aim of the ENSURE-project was to "ensure that Uganda's population has access to adequate quantities of essential medicines and health commodities," as its mission formulated. This project was implemented by Management Sciences for Health, which was awarded the contract by the US government.[65] ENSURE was officially launched in 2009 and is still running. When this project took shape, pharmacists pointed out that "there is a new project"—after a number of projects had been phased out in the same year (see also Chapter 1). Pharmacists added with bewilderment, "they have $40 million for 5 years. And they do not buy a single drug, it is just for technical support."[66] When ENSURE comes to an end in 2014, it will have provided a package of interventions, ranging from policy option analysis (described in this chapter) to a large-scale experiment to improve pharmaceutical practices through support supervision. The project hired many pharmacists all over the country, like Janet and Achmet, who had been working for the Ministry of Health. James worked for Mulago Hospital and Christine worked for PEPFAR SCMS. These pharmacists were hired to work for ENSURE, whereas pharmacists are generally few in number in Uganda. In the public sector, by contrast, about 140 positions for pharmacists are vacant and only 25 pharmacists (with BA-degree) are employed, according to the Human Resource Department of the Ministry of Health. Such proportions make a number of improvisations and shifts necessary for running interventions to improve pharmaceutical practices in the country, as will be discussed Chapter 10.[67]

The first step of the ENSURE-project was to provide a policy option analysis for the stabilization of pharmaceutical supply chain management in Uganda. This policy option analysis was presented at a workshop in April 2010 at one of the larger hotels in the middle

[65] *Management Sciences for Health* is famous for being the publisher of the handbook Managing Drug Supplies, which established itself as the "yellow bible" for national medicines programs (Greene 2011: 16; see also MSH 2012).

[66] Interview JK, pharmacists; 25.11.2009; Kampala.

[67] Interview CI, Ministry of Health; 26.6.2010; Kampala.

of Kampala with the capacity to host more than 100 participants. A group of national and international experts in pharmaceutical supply management had carried out a situational analysis pharmaceutical supply system in Uganda for several months, which was presented at this workshop.

The invitation card distributed by email stated that this workshop would "bring together pharmaceutical policy and supply chain partners in Uganda and will aim at identifying and evaluating alternative policies and interventions that can best address some of the existing challenges in ensuring availability and access to Essential Medicines and Health Supplies (EMHS) in the country" (Invitation letter POA Analysis; 11.3.2010). All participants were promised the ability to "involve themselves in proposals for possible options that are cost effective and have high potential for maximizing access to and availability of EMHS in the public sector" (ibid.).

One of the proposals to be discussed at this policy option analysis workshop was the harmonization of the supply side of ARVs. As demonstrated above, the fragmentation and the lack of transparency in the supply of antiretrovirals had been frequently discussed in the previous months. In addition to defining the stock-out of antiretrovirals as a life-threatening crisis for patients, ENSURE framed the shortage of ARVs as problem of a weak pharmaceutical supply chain management of the whole public sector.[68] Establishing this connection and providing the respective evidence was crucial in staging pharmacy as a field of scientific expertise in global public health (see also Chapter 10). How did the ENSURE workshop stabilize this idea of harmonization? How did it promote the lack of harmonization as a scientific explanation for the rise of stock-outs of ARVs in Uganda? What kind of rationality lay behind this approach?

[68] A number of public health studies have been early on studying essential medicines and pharmacy in Uganda, which do not follow the disease-specific layout in global health (e.g. Mburu 1985; Odoi-Adome, et al. 1996; Jitta, et al. 2003). This entails also interregional comparative studies of essential medicines in the so-called developing world (Najmi, et al. 1992). Before antiretroviral medicines became available in Uganda, these studies also addressed AIDS treatment as a topic of public health care of opportunistic infections, which are associated with AIDS (e.g. Lyons 1998) or starting to raise the question if the treatment of AIDS patients exceeds the capacities of existing public health systems in Uganda (e.g. Goodgame 1990).

To answer these questions I will explore the staging of harmonization in global health pharmacy by ENSURE. I will present this staging through the fictionalized minutes of an imaginary working group discussion on harmonization.[69] In doing so, I want to illustrate how the ENSURE-project produces scientific credibility and moral authority by using techniques to control information and promote participation in the pharmaceutical politics, which are deemed to take place at the backstage of stock-outs (see Hilgartner 2000). This staging of scientific advice as an exercise in participatory decision-making led years later to Dr. Isaac's presentation on the harmonization and rationalization of the supply lines of ARVs mentioned above.

I will keep the minutes long in order to capture the techniques to control information and stabilize an explanation for the stock-outs through which global health pharmacy constructs its scientific authority. In doing so I also want to highlight actors' use of rhetorical devices to control information by focusing on certain problems and ignoring others like the corruption of donor aid. A significant effect of this information control is to craft the object of intervention to ensure Ugandan's access to medicines. The fictionalized minutes of this working group discussion is here reproduced extensively to give an idea of an imaginary backstage discussion, which led to the collective agreement in the workshop on the "Harmonization and Rationalization of the Supply Lines of ART" (see Section "The drugs are there" above). Although the discussion is a fictionalization, it draws on my participation of numerous other workshops and is augmented with interviews conducted outside of this workshop on the topic. The content of the discussions attempts to describe the positions of the major actors in the field of pharmaceutical supply chain management in Uganda and moreover some of the most salient issues in the discussions of stock-outs.

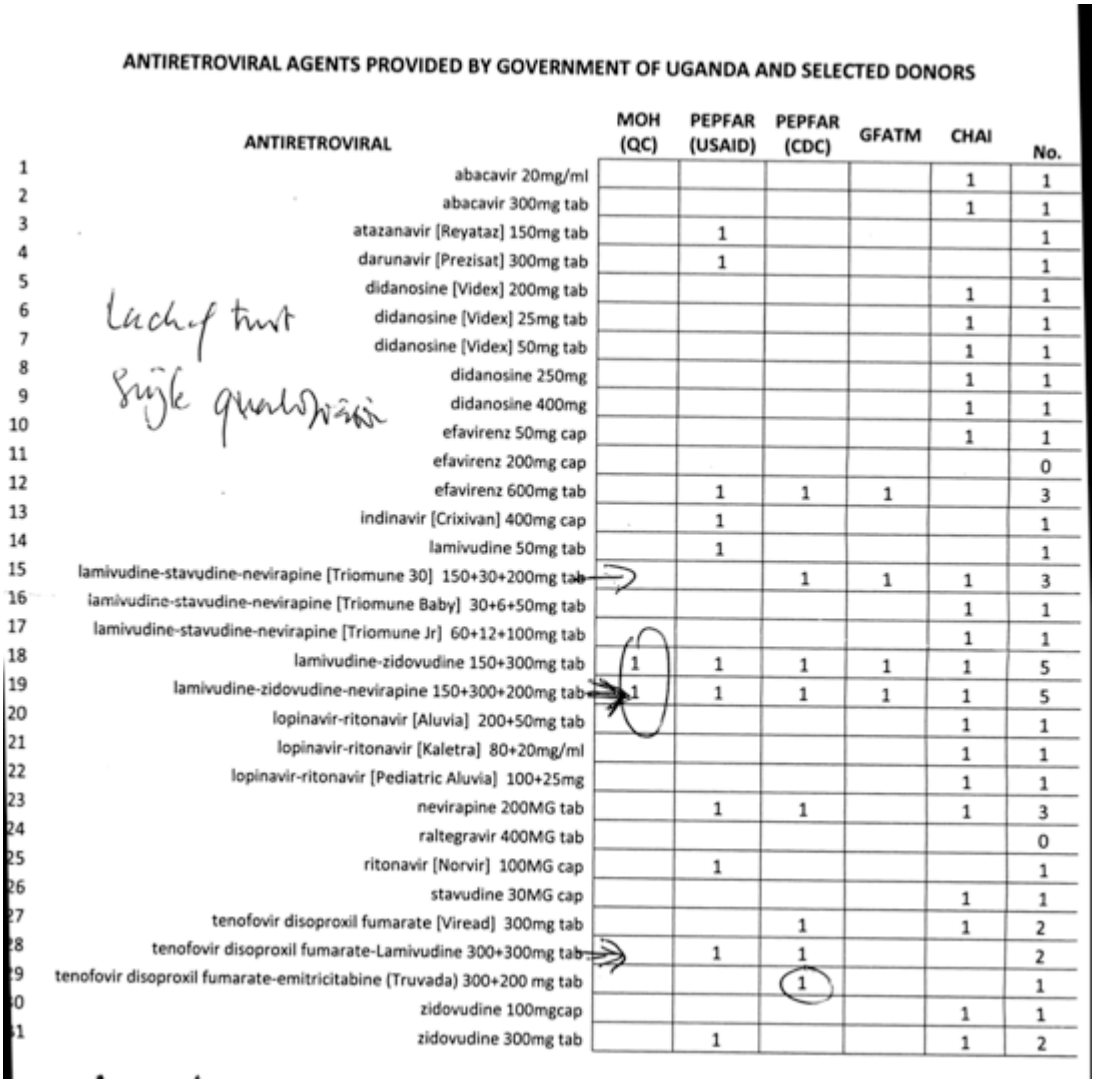
15. April 2010—"The minutes of the harmonization discussion"

After the opening speeches and the organizers' introductions, the presenters and the audience splits off into six working groups to deal with different questions and develop

[69] The presentation of minutes of an imaginary discussion is inspired by (Hilgartner 2000; Rottenburg 2009a).

recommendations for these problems. I join the working group on "Harmonization and Streamlining" which consists of about 20 participants sitting in a circle. The group is very heterogeneous. It comprises health workers, government officials, academics, representatives of all major funding agencies, and even the 'public' in the form of a journalist from the United States. One of the participants wants to know "what harmonization means. Is it about funding, procurement, or storage? Can we harmonize the funding into one basket? Or should we keep the funding separate"? The few participants who actually have a say have already made up their mind before this working group discussion. "No", answers Moses, the supply chain management expert in our group. He immediately explains what harmonization means here:

> "If we sit down and ask how many ARVs do we require in Uganda. You bring the donors on one table and everyone brings his figures. And then we know the need and how much commodities we have. And then we know what the gap is. But right now this is not happening. In the end you see one hospital receiving the same thing and yet they are stocked-out for other ARVs. We need the figures. So we then know where the gap is. The next step is to bring all donors and the donors make their commitment. You may not commit money in the basket, but you may commit the value of the commodity for a basket. But currently this is not happening. *We don't know what the gap is.* If we knew how many antiretrovirals were needed where, we would not have hospitals with particular ARVs, while other hospitals are stocked-out."



ANTIRETROVIRAL AGENTS PROVIDED BY GOVERNMENT OF UGANDA AND SELECTED DONORS

	ANTIRETROVIRAL	MOH (QC)	PEPFAR (USAID)	PEPFAR (CDC)	GFATM	CHAI	No.
1	abacavir 20mg/ml					1	1
2	abacavir 300mg tab					1	1
3	atazanavir [Reyataz] 150mg tab		1				1
4	darunavir [Prezisat] 300mg tab		1				1
5	didanosine [Videx] 200mg tab					1	1
6	didanosine [Videx] 25mg tab					1	1
7	didanosine [Videx] 50mg tab					1	1
8	didanosine 250mg					1	1
9	didanosine 400mg					1	1
10	efavirenz 50mg cap					1	1
11	efavirenz 200mg cap						0
12	efavirenz 600mg tab		1	1	1		3
13	indinavir [Crixivan] 400mg cap		1				1
14	lamivudine 50mg tab		1				1
15	lamivudine-stavudine-nevirapine [Triomune 30] 150+30+200mg tab			1	1	1	3
16	lamivudine-stavudine-nevirapine [Triomune Baby] 30+6+50mg tab					1	1
17	lamivudine-stavudine-nevirapine [Triomune Jr] 60+12+100mg tab					1	1
18	lamivudine-zidovudine 150+300mg tab	1	1	1	1	1	5
19	lamivudine-zidovudine-nevirapine 150+300+200mg tab	1	1	1	1	1	5
20	lopinavir-ritonavir [Aluvia] 200+50mg tab					1	1
21	lopinavir-ritonavir [Kaletra] 80+20mg/ml					1	1
22	lopinavir-ritonavir [Pediatric Aluvia] 100+25mg					1	1
23	nevirapine 200MG tab		1	1		1	3
24	raltegravir 400MG tab						0
25	ritonavir [Norvir] 100MG cap		1				1
26	stavudine 30MG cap					1	1
27	tenofovir disoproxil fumarate [Viread] 300mg tab			1		1	2
28	tenofovir disoproxil fumarate-Lamivudine 300+300mg tab		1	1			2
29	tenofovir disoproxil fumarate-emitricitabine (Truvada) 300+200 mg tab			1			1
30	zidovudine 100mgcap					1	1
31	zidovudine 300mg tab		1			1	2

Figure 21: Handout for the working group "Harmonization and streamlining of ARVs". This list captures all 31 ARV regimens procured in Uganda—including first-line, second-line, and third-line regimens. The most common standard first line regimen AZT/3TC/NVP is encircled and the right-hand column shows that this regimen is procured by five different organizations in Uganda.

Our facilitator comes in. Moses' explanation was too quick and was already giving us the solution, which required a step before. Not everyone understands immediately. The facilitator, a consultant form Peru and an international expert for pharmaceutical supply chain management, hands out a list of all antiretroviral regimens, which are currently procured in the country (see Figure 21).

The facilitator first explains the problem:

> "Currently each supplier does its own 'quantification', the calculation of need for specific ARV regimens. After the need is quantified, the supplier commissions each product. The result is a list of 31 different regimens, including first-line, second-line and even up-market third-line regimens. The first-line standard regimens are even supplied by 4-5 different sources, as you can see in the right column."

Then he explains our task:

> "We could say our approach is to harmonize and first reduce the number of antiretroviral regimens. Say for Uganda the most appropriate number is 24, or whatever the number. We should argue that we as a group we feel the most appropriate number is so and so. Further with the power that our organizations have, we can make an agreement. Or, we could say for Uganda the appropriate approach is to have 31."

In a more persuasive voice he continues to explain the effect of such a decision:

> "Irrespective of our final recommendations, it will be a good decision, because we are all in harmony and have decided as a group, so that at the next step, we can ask, what are going to be the needs, what are the targets. And than with that we can start to quantify how much products we need, then we can decide as donors and say 'I can contribute ba ba ba. You will contribute ba ba ba'".

He wants to make us understand that the unity displayed in the envisaged agreement about the number of antiretrovirals *is* the real harmonization as all participants represent the major stakeholders. A recommendation in which all actors speak in one voice will be the harmonization. Once they have an agreement then the actual harmonization will be a technical challenge. But this challenge will not be rooted in disagreement:

> "Now the next step would be more complicated than the first step, which is how to

> make sure I will contribute for what I am responsible. Then we will track how everyone contributes *his or her share* to this *collective decision*. At the end everybody knows, what and how much everybody is going to contribute. But the point is that everybody will do that. This is better than saying 'oh we dumped all the money into one basket and then it disappeared'. So, what I told you now is a spectrum of steps. First we all agree, that this is what all of us are going to contribute, for what and for how much. But this must be based on a common agreement what is needed. That is what ARVs are needed in the country. This is where the quantification unit can come. But without the first step, what are we going to quantify at all?"

As the facilitator argues, any recommendations on the harmonization would literally rely on the unity of the working group. In addition, this unity and the collective agreement on the harmonization would in turn lead to greater credibility by defining the responsibilities of each organization. In contrast to this friendly invitation to a collective agreement, the participants of the working group discussion are more skeptical in particular about the role of the Ugandan government.

The journalist from the United States, drawing on his experiences in Tanzania asks

> "Does 'harmonization' mean a harmonization between the donors, does it include the Ministry of Health?"

According to him, the Tanzanian government is more rigorously controlling all donor-funded activities. He raises a bigger problem. For other representatives the role of the Ugandan government is also unclear:

> "Why are there so many different regimens in the country? And why does the Ministry of Health not control the number of drugs?"
>
> "It is the Ministry of Health that should come in strong and say 'this is what we want in our public health clinics', not us."

The UNICEF program manager for essential medicines answers these questions by stating

> "Harmonization is that the funders *come together* and advise the government on how to improve the supply chain of antiretrovirals. But at the end of the day, if we look at the population growth, it is the government, which has to come in. The government will have to put more money into the health programs in future. It is thus important that government already takes ownership of this distribution system. *I want strong leadership and clarity*. But if already the Ministry of Health is not managing its ministry properly and we are starting to search for leadership, I don't know if that makes sense. We really have to come up with very specific recommendations."

But moving to specific recommendation is still too quick for the representative of SIDA, the Swedish International Development Agency. Speaking on behalf of the European Union, she insists that we

> "Should ask if it is possible to harmonize at all? I mean, why are there so many different funding sources in the first place? Is it a question of trust? I think it is a question of trust. It is a lack of trust. Basically."

The doctor from the district is even getting more explicit:

> "Do we need the Ministry of Health? Do we really need to invest into the Ministry? There is something at the Ministry that *they all fear, that they cannot touch*. What is that? We need to discuss that before we get into discussions about harmonization."

Such comments are hardly surprising in regards to public outrage over the stock-outs in the country over the last months in the media and other forums. Still, people in this group feel irritated by this statement and the SIDA representative immediately supports the doctor's intervention:

> "Yes she is absolutely right. She has a point. We want the Ministry of Health to seriously address all the problems. *And the fact, that there are still no drugs at the health facilities*. The whole EU is going for budget support. If we go for budget support and we are not anymore earmarking money then we cannot track our money. Thus what we need a transparent system. A transparent system is a system that gives good tracking such that we know how much is bought and where it goes. There is currently no monitoring. There is no follow up. *The hospitals order what they give away. And we replace the stocks without a proper analysis*. That is a fact. We loose track of what is actually bought in the whole of Uganda. There must be more transparency. Because the donors are not going to carry on, if they are not satisfied that the drugs are getting there, where they are supposed to be. There is lots corruption that nobody is addressing. It is not so much about the lack of funding. *This is a fact."*

The HIV advisor to PEPFAR, who is also an expert in logistics, wants to get us more technical:

> "There must be a way to ensure that the drugs get to the facilities in the right quantities and at the right time. This is indeed where the Ministry of Health and other organizations could come in. If there is a layer missing in our discussion here, that layer comes right after the store and that is managing facility orders. One of the reason we, that is PEPFAR, do no trust in NMS, because we were not confident that those products will get to the facilities in the right quantities and at the right time. It is not about money."

The researcher based at Makerere University raises a further question, which leads to a discussion

Researcher: "What do you mean it is not about money?"

PEPFAR: "It is not about money".

SIDA: "It is a fact".

PEPFAR: "It is just the technical level I am talking about. Sometimes they send in wrong orders, sometimes they don't report at all, and if they don't report they don't get any new supplies for the next two months. Those are the technical details. This has nothing to do with money, because *we don't give any money to this government.*"

Indeed, donor money was either bypassing the public health sector (PEPFAR) or had been suspended and was thus not flowing at all (Global Fund). But once the questions of mismanagement, distrust, and corruption are raised, it is very difficult to get the donors back to the table to discuss the technical questions on which one collectively can agree. Thus the supply chain expert gets impatient. He is not interested to continue a discussion whether a presumably inefficient or corrupt government should be on board or not.

> "Mr Chairman [the facilitator], I ask you for direction. The discussion is about product selection, which could be a role of the quantification unit. The question is actually Are the donors willing to sit on the same table and say either the commodities were you willing to support either in terms of funding or in terms of commodity. I don't know if I am thinking wrongly?"

Also the researcher based at Makerere University, working for many years on HIV and pharmacy in Uganda, moans and states that

> "I don't know what this question is about. Is this a historical question or is this a question that we can properly address here? So do we really want to tell the Ministry of Health, you have too many problems, lets just call the funders and let them sit together and solve the problems? Please, lets put aside corruption, the GAVI scandal, the Global Fund scandal, and so on. Were these collective or individual cases of mismanagement? If there is supposed to be a way forward in the name of the *greater good*, we cannot do without the government. Let us take the government together with the funder."

The researcher by evoking of the "greater good" tries get us closer to a consensus or what the facilitator had described as the harmonization. Moreover this consensus could only be effective, as the researcher insisted, if the government would be part of this consensus.

Stefan, working for CHAI, joins the discussion and luckily introduces a self-reflexive moment to the whole discussion:

> "Transparency works on an individual basis, it works me going into NMS or the Ministry of Health and speak to individuals. But there is no collective transparency between all of us."

Stefan's comments make the SIDA representative more frustrated:

> "Yet it is true, it is us, there is also a lack of communication between donors. We have our regular meetings, but this does not go far enough. Some programs keep away from the government, because they just want their program. We don't have even transparency between us."

The PEPFAR representative is friendly with this intervention, and again tries to get us back to the technical questions:

> "There are different reasons along the chain. One problem is also the different approaches. One problem is that for example we PEPFAR do not see the country as a whole. We see it in the districts we support. Our quantification of the need for ARVs is only for those districts. We do not participate in the whole quantification of the country. But I think even if we would not change our programs we would still like to know about the whole country. If I could just go ahead and talk about PEPFAR. We are supplying ARVs through USAID, CDC, CRS—they all have their own mechanisms [see Figure 3 in Chapter 3]. We will be working internally and to try harmonize that. *And this working group here will give the impetus to do that.* There are rather political rather than programmatic reasons for this. It doesn't make sense technically, it doesn't make sense cost-wise, but it is a political thing that is out there. Even just basic contractual requirements. We have a contract with CRS that says, you

> can procure on your own and you are responsible to distribute. For me it is getting so complex and there are so many different reasons and can we look at each link of the chain and discuss it?"

* * * *

The working group did not really come to a conclusion. But how could it in 45 minutes? It was coming to lunchtime and it was difficult to keep all participants discussing. The majority of participants would not make any decision. The participants reflected the broad spectrum of organizations, which were potentially involved in the harmonization. But the main protagonists of this working group, that is the facilitator, Moses, the expert for supply chain management, and PEPFAR already had made up their minds. More importantly, the ENSURE-project was broadly funded by the US government and worked closely together with USAID and CDC. And as the HIV advisor for PEPFAR indicated, PEPFAR was already discussing internally to reduce its entanglements. For PEPFAR the question was what the Ugandan government would do respectively.

So, most organizations had made their decision independently from the Ugandan government. However, a number of high-ranking administrators from the Ministry of Health, the Ministry of Finance and even from the Office of the Prime Minister were sitting in the audience to which our working group was going to present our 'agreement'. Moreover, the general managers of all organizations involved in the pharmaceutical supply chain of medicines in Uganda were present. They all were supposed to be convinced that the donor community would demonstrate unity and declare that harmonization is possible. Thus, the working group discussion on harmonization was crucial to construct scientific and, moreover, moral authority on this matter, which would later be discussed and decided upon in a series of closed meetings including the participation of the Ugandan government.

Before the lunch break, the SIDA representative had put a final question:

> "Why are we here focusing only on ARVs and what about the other medicines? What about ACTs yesterday we heard that the ACTs are going to be stocked-out. Maybe we

> can extend our discussion to other medicines. Is this really reflecting the bigger picture?"

On this question, it is the PEPFAR advisor who explains why antiretrovirals and the problems in the supply of these pharmaceuticals reflected the bigger picture:

> "This is the most fragmented and most complex of all the parts so that is why it is important."

Our presenter, whom I know very well through several occasions, always emphasized his strong belief in technical solutions by stating his preference for "simple things". According to him, it is simple things that convince policy makers. In his presentation of our discussion he rhetorically asks "is it desirable and feasible to simplify the immensely complex structure of support?" His answer is prompt: "YES it is". Among the many things that already worked in Uganda, he points out that "partners are now willing to share information". So, although organizations like PEPFAR would never give a single dollar to this government, they could share at least information enabling the Ministry of Health to produce a more accurate quantification. Then our presenter reformulates the harmonization question into an argument "once information regarding budgets, plans and long-term arrangements would be shared with the Ministry of health it would yield greater transparency and more importantly to a "harmonization of goals and objectives". All these recommendations were two years the later drama of agreement in the workshop led by Dr. Isaac mentioned above.

From antiretrovirals to global health pharmacy

The last comments by the PEPFAR advisor shifted the focus from the complex fragmentation in the supply side of antiretrovirals to a problem of the larger public health care system in Uganda. The shortage of ARVs were in fact largely a result of insufficient funding, but questions of funding cannot be separated from the larger institutional framework to count and account for funding, pharmaceuticals and patients.

As I showed throughout the previous chapters, insufficient funding levels were overlaid with a lack of information, like treatment numbers, which are indispensible to establish the requirements for medicines. At the center of the staging of harmonization of antiretrovirals was the combination of a lack of information and a lack of funding. These 'gaps,' which resulted in the stock-out of antiretrovirals, were not unique for mass HIV treatment. In principle, this was true for the whole public health system in Uganda. In this regard, the workshop organized by ENSURE was indeed different from past interventions. This workshop gave a fascinating presentation of key financial indicators of the public health system in Uganda, which were hard to come by at that time. These financial indicators presented the "bigger picture", which many actors like the SIDA-representative or Joy Kabayaga (see Chapter 3), had been missing.

In the subsequent presentations, the consultants of ENSURE were bringing out a remarkable up-to-date situation analysis of the financing of medicines, including antiretrovirals. The presentation of these findings turned the harmonization into an "obligatory passage point", through which all actors had to go in order to establish stronger health systems—purely because of the immense amount of funding for antiretrovirals which were missing for other kinds of medicines (Callon 1986: 205ff). Following Hilgartner the presentation of evidence is better understood as an event that provides the scientific and moral legitimation to reach a collective and political consensus on how to make patients, pharmaceuticals and donor aid calculable (Hilgartner 2000). Putting new evidence on stage was essential to construct the project's scientific credibility in providing advice on global health pharmacy. Albeit the facts presented were, scientifically speaking, not revolutionary, it was the comprehensiveness and the novelty of the undertaking to collect this information, which transformed the workshop into a premiere of staging global health pharmacy. The scientific credibility which ENSURE is trying to construct should endorse a new understanding of infrastructural problems in the supply of antiretrovirals as an element in the strengthening of the public health sector in Uganda.

After I had shared my own mapping exercise with the ENSURE project, the consultants had produced a far more complex map of the flow of *all* medicines in the country. The entanglements in the supply of antiretrovirals were only a snapshot of the bigger picture,

which the new map depicted (Figure 22). As the consultants told me, "the real science is about numbers, mapping is rather something for policy makers and people like you. You just have to *flash* it on the wall and everybody can *see* that you have to simplify things."[70]

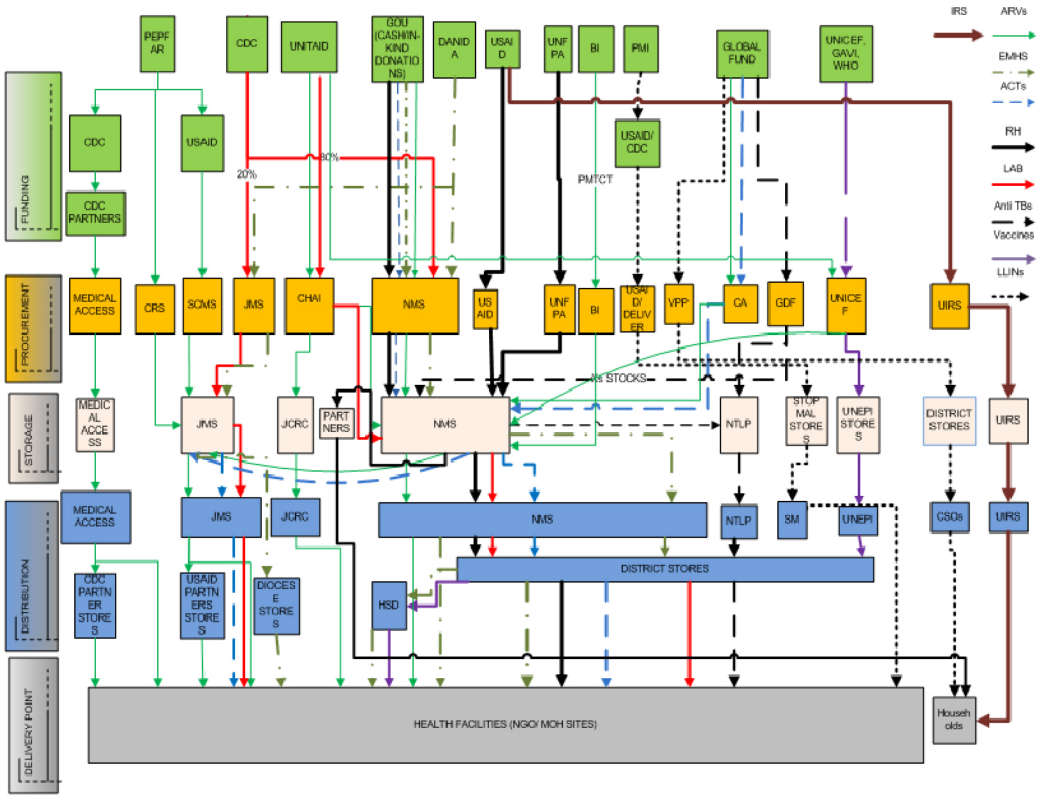


Figure 22: Presentation "Systems and flows for Essential Medicines and Health supplies in Uganda."
Policy Option Analysis of the ENSURE project; 15-16.04.2010.

The previous chapters pointed out how frequently actors had been complaining about the complexity in the supply of antiretrovirals. Now, seeing the complexities of the whole infrastructure gave rise indeed to the audience's collective astonishment. Such visualizations were powerful tools to stabilize the credibility of the statistical analysis in

[70] Interview KM; 28.2.2010; Kampala.

other presentations on logistics, financing and public health architecture. The scientific literature is not conclusive on the efficiency of complex supply systems as opposed to more centralized supply systems. This depends on more specific assessments of the underlying financing mechanisms. In fact the larger map raised the question: where is regulatory authority and budgetary control vested in this infrastructural complexity of the pharmaceuticals distribution? This staging of global health pharmacy in giving scientific advice was thus closely intertwined with the creation, negotiations, and contestations over budgetary authority and regulatory control in public health financing (see also Hilgartner 2000).

As the consultants pointed out, the real science is about statistical evidence. Let me now turn to the presentation of the 'content' of the scientific advice presented in staging ideas of harmonization. Understanding the production and, more importantly, the presentation of evidence as an event is not to dispute the objectivity of these findings. Rather, it suggests that value of such information is to be on the scene. As Hilgartner writes, "controlling what the audience sees is fundamental to a successful drama"(Hilgartner 2000: 11-12). In this case presenting evidence through which the stock-out of antiretrovirals is seen in the context of an underfunded public health system. Visualizations in the forms of maps and the provision of quantitative data grounded the credibility of ENSURE's advice on scientific objectivity, which the political controversies on stock-outs that played out in the media were lacking.

Against this background, ENSURE's "key findings" on the pharmaceutical supply chains were fascinatingly accurate and, at the same time, provided a sobering picture of the future. These findings were fascinating as most organizations in the supply side of antiretrovirals are reluctant to share key information on health financing. In order to retrieve information the consultants had to do an arduous analysis of the vouchers for all transactions in the public sector, which were stored at the Ministry of Finance, Planning and Economic Development, as the consultant told me.[71] However the facts he presented at the workshop gave a sobering analysis of the "bigger picture", which suggested that the stock-outs of

[71] Interview PJ; 13.4.2012; Kampala.

antiretrovirals were only the tip of an iceberg.

Dr Michael—Presentation "Financing Essential Medicines in the Public Sector"

In the financial year 2008/2009 donors and the government spent about $139 million in total on medicines (including antiretrovirals). This includes budget-support, government funding, and more importantly off-budget contribution by the donors. In detail:

- $53.82 million (39 percent) were spent for ARVs only,
- $22.89 million (16 percent) for essential medicines,
- $17.1 million (12 percent) for ACT.[72]

To interpret these figures, it is crucial to separate government funding from the so-called 'off-budget' expenditures coming from donor agencies:

- For antiretrovirals donor contribution amounted to $44.9 million (83 percent). This amount exceeded the total expenditures for all medicines by the Ugandan government, which was equivalent to $33.4 million.
- Out of this $33.4 million the government spent $8.89 million for ARVs only and together $14.51 million for ACTs; this makes already 68 percent of all government expenditures.
- That is, the Ugandan government spent only $9.9 million medicines for its Essential Medicines Program. This was usually topped up by an equivalent of $9.5 million by DANIDA.

These figures show that funding for antiretrovirals accounts exceeded in all respect any other public health expenditure by both donors and the Ugandan government. This is

[72] Presentation PJ; 15-16.4.2010; Kampala.

partly a result of the relatively high costs of antiretrovirals. Funding for essential medicines hardly covers the need in the country, which the so-called out-of-pocket payments suggest. As essential medicines are underfunded, they frequently run out of stock at health facilities. Thus, patients have to buy these medicines at private pharmacies:

- About $4.06 were spent for essential medicines per capita and the national health budget paid only $0.72 in Uganda in 2009/10. About $3.33 were paid by donor organizations.
- In addition to these per capita expenditures by donor agencies and the government, patients were also spending about $5.13 by themselves. This figure accords global estimates, which state that today "in most low-income countries, 50 to 90 percent of medicines are paid for by patients themselves" (Quick 2003: 2).

In contrast to other essential medicines, antiretrovirals were not sold in private pharmacies. Even if antiretrovirals were sold, they would be too expensive for most Ugandans, such that out-of-pocket payments cannot be established for antiretrovirals. Thus, one needs to look at the funding gap, which is another crucial indicator to assess the proportion and the volume of funding for medicines.

Funding Gap for EMHS 2008/2009

COMMODITY	Quantified requirement 2008/2009 in million USD	Total resource envelope 2008/2009 in million USD	Funding gap in million USD	% of estimated requirement financed
EMHS including anti cancer drugs GOU facilities	36.1	18.3	(17.8)	**51**
ACT'S GOU facilities	17.1	13.2	(3.9)	**78**
ARV including PMTCT	57.3	53.8	(3.5)	**94**
Vaccines Routine & Supplemental	29.4	16.5	(12.9)	**56**
Contraceptives	1.8*	5.6	3.8	**100***
Condoms	3.2	1.9	(1.3)	**57**
Anti TB drugs	1.3	2.3	1.0	**179**
Lab supplies & consumables	21.6	5.1	(16.5)	**24**

Figure 23: Funding gaps for medicines in the country.
The right hand column shows the percentage of financing according to the requirements. The difference reflects the funding gap expressed in US dollars in the second-right column. Presentation PJ; POA Analysis; 15-16.4.2010; Kampala.

For essential medicines the funding gap amounts to 49 percent, or in absolute value $17.8 million. For antiretrovirals this funding gap was estimated to be only 6 percent or in absolute value $3.5 million (see Figure 23).

* * * *

These indicators for health financing showed that, in principle, funding for antiretrovirals was stable and, moreover, plenty, but not for essential medicines for any other disease. At the same time, the supply of antiretrovirals is highly complex and vulnerable to stock-outs. Antiretrovirals are unevenly distributed. And information is scattered in the infrastructural multiplicities, such that some ART clinics were moderately scaling up, while others had to stop the enrollment of new patients (see Chapter 8).

The funding gap of 6 percent is pretty low if one considers the stock-outs of antiretrovirals. These figures are however not based on the actual need. They are based on projections and a quantification of the requirements for the financial year, which are compared with the actual disbursement for these medicines. The actual demand for treatment in the country was of course much higher. According to the national treatment guidelines for ART, about half of the people eligible for treatment do not have access to treatment, which was not included in this this funding gap indicator of 6 percent. Moreover, this presentation did not capture the actual amount of antiretrovirals procured with this funding. As the previous chapter discussed, the Ugandan government used its funding to procure antiretrovirals from Quality Chemicals, which were twice as expensive than on the global market. In contrast for NGOs, the scale-up of treatment numbers was largely a result of price reductions—but not an increase of funding, according to the quantification of the requirement.

But omitting this information was crucial for embedding the stock-outs of antiretrovirals in the context of a completely underfunded public health sector. In fact, the funding gaps showed how the resource requirement for antiretrovirals and ACTs was 'eating' into the resource envelope for essential medicines. Moreover, as the ENSURE consultant emphasized, one should not expect that the Ugandan government would increase the national health budgets in the near future. The only way to move ahead was to make the supply of medicines more efficient and further rationalize the supply of medicines, for instance.

According to the experts of ENSURE, it was indispensible to "rationalize the needs" by setting new priorities for which medicines would be considered to be essential. Similar to the above-mentioned harmonization exercise in the working group discussion in which we were supposed to reduce the product range of antiretrovirals, ENSURE suggested rationalizing the product range of all pharmaceuticals procured in the country. According to ENSURE, this meant prioritizing medicines according to the following guidelines: (1) those which are *vital* and should never run out of stock; (2) medicines which are *essential* or (3) *necessary* medicines, which had only therapeutic advantages and could be bought by the patients themselves. As a result, the available funding would be used to guarantee a safe

and reliable supply of vital medicines and reduce stock-outs for these medicines, while other would have to be paid by the patients themselves as they were regarded to be less vital.

The logic of rationalization is straight. No patient should pay for vital medicines. But vital or essential has to be seen in the light of the availability of financial resources in Uganda. I will return to the implementation of this rationalization in Chapter 10 to explain how these ideas were put into practice.

Here I suggest that this rationalization of antiretrovirals within the broader context of public health sector is better understand as the permanent reorganization of the AIDS crisis around the supply of medicines. In this reorganization of the AIDS crisis, the supply of antiretrovirals and its weakness are framed in the context of the larger pharmaceutical supply chain system, where all kinds of medicines are stocked-out and underfunded. But building a stronger health institution does not mean putting more money into the supply of antiretrovirals and essential medicines. The next chapter attempts to give an illustration of the reconfigurations of the institutional frames and the experimental practices to achieve better results by optimizing the use of limited resources (Chapter 10).

10. Optimizing health institutions

Global health pharmacy and implementation science

The previous Chapter 9 discussed the staging of the new project ENSURE, and how it reorganized the scarcity of antiretrovirals as a general problem of the supply of pharmaceuticals in the country. In this staging of harmonization, pharmacy was claiming scientific authority as a distinct global health discipline. This form of pharmaceutical research differs from the laboratory science at research institutes. Laboratory research or pharmaceutical Research and Development (R&D) are predominantly occupied with the discovery and development of new molecules, which are later tested in experiments. The type of experiment conducted in global health pharmacy differs from these experiments with human bodies, but addresses pharmaceutical practices, behaviors, and, moreover, institutions in an attempt to build stronger health institutions. Global health pharmacy resembles what Thomas Kuhn termed a normal science, which unfolds after major novelties are discovered and accepted by the scientific community (Kuhn 1962). This normal scientific research follows the "paradigm shift" from prevention to treatment as the roll-out of antiretrovirals is frequently described (cf. Hardon and Dilger 2011: 144). As Kuhn argued, this form of normal science mainly consists in "empirical work undertaken to articulate the paradigm theory, resolving some of its residual ambiguities and permitting the solution of problems to which it had previously only drawn attention" (Kuhn 1962: 27).

The normal science of antiretroviral therapy has been stabilizing a particular style of reasoning, which not only shapes what we think about AIDS, but, more importantly, how we think about AIDS treatment in the context of global public health (Hacking 1992). This style of reasoning, which Ian Hacking describes in his work on the history of statistics, is pivotal for a general trust in biomedical knowledge, which is constitutive for contemporary global public health. This trust hinges on the proof that antiretroviral therapy can be effectively administered as a life-prolonging therapy and translated into what public health experts term stronger global health institutions (Frenk 2010).

The scientific novelties and, moreover, the kind of normal science in the logistics of antiretrovirals is not taking place in countries of the global North, but in countries like Uganda. Moreover, the effects of life-saving antiretroviral therapy are not restricted to the realm of HIV care and treatment. In contrast to pharmaceutical research in chemical laboratories, global public pharmacy runs as real life and real time experiments in ordinary health institutions, and the objects of these experiments are everyday pharmaceutical practices. In these experiments, a range of indicators is used to measure practices and to test health economic models.

Pharmaceutical practices were quite well researched early on in Uganda and, of course, in other so-called developing countries before ideas of global public health and demands to build stronger health systems became popular. Numbers have always been quintessential sources of information about the use of medicines in the so-called developing world and to promote international drug policies like the essential medicines lists, primary health care models, or the concept of rational use of medicines. Putting these models into practice is, however, fraught with a range of obstacles, unintended effects, and failures, as various critical studies of health and development have repeatedly demonstrated (e.g. Kanji, et al. 1992;Turshen 1999). A variety of international declarations and national health policies exist on paper, but not in practice. In addition, these discrepancies also give rise to critical questions about the accuracy, consistency, and reliability of numbers, which often travel from countries of the global South in poor quality to the centers in the global North, where they should guide policy decision.

In public health debates such observations have led to addressing the notion of implementation as a discrete scientific problem. Madon and others define the discrepancies between models and practices, between ideas and figures, and financial investments and results as an "implementation gap" (Madon, et al. 2007: 1728; but see Pfeiffer and Chapman 2010). Implementation science's argument builds on the assumption that randomized, controlled trials are the most rigorous method to answer scientific questions. Implementation, according to this rationale, is a scientific question, too. "Although randomized, controlled experiments are the gold standard for testing safety and efficacy of pharmaceuticals, health delivery schemes are less likely to be subject to

rigorous scientific analysis" (Madon, et al. 2007: 1728). It is not only numbers, but, more importantly, the rise of statistics to test global health interventions at distant places, which underlies the propagation of ideas like implementation science (Nguyen 2009; Sangaramoorthy 2012). Statistical knowledge is neither a purely positivist truth nor should it be regarded as socially constructed. Following Hacking, statistics rather constitute a style of reasoning, which is distinct for late modern science and politics (Hacking 1992).

A PEPFAR-publication defines implementation science as the "study of methods to improve the uptake, implementation, and translation of research findings into routine and common practices" (Padian, et al. 2011: 199). According to this account, the roots of implementation science are to be found in monitoring and evaluation, operational research, or in impact evaluations. These different areas of organizational practices draw heavily on indicators and statistics either to measure performance at work places, to improve organizational efficiencies, or to assess and evaluate outcomes. According to these authors, implementation needs to be understood as a dynamic process. It has to be rigorously assessed in order to make reliable assertions as to whether health services models are translatable—or not (Madon, et al. 2007). As a result, this means building the transfer of interventions from one setting to another on scientific evidence.

Pharmacy has not been excluded from this development in global public health. Statistics play an increasingly important role in creating an evidence base for pharmaceutical practices. More important are the use of indicators and the production of evidence, which fosters the optimization and further rationalization of pharmaceutical practices, as it will be discussed below. Reaching global health targets, or rebuilding stronger health institutions is often a matter of correcting practices deemed to be economically, medically, or ethically wrong. These practices underlie the promotion of ideas that patients should have safe access to a list of medicines, which are regarded to be essential, or that the use of medicines should be rational. In implementation science, statistics provide additional means to analyze practices in order to correct and fix these practices through sophisticated optimization and rationalization strategies.

From the private to the public sector

During my field research, I evaluated a pilot study called "Mentoring for Service Improvement in Pharmaceutical Management" at TASO.[73] TASO has eleven treatment centers, which are spread throughout the country. In the intervention phase, pharmacists at Makerere University provided on-the-job training to the medical personnel of TASO in various aspects of pharmaceutical management of antiretrovirals. The areas of pharmaceutical management were standard topics in international drug policies, like rational use of medicines, storage practices, dispensing practices, etc. Other topics, like logistic and information management, were novel. In order to put these concepts into practice, the pilot study designed the intervention as a randomized, controlled trial. Unlike in research on human subjects, mentoring was provided at four treatment centers out of eleven treatment centers. Two treatment centers were taken as control sites in order to compare and establish empirical evidence on the intervention's impact. The intervention used a range of indicators to assess the different aspects of pharmaceutical management. All indicators showed 'good' performance at all treatment sites. Most importantly, data for most indicators was readily available by "looking into the system of TASO". TASO keeps meticulous records of various program indicators for the monthly reports for the Center of Disease Control (CDC), the quarterly reports for PEPFAR, and the semi-annual reports for the Office of the US Global AIDS Coordinator (OGAC). For instance, counting pharmaceuticals on the shelves and comparing the figures with the entries on the stock-cards seldom revealed a discrepancy. The organizational and infrastructural conditions are very elaborate and robust at TASO compared to the government's public health system. They are better funded, albeit funding commitments must be renewed after a relatively short period of time. Finally, organizations like TASO put strong emphasis on actual implementation in the form of on-the-job training. When I asked the pharmacist who designed the interventions if he believed that they would make a difference, his answer was

[73] The "Mentoring for Services Improvement in Pharmaceutical Management" was funded by Medical Access, which supplies all PEPFAR programs in Uganda with antiretroviral medicines. During my field research, Medical Access asked me to lead the evaluation team, write the evaluation report, and present the "findings" to the board of directors at TASO.

"of course, it must, because mentoring is such powerful tool."[74] His point has to be seen in the context of a mushrooming of workshops in Uganda. The pharmacists thought that mentoring would be more effective than the usual workshops, which NGOs were providing.

Pilot projects like Mentoring for Service Improvement essentially try to go beyond the emergency responses of the first years in the global fight against HIV/AIDS, and aim to build the capacities and infrastructures necessary to make AIDS interventions "sustainable" programs that provide "quality care" (see also Padian, et al. 2011). One of the TASO managers, to whom I had to report the findings of the evaluation, graphically pointed out that he was a medical doctor, but unfortunately did not see patients anymore. His main contribution in making TASO one of the biggest organizations in the country was the result of reading books, in particular those on the Japanese automobile industry: "You can learn so much from a Toyota manufacture in running an antiretroviral therapy program—it is impressive."[75] Conducting operational research like mentoring is, in this regard, inherent to the managerial idea at TASO that continuously providing high-quality care and treatment is dependent upon continuously improving the delivery of services.

In our evaluation, the availability of medicines – antiretrovirals and antibiotics –at TASO stood at 100 percent. None of the drugs had been out-of-stock over the last six months. In contrast, during the same period of time antiretrovirals were constantly short in supply for government hospitals. Only 6 percent of government hospitals had not experienced a stock-out of antiretroviral medicines during the last six months. In regards to the general availability of essential medicines, facilities without a stock-out decreased from 35 percent in 2004 to 28 percent in 2006 (see also Chapters 2 and 3). The infrastructural and institutional conditions that determine the availability of antiretrovirals at NGOs like TASO also differ considerably from the logistic arrangements to supply government hospitals with pharmaceuticals. As the previous chapters describe, TASO is supplied by Medical Access and exists independently of the public sector. Thus, pharmaceutical

[74] Fieldnotes, 13.1.2009.

[75] Interview Dr. E; 25.7.2010; Kampala.

practices are not easy to compare across the variety of institutionalized forms that provide access to medicines—all types of medicines.

As pilot studies like the Mentoring for Service Improvement in Pharmaceutical Management produce the demanded empirical evidence, the question of how to best 'scale up' the model to other sites and other contexts arises immediately. In particular, can such models, tested at nongovernmental organizations, be transferred to governmental health institutions? Can one replicate such models under the completely different infrastructural conditions of the public sector? To what extent are randomized controlled trials in government health institutions possible such that good data and empirical evidence can be generated?

Statistical practices and the making of statistics offer insights into the bureaucratic and scientific practices, which render things and institutions comparable. In this respect, the invention of implementation science itself constitutes a field of inquiry to trace the role of statistics in shaping pharmacy in global public health. According to the historian of statistics Alain Desroisières, modern statistics is the result of combining administrative and scientific practices (Desroisières 1998). Statistics is not only the mathematical representation of a social order, but it builds upon administrative knowledge repositories, like records, taxonomies, and classification, which enable the creation of new things and new social orders through statistical reasoning. In this regard, "statistical work is to make a priori separate things hold together, thus lending reality and consistency to larger, more complex objects" of another order (Desroisières 1998: 386). Things hold together in statistics as a result of its "impure" use in administrative contexts, which entails the planning of public infrastructures and the crafting of modern institutions. Modern statistics aims at producing objects with stable meaning, which is regarded as a precondition for organizing public life.

Similar to modernist planning schemes, in which statistics is used to turn administrative imaginations of social order into reality, implementation science draws on statistical technologies to articulate knowledge claims in governing objects like pharmaceuticals, the use of pharmaceuticals, health services, etc. But, in addition, implementation science

contrasts with the modernist origins of statistics by emphasizing experimental modes of interventions. In doing so, modernist notions of consistency, completeness, or coherence are augmented with, and partly replaced by, ideas of innovativeness, efficiency, and optimization.

The stability of the meaning of objects is a constitutive problem in implementation science, which emerges in the global public health contexts in countries of the global South, where a broad variety of objects of knowledge are considered to be unstable or unpredictable. But this may not necessarily be the result of an implementation gap. Rather, the lack of good scientific facts to improve implementation is situated in the way scientific and administrative practices are related to each other in producing scientific knowledge. Over the last decades NGOs have been steadily expanding in the field of international development assistance, underwriting an analytical distinction between the state and government. Fassin captures this distinction with the term "nongovernmental government" opposed to the government of the state (Fassin 2007), which needs to be taken into consideration in studying the circulation of commodities, power, and knowledge in global public health. Whereas in the past implementation mainly addressed state bureaucracies, today NGOs are increasingly the autonomous implementers of health policies, fostering the use of statistics in knowing how pharmaceuticals can be used in better ways.

Instead of deconstructing the dominance of statistical thinking in global health, as frequently takes place in critical social research, this section attempts to provide a case study of how scientific and administrative practices are intertwined in producing the objects of global public health by discussing some of the everyday practices of implementation scientific research. The case study describes a support supervision intervention to explicate some aspects of implementation. This support supervision is run by ENSURE, which was introduced in the previous chapter on the harmonization of the supply side of antiretrovirals. ENSURE's support supervision resembled the project on Mentoring for Services Improvement at TASO, which I had evaluated before. However, it also differed in addressing the pharmaceutical management of essential medicines (not only antiretroviral medicines). Also the scope of the intervention was larger and targeted

health centers at different levels in the public health sector.[76] In the following ethnographic case study, I am interested in the use of statistics and how it seeks to produce stability, consistency, and accuracy by translating pharmaceutical practices into an object of statistical inquiry. Furthermore, I attempt to engage the health economic rationality in strategies to optimize the use of pharmaceuticals, which illuminate the reorganization of public health in Uganda and the production of novel global health orders.

The trial

Oliver Bukanga and Samson Butagira form the field team East of ENSURE. We visit a Health Center, about eight km South of Mbale (Eastern Uganda), for a support supervision day. Six more health centers are on the list for the next two weeks: the hospitals in Makaluku, Bugema, Nakaloke, Bunghoko, Chebonet, and Kapchorwa. All are located in two different districts in Eastern Uganda. Oliver and Samson are both pharmacists, and train Paul Waniale and Sarah Birungi to work as medicine management supervisors (MMS) for pharmaceutical management within the ENSURE intervention. Otherwise, Paul works at Mbale District Health Office. Sarah has her placement at Busiu hospital. After the baseline in Busiu, which is done together with the whole team, Paul and Sarah are supposed to provide support supervision to other health centers in the larger district area on their own.

Support supervision is not new, but is an established public health procedure in Uganda. Higher-level public health officials, like the district health officer, supervise lower-level units (Jitta, et al. 2003). But, like various other activities, it depends on fuel for transport to visit hospitals, which, like many other things, is sacrificed because of the insufficient budget allocation by the Ministry of Health. ENSURE fills this vacuum by providing means of transport as well as training and paying additional support supervisors. In addition, it replaces hierarchical relations in support supervision with a scientific assessment of pharmacy work, where pharmaceutical practices are measured with a comprehensive list of indicators, assessed through statistical methods of analysis, and ranked. Based on the score,

[76] The public health sector is a tiered structure within each health units are classified as health center 2 to health center 4, regional referral hospitals, and finally the national referral hospitals.

hospitals and health centers are supervised on how to improve their pharmaceutical practices in the respective areas. Finally, support supervision does not target one of the major disease HIV/AIDS, TB, or Malaria, but works towards an integration and strengthening of health systems, which is manifested in the sheer number of health facilities that are part of the intervention and the broad range of topics that are covered. The project works in 45 districts out of more than 110 districts in Uganda. Field team East works in 12 districts with 361 health facilities and is training 34 health workers as medicine management supervisors.

So far, team East has completed about 69 baseline visits and is way beyond the schedule. The intervention in Eastern Uganda started in March 2011, six months later than in other regions, and lost three trainees, as Oliver explains to me. "But we have so many facilities—more than 300 health facilities in this region. We still have to do so many districts. When I do the baseline in one district, I may only return 2 months later for my second visit, because I have to do the baseline at other districts. But in 2 months they will have forgotten everything. They won't remember any of the things we told them."

A support supervision visit takes about one to two days. First the team introduces itself to the hospital and signs into the visitor's book. Then it moves through different departments and collects baseline data. One can read the data collection tool, but as Oliver remarks, one must apply it in real situations. "You know I have to take my time. I want to move with them. It is their first visit." Thus, he teaches how to collect data that meets standards of accuracy, how to calculate percentages without using a calculator to increase on speed, etc., and, more importantly, Oliver teaches the trainees what counts as "good pharmaceutical practice".

"A support supervision day"

Data collection, which precedes the medicine supervision, takes most of the time. Almost everything in the facility is counted, measured, and assessed: the infrastructure of the facility, hygiene, supply chain management practices, medicine availability, stock

management, drug dispensing practices, financial management, and client satisfaction. It is very comprehensive. We are equipped with rucksacks, teaching material, pens, and notebooks on which ENSURE's logo is printed on. We enter the medicine store and see a huge number of antiretroviral medicines. This was very different from other government hospitals, which ran out of antiretrovirals in 2010. For example, Busiu health center, a government hospital, is also supplied by the NMS, and I am surprised that it supplied these drugs, after a massive shortage of medicines in the past. The 'in-charge'—that is the acting head of the facility—explains that first NMS had failed to supply antiretrovirals and the hospital was ordering from other hospitals like Mbale Regional Hospital, and the USAID project "Star E", and also borrowed medicines from lower health units. In addition, they had continuously resubmitted their old orders to the National Medical Stores, which surprisingly supplied antiretrovirals for three orders a few weeks ago. Oliver wonders if the stock is not too much for the number of patients at this facility. He quickly estimates that it must be stock for a year and looks at the expiry dates. "That is too much, they will expire. We need to tell these people to redistribute these drugs".

As in other forms of medical research, this intervention deploys a wide range of indicators and statistical methods, not only to measure changes, but, more importantly, to assess the project's impact on the improvement of pharmaceutical practices. This intervention teaches the respondents what counts as 'good' pharmaceutical practice. "Support supervision is when you come and enter into that store and see what they are doing and if there is a problem you correct immediately there—on site" as Paul explained. In particular the trained MMS, who are themselves health workers at a hospital, will not only learn to teach these practices, but will also implement these practices at their own work places.

August 2011—Feedback

After we finish the data collection for the baseline and calculate the score for another two hours, Oliver and Samson call all health workers to give feedback. It is already late, almost 5pm. But it's still better than in Kapchorwa where we arrived late and kept health workers

waiting until 9pm. We sit around a table. The feedback is in English, since neither Oliver nor Samson are fluent in *Lugisu* or *Sebei*, which are spoken in this area.

Figure 24: Feedback session at Busiu Health Center.

Samson goes through the scores and comments at each and every point:

> "Then we assessed the cleanliness of the pharmacy. I give you 50 percent for the cleanliness of the dispensary. It was ok, but if I give you 100 percent, I will not see improvement at my next visit. You still have to add on a bit to get full marks. But my colleagues [pointing on us] have been very generous with the store. They give you 100 percent. I don't know why."

Oliver and myself answer, "The store was very ok. It was very organized. It was very clean, by the way". Stores at other hospitals were indeed less well managed for whatever reason. This store even put the medicine boxes on pallets, which pharmacists strongly advocate for. Moreover, it did not put pharmaceuticals arbitrarily on the shelves, but kept an alphabetical order and stored pharmaceuticals according to therapeutic classes. Samson ignores our interventions and continues to explain at length the importance of hygiene. It is one of his

favorite topics. He rubs his hand demonstratively while depicting how and when hands must be washed. He gets upset when he sees dirty toilets, or when toilet paper and soap are missing. When health workers point out the small budget allocated to run the hospital, he shouts, "then tell me exactly what do you do after the toilet? You return to work, isn't it?"

Another important area of the intervention is rational drug use. Samson discusses rational prescribing and adherence to the standard treatment guidelines in Uganda:

> Samson: "Number of antibiotics prescribed. Here we are seeing that 75 percent of your patients getting antibiotics. The recommended must be 45 percent or less and you have 75 percent. Out of 4 people, 3 are getting antibiotics. That is too much. Let me ask you, how do you want to solve this problem?"
>
> In-charge: "Proper diagnosis, carry out CME, sensitization, provide guidelines."
>
> Samson: "Yes, you know these things and I want to see these things in practice."
>
> Samson: "Percentage of recorded diagnosis. When you record the diagnosis in that patient register, the diagnosis must be definite. And you know what definite diagnoses are? It is not symptoms. For you now, 75 percent had definite diagnoses and 25 percent were only symptoms. So your overall mark on rational prescribing is 'zero'. [...]
>
> Another issue is adherence to standard treatment guidelines. We look at three cases 'diarrhea no blood', 'cold cough' and 'malaria'. For patients with diarrhea, in our sample, all of them got antibiotics. Yet, you are expected to give ORS, only some were given ORS and no one received zinc. [...] That is it and you scored again 'zero'."

The hospital scored poorly on rational use of medicine. Each "zero" sounds like a judgment, and the in-charge of the hospital sighs "eh" whenever Samson utters this judgment. Samson continues to explain the scores for the other tracer conditions. For "cold cough" again too many antibiotics, and "Malaria" no proper diagnosis before prescribing

ACTs.

****

The tone in the discussion of the irrational uses of medicine is strict, but not too draconic in regards to hierarchical differences between Samson and the health workers. Samson mainly gives instructions to reduce the number of antibiotics prescribed, but hardly engages in a conversation about the reasons for such practices or attempts to resolve these problems as a team. The scoring of rational use of medicines was largely oriented to reduce 'overprescriptions' as a precondition for making the pharmaceutical supply of medicines more efficient. Prescribing antibiotics for diahrrea is considered a wastage of resources.

Rational use of medicines is one of the major topics in public health. However the distinction between rational and irrational use of medicines in countries like Uganda has been variously questioned. Indeed, "irrational" uses of medicines have been quite frequently observed in government hospitals in Uganda, and social research on essential medicines gives an idea why presumably "irrational" prescription and uses prevail (Mburu 1985; Jitta, et al. 2003). Various studies of essential medicines document that the available essential medicines at government hospitals is insufficient and inadequate. Mburu states in one the first evaluations of the Essential Drug Program in Uganda that "drugs are short in supply" (Mburu 1985: 88). Thus, District Medical Officers divided essential medicines, which were delivered in kits, such that all health facilities were given an "equal share" (ibid.). These essential drug kits were assembled by the central medical stores based on the WHO's Essential Medicines List. The kits did not necessarily match the disease burden in various regions in Uganda, which were reflected in discrepancies between diagnostic patterns and prescriptions. For example, intestinal worms ranked as the fourth important health risks, but treatment was not included in the essential drug kits (Mburu 1985: 89). Most health centers were frequently stocked-out once the kits were depleted. According to Mburu this "results in clusters of attendance or 'peaks' when drugs are in stock, and corresponding 'valleys' when supplies run out" (Mburu 1985: 90). Practices of rationing also suggest that health workers consider "more expensive drugs (and perhaps the most

impressive to patients), the [...] more essential" (ibid.). But consumption practices also seem to facilitate that pharmaceuticals, like antibiotics or injections, run out faster and are always out-of-stock. According to Jessica Jitta and others, clients demand certain pharmaceuticals to be satisfied (Jitta, et al 2003: 173-4). A health worker explained the high rate of injections: "In this area … if you do not prescribe an injection for a patient, you have more or less not given him any treatment and they go away saying you are a bad health worker" (Jitta, et al. 2003: 173-4).

In addition, the lack of diagnostic tools may lead to supposedly irrational practices; Anita Hardon and Kanji Najmi state that "if health care workers lack the diagnostic tools with which to test if patients have malaria, then such a prescription may well be considered rational. They may not know for certain if a patient actually has malaria, but do know that many patients suffer malaria in the area. In this health care context the benefits of giving an anti-malarial are likely to outweigh the risks" (Hardon and Kanji 1992: 117). Moreover, as Najmi argues in his critique, the focus on health workers and patients tends to ignore that the private pharmaceutical industry "needed an irrational pharmaceutical environment within countries to continue making enormous and unjustifiable profits. The adoption and implementation of an essential drugs policy meant rationalizing a chaotic sector" (Najmi 1992: 74). Thus, international pharmaceutical producers opposed and tried to obstruct the introduction of the essential medicines by the WHO, as the promotion of rational use of medicine was regarded to threaten the lucrative profit margins in the developing world.

ENSURE similarly tried to rationalize the use of medicines and, more importantly, reduce the number of prescriptions to the most essential medicines, which would be a crucial precondition to stabilize the pharmaceutical supply chain management system.

Working and living in the knowledge economy of global health

When Samson explained the treatment guidelines, the in-charge answered, "I am getting there, the reason is coming". As the feedback goes on and on with poor scorings, she suddenly remarks, "but I told you about our challenges that we have on this issue. The

person who is recording there [pointing to the ward] is not a technical person". The technical person wrote prescriptions, while other health professionals were trying to get by with the erratic supply of essential medicines for patients. Staff was heavily rotating at this clinic. There was no pharmacy technician at the hospital, so Sarah Birungi, trained as a midwife, had been working in the store. But since Sarah was currently trained as a MMS, a nurse took over the responsibility of the store, whereas she had been working at the dispensary before.

The in-charge of Busiu hospital tells us she is happy that Sarah was selected to become a medicine management supervisor. She and Paul receive a "Safari Day Allowance" of 12,000UGX ($4.4) for each visit. This makes 60.000 for all five visits in her sub-district during the first phase of the intervention. Oliver and Samson as staff member receive 60,000 UGX ($21.2) for each visit and an additional 120,000 UGX for accommodation.

On the day of the support supervision the USAID-funded HIV-project "STAR E" also runs a workshop in pharmaceutical supply management at Busiu hospital. Both projects are funded by USAID and they share the same headquarter in Mbale. Oliver points to Joseph, "he is the senior pharmacist at STAR E". But Oliver doesn't know that STAR E is also running a workshop. During a break, Joseph, the facilitator, joins us. He tells us that his workshop is finished and he will leave at 4pm. We are still looking forward to another two hours. He looks at the MMS who is still entering numbers into the forms and asks, "Where have you been?" Sarah responds, "I was here doing data collection." "Which unit are you?" — "I am from here" — "Ok, that is ok". He points to Paul, the other trainee, and says

> Joseph: "But you, you are at the district office, why didn't you come?"
>
> Paul: "I am here. I am almost done with my data collection and will sign for the workshop. I still want to sign"
>
> Joseph: "Ah, now you missed more than three-quarter of the workshop, how can you sign now? I am very strict on accountability."

Each projects offers an additional income, either in the form of a sitting allowance, travel allowance, or other material incentives, which are all important supplementations to the meager salaries, and, moreover, ways to provide recognition for work in the health sector. These numerous projects often compete for the few health workers in the country to collect data, have participants for their workshop, and, moreover, have informants for their evidence-based interventions. That is, health workers who are too few in number have to do everything at the same time—including patient care.

Interventions like support supervision share various characteristics with medical research in Africa in general, like clinical trials, which have been critically discussed in regards to the problematic involvement of participants and local research assistants (Geissler and Molyneux 2011). As Geissler argues, medical research and the reimbursement for participation in research (as data collectors or workshop participants) constitute value transactions that are at times at odds with scientific principles and formal definitions of labor (Geissler 2012). Yet, in various African contexts, reimbursements constitute a substantial form of income, which is not acknowledged for a variety of reasons. Most notably, incentives may bias the responses participants give, the way they participate, and generally undermine the voluntary decisions that are crucial ethical preconditions. According to Geissler, it is the diversity of medical research projects making use of these practices that points towards the emergence of a novel "labor market" in African countries (Geissler 2012: 219).

In contrast to these observations, ENSURE interventions did not only offer a financial compensation, but material incentives, like certificate, mobile phones, and motorcycles for well performance, were part of the experiment. As the head of the project explained, it is the "carrot-stick-strategy", which has been proven to be most successful in the world of international aid. However, as mentioned above, other projects are also providing "incentives" and "compensations", perhaps in even higher amounts, which introduces a competitive dimension to the participation in the interventions.

Composite indicators and stronger health institutions

Support supervision and the content of support supervision of for example rational prescribing are not entirely new in the national drug program of Uganda (Jitta, et al. 2003: 177). Support supervision can be less instructive and is, in participatory approaches, less inquisitive and more problem-oriented. For instance, the TASO intervention overtly emphasized the improvement of health workers' capacities in identifying and solving problems efficiently. Support supervision focused on the joint development of a strategy identifying how these problems could be resolved with the existing means at this hospital.

It is not easy to tell which way is better in dealing with problems. They rather seem to expose different ideologies, especially in regards to expectations in the use of indicators in influencing pharmaceutical practices. The ENSURE intervention differs from previous attempts through an encompassing use of composite indicators for what it terms "good pharmaceutical practices" in orienting support supervision. Such composite indicators are bundles of several other indicators and enable measuring and comparing more complex concepts, which are qualitative in nature, like "good pharmaceutical practice" (Merry 2010: S86). In the case of the ENSURE project, 'rational use of medicine' is only one indicator amongst many others that are considered to constitute 'good' pharmaceutical practices.

Composite indicators enable complex statistical calculations to assess how strategies optimize pharmaceutical practices. The huge amount of data from support supervisions at more than 1500 health centers provides a unique opportunity to produce reliable empirical evidence about how these options can be continuously optimized such that institutions' abilities to deliver health services are ultimately stabilized. Such strategies also include the use of statistical devices like spidographs to visualize complex indicators (see Figure 25), and enable the identification of critical areas and further direct optimization strategies.

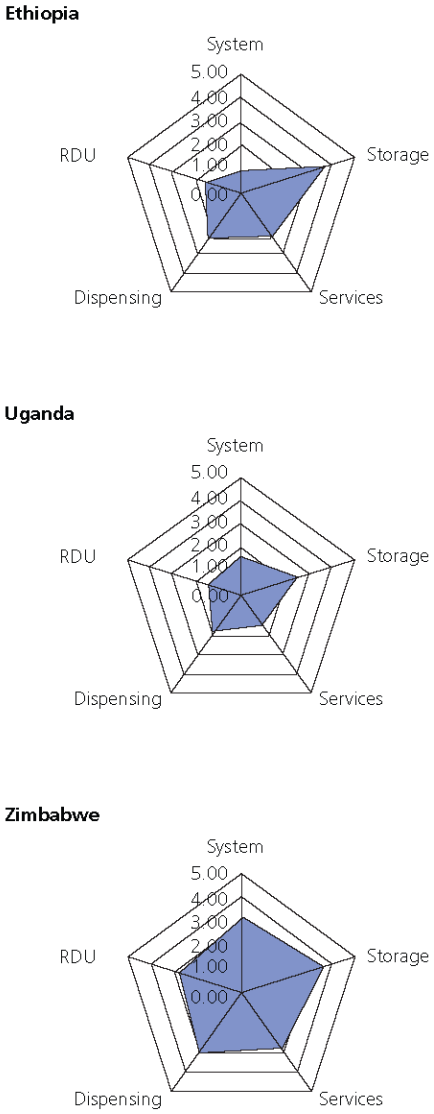


Figure 25: Spidograph for "good pharmaceutical practices".
The spidograph is one of the statistical instruments used in the ENSURE project. Here, 'good pharmaceutical practice' is represented as a composite indicator consisting of System, Rational Drug Use, Dispensing, Services, and Storage. Such composite indicators can also be used for comparisons. This example is taken from a related scientific article (Trap, et al. 2010: 5).

In the spidograph, the blue pentagon represents the scoring in different areas. It also shows in which areas interventions are more urgent than in other areas, or require additional interventions. It is a statistical map that shows how policy options translate into pharmaceutical practices and how the measuring of pharmaceutical practices provides

evidence of how a range of calculative choices may not solve the host of problems in public health systems, but can come closer to optimal solution under a given situation. Further, it enables more detailed comparisons between different countries, which explains why certain countries rank higher or lower in these comparisons.

The use of the composite indicator "good pharmaceutical practice" at ENSURE is part of what, according to Timothy Mitchell, can be understood as a health economic experiment, in which interventions like support supervision are designed as a randomized, controlled trial to test health economic arguments (Mitchell 2005; Muniesa and Callon 2008). These economic arguments are not tested in laboratories, but in the real world, as Mitchell puts it. In this regard, economics must not be understood solely as an academic discipline. Rather, economics comprises a range of different types of actors, most notably international development organizations, which precisely develop experimental modes of research like implementation science.

Mitchell emphasizes that economics is performative. That is "economics claimed only to describe this object, but in fact it participated in producing it. Its contribution was to help devise the forms of calculation in terms of which socio-technical practice was increasingly organized. Economics, it follows, is important not just for what it says but for what it does" (Mitchell 2005: 298). In this regard, understanding support supervision as a health economic experiment is dependent upon examining how statistical practices organize public health systems.

Further, it is important to note that such health economics experiments like support supervision are conducted amidst far-ranging attempts of neoliberal economic restructuring in Uganda and other so-called developing countries, which date back to the 1970s. In these years, attempts to stabilize and improve public health services by international health policies—comprising the development of essential medicines list or the primary health care concept—coincided with the introduction of neoliberal reforms like the structural adjustment programs (SAPs). SAPs demanded huge budget cuts for public services, which emptied out public health institutions and led to the deterioration of government hospitals (Turshen 1999; Pfeiffer and Chapman 2010). The massive funding

for AIDS medicines seems to have aggravated the emergence of neoliberal regimes of governance in African contexts in various ways. NGOs emerged as major implementers filling the institutional vacuum left by drastic cuts of national health budgets across most African countries. In addition, donor funding focused primarily on AIDS, followed by Malaria and TB, which were regarded to require an emergency response. Thus, access to antiretroviral medicines is broadly funded today, but access to other essential medicines is not. The huge amount of funding to increase access to antiretrovirals flows through NGOs outside of the public health system, which remains largely underfunded.

In regards to the lack of funding, support supervision is not limited to the improvement of pharmaceutical practices. Support supervision takes place in a setting where resources are lacking and will most likely not increase substantially in the future. The lack of financial resources is, in turn, ultimately a political decision. In this regard, ENSURE can be understood to strive for an optimization of pharmaceutical practices to deal more efficiently with the scarcity of resources. The broad set of indicators measured at support supervision days enables identification of how and in which areas pharmaceutical practices can be adjusted to optimize the use of available resources. In this respect, support supervision builds on three options that result from the health economic analysis of Uganda's public health system. The inception report argues in order to make essential medicines available at an affordable cost or free of charge in the public sector:

> "Reduce the need: Narrow the gap between what is needed and what is available by strictly prioritizing procurement and by reducing the list of essential medicines using a prioritization approach.
>
> Increase available funds: Increase the funds available for EMHS by at least $1 per capita and minimize waste, leading to more funds becoming available for the procurement of essential medicines. Increased funding can be achieved through increased government/donor contribution or patient contribution combined with reduced waste and increased effectiveness and efficiency.
>
> Increase out-of-pocket payment: Develop and support alternate financing systems including private wings, user fees, health insurance, and community resource

> mobilization as identified in the National Health Policies and the Health Sector Strategic and Investment Plans of the last years" (ENSURE "Policy Option Analysis 2010": 58)

.

According to ENSURE, these options are subject to calculative choices—not political decisions—which need to be balanced against each other, since none of these choices provides a conclusive solution on their own. Reducing the need would mean further reducing the list of free medicines at government hospitals, which are already scarce. The option to increase funds by at least $1 per capita is neither expected by international development assistance, nor by the Ugandan government. Finally, out-of-pocket payments by patients are already very high in Uganda and are equal to the government's per capita expenditures for medicines. None of these suggestions can be addressed separately, but need to be weighed against each other in searching for an optimal strategy: raising the capita expenditure for health by $1 at least, instead of the required $7. In addition, making a decision as to which essential medicines are 'very important' and must be prioritized such that they never run out. In contrast, some pharmaceuticals are 'essential' but are also only 'necessary,' and patients must buy them out-of-pocket at private drug shops, if they think they are needed. Further, since drug prices at private drug shops are difficult to regulate, the establishment of new private wings and cash-and-carry pharmacies, would enable prices to be strictly monitored.

Managing scarcity is an essential technique for building stronger health institutions. As the public health expert Julio Frenk writes, "we know that some systems are much more efficient in achieving better results with limited resources" (Frenk 2010: 1). The expression "Better results with limited resources" is a neat description of the ENSURE intervention to "stabilize and improve people's access to treatment". It underwrites the massive deployment of indicators to measure and orient pharmaceutical practices as well as the scarcity of medical personnel, infrastructures, and pharmaceuticals.

As the ENSURE intervention showed, some of the ideas that support comprehensive health institutions, like the essential medicines concept or rational use of medicines, have

already existed for many years. Yet, which pharmaceuticals are regarded as essential or which pharmaceutical practices are rational have been subject to numerous scientific and technical interventions in Uganda (Jitta, et al. 2003). As the technical report of ENSURE aptly notes, "in the last decade, Uganda's public sector supply chain management has focused on better coping with an increasing number of products, programs, and patients" (ENSURE "Policy Option Analysis 2010": 13).

"Better coping" describes what organizational sociologists term a muddling (e.g. Czarniawska 2002)—through the variety of approaches that come and go with each intervention. Thus, critical analyses point out that the increasing number of products and projects to provide health services to an increasing number of patients for specific diseases like AIDS have undermined public health systems. They pull too many resources, health workers, and global attention, which are all scarce. Examples provided in the case study above, where health workers are dragged back and forth between different projects, underwrite the complex fragmentation in global public health. Even the ENSURE-project to resolve the fragmentation in global health, by building capacities and improving pharmaceutical practices at government hospitals may, under certain circumstances, enforces fragmentation by creating a distinctive labor market in global health, where medical professionals work in research projects—instead of providing health services.

In addition to the widely observed fragmentation of work and institutions in global public health, this chapter examines support supervision as an entry point. Ideas about comprehensive health institutions exist already in the form of models like essential medicine or the rational use of medicine, but have often been institutionalized in incomplete ways. They have been emerging over years by optimizing pharmaceutical practices. Indicators are crucial tools for optimization strategies. Indicators can bundle the variety of public health models and generate one composite indicator that enables one to quantify, measure and influence complex pharmaceutical practices.

The case study on support supervision focuses on the attempt to build stronger health institutions through health economic experiments. In this regard, it suggests considering the invention of implementation sciences in health as an attempt to fix the economy of

global public health and test new health economic arguments. The fixing of health economics, however, cannot be separated from more encompassing forms of neoliberal economic restructuring. The latter gives includes strategies of optimization in order to adjust the improvement of pharmaceutical practices to the unpredictable fiscal spaces in global public health.

Intuitively, stronger health institutions can be understood to include stable infrastructures that foster predictabilities and certainties in the availability of medicines on which patients and doctors can rely. To return to Desroisières historical analysis of statistics' emergence at the intersection of scientific and administrative practices, predictability and certainty are specific to the institutionalization of modern biomedicine (see also Jenkins, et al. 2005: 18). In this regard, statistics enable calculative practices to make disparate things hold together in modern institutions, which are often considered absent in the developing world—an observation that resonates in more recent demands for stronger health systems. According to Rottenburg, economists, development agents, and anthropologists have all interpreted the absence of modern institutions in the developing world in different ways, either by enforcing modernization theory, or by refusing to inquire after how institutions produce scientific knowledge altogether (Rottenburg 2009a: xxv). Moving beyond these positions, the study of the rise of statistics, the development of new calculative practices, and the widespread reliance on statistical tools, like indicators, to test economic and scientific arguments attempt to question how things are made to hold together and how new objects are created—questions which belong to another global order, like global health.

In this chapter, I highlighted the production of statistical knowledge in developing novel approaches to old problems, which are enabled by technologies like indicators that produce huge amounts of data for such technologically-assisted calculations. Such optimization strategies can be understood to address problems of governing pharmaceuticals and patients by introducing calculative choices into institutions. In this optimization rationality, financial resources are taken for granted to be scarce, particularly in the developing world. Yet, as the public health expert Frenk in promoting the idea of strengthening health systems points out, the institutional fabric is decisive for the

achievements of better results (Frenk 2010: 1). In this account, understanding the mechanisms that foster an efficient use may further convince political actors to increase the funding for global health, as Frenk reasons.

These efficiencies must also be considered against the background of neoliberal economic restructuring of public health systems in countries like Uganda or elsewhere in Africa. Here, novel ideas of implementation science promote health economic experiments to put the translation of models into practices based on scientific evidence. These health economic experiments share ideas with more general neoliberal economic strategies, which, according to Aiwha Ong, express an "optimizing rationality [through which] political institutions and actors defines a particular configuration, i.e. a milieu of transformation that is also for the analyst, a space of problematization" (Ong 2007: 5). Calculative choices are discrete and always limited. They are all associated with specific risks and problems. If these choices are presented as a set, they appear to be an acceptable compromise to make coping with the multitude of interventions constituting global public health in Uganda better. Increasingly, these practices take on scientific designs and are expressed in ideas like implementation science. The production of stronger health institutions through health economic experiments produces new things and new technological problems that belong to another order. That is a neoliberal economic order, which reproduces itself by continuously optimizing and, moreover, rationalizing the calculative choices within a narrowing fiscal and political space of global health. As various critics point out, neoliberalism is an ambiguous term, which is often treated as an overarching macro-structure (Ferguson 2010; Collier 2012). Instead, this section attempted to examine particular techniques and interventions through calculative choices, which are translated into a health economic experiment and tested in the real world, and thereby produce a new institutional order.

11. The permanent reorganization of the AIDS crisis

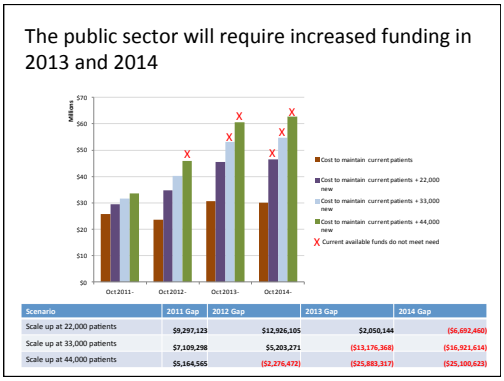
More patients and new insecurities

That antiretrovirals "are there" does not mean that they will also continuously flow in the future such that patients in Uganda can have life long access to treatment. Staging the harmonization as a response to stock-outs and the experimental implementation research to test new models in global health pharmacy are better understood as the permanent reorganization of the AIDS crisis around the supply of antiretrovirals. The reorganization of the crisis does not entail an increase in funding to meet the life-long fiscal commitments in mass HIV treatment. Rather, the harmonization and improvement of the quantification of needs across all organizations produce new insecurities in the provision of free ART, which arise around the unpredictability of the flow of funding, which may again lead to acute stock-outs.

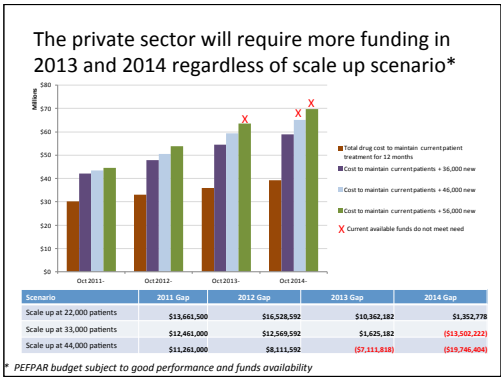
Let me return to Dr. Isaac and his presentation on the rationalization of the supply lines for antiretrovirals at the workshop for "Harmonization and Rationalization of the Supply Lines in Uganda". This final workshop was the result of a series of workshops and analyses taking place in the previous years, which were described as the staging of a "new project" in Chapter 9. They all constituted the stage against which this final backstage decision on the harmonization of the supply lines was taken two years later in 2012.

At the harmonization meeting actors did not only agree on the harmonization. More important Dr. Isaac was distributing a remarkably accurate list of patient numbers, showing that exactly 274,789 patients were receiving antiretrovirals in Uganda, which was still far from the international targets to provide universal access to treatment in Uganda. The harmonization of the supply lines was also an effort to mobilize more resources. According to Dr. Isaac's calculations, the public sector lacks $2.27 millions to scale up access to treatment for 44.000 people and will thus have to reduce its annual targets to 33.000 patients for the financial year 2012/2013. In 2014 there would be no funds for the scale-up at all. The private sector will have a gap of about $19 millions to reach a scaling-up target of 44.000 people because the most important donor agency PEPFAR will already exceed its funding level in 2013 due to higher current consumption figures of the previous years.

With the remaining funds, the larger private sector will be able to scale-up treatment for 11.000 people only by 2014 (see Figure 26).



Scenario	2011 Gap	2012 Gap	2013 Gap	2014 Gap
Scale up at 22,000 patients	$9,297,123	$12,926,105	$2,050,144	($6,692,460)
Scale up at 33,000 patients	$7,109,298	$5,203,271	($13,176,368)	($16,921,614)
Scale up at 44,000 patients	$5,164,565	($2,276,472)	($25,883,317)	($25,100,623)



Scenario	2011 Gap	2012 Gap	2013 Gap	2014 Gap
Scale up at 22,000 patients	$13,661,500	$16,528,592	$10,362,182	$1,352,778
Scale up at 33,000 patients	$12,461,000	$12,569,592	$1,625,182	($13,502,222)
Scale up at 44,000 patients	$11,261,000	$8,111,592	($7,111,818)	($19,746,404)

* *PEPFAR budget subject to good performance and funds availability*

Figure 26: Funding gap in the public and the private sector. Slides were provided from AIDS Control Program Uganda.

Altogether, the funding gap to reach a scale-up target of 100.000 patients through 2014 in the country accumulates to $38.6 millions in total. But funding for other HIV-related medicines were also not yet secured. Funding for septrin is insufficient. PMTCT—Preventing Mother-to-Child Transmission of HIV—will accumulate a funding gap of $17.5 millions by 2014 (see Figure 26).

So, what does it mean then, that "the antiretrovirals are there"? The harmonization described above is not the only reason for the stabilization of the supply of antiretrovirals and the reduction of stock-outs. At some point early 2010, antiretrovirals from the emergency procurement of Duovir -N, worth $4.25 million, eventually arrived in the country. In May 2010 the Global Fund made another disbursement of $19.9 million, and about $5.9 million went into the procurement of antiretrovirals. Further, PEPFAR also started its second funding phase.[77] The new budget of almost $50 billion was largely meant for strengthening health systems (see Pfeiffer 2013).

[77] See *Status Report on the Global Fund Grants in Uganda* (MoH 2011).

Yet, Dr. Isaac's worries were not unfounded. As I tried to show throughout the last sections, the huge amount of funding stands in strong contrast to the practices for meticulously generating savings and increasing the number of patients. Both depend on continuous price reductions. But the development of price reduction through generic competition is much more difficult to anticipate. In contradistinction to these first-line regimens—pivotal for the scale-up of access to treatment in Uganda and other Africa countries—pharmaceutical companies are now protecting their investments into pharmaceutical research more rigorously; making newer and safer antiretroviral medicines is too expensive for countries in the global South (T' Hoen 2009; T' Hoen, et al. 2011). In particular, beginning in 2005, the TRIPS-Agreement was also implemented in India, which has been the largest producer for cheap antiretroviral generics. Respectively, the number of patent applications filed in India has been increasing. One patent application on antiretrovirals was filed before 2005 and was rejected (Moon, et al. 2012). Since 2005 ten patent applications have been filed of which six have already been granted. Pharmaceutical companies mainly file a patent application for second- and third-line antiretrovirals. This also includes secondary patents on production processes, which ultimately block the production of combination therapies. Thus, it is now more difficult to produce cheap generic second-line therapies in India and export these pharmaceuticals to countries like Uganda than before 2005 (T' Hoen 2009).[78]

Global mechanisms to lower drug prices do exist, though there are fewer for antiretrovirals than for other medicines. The Medicines Management Pool is such an innovative mechanism, located in Geneva/Switzerland, which invites pharmaceutical companies to join a so-called patent pool, which then negotiates the licensing for the production of generic second-line antiretrovirals, which are currently still very expensive (Medicines

[78] This was precisely the reason for Cipla to invest into a plant for generic antiretrovirals to Uganda. As the bid by Cipla stated "This is the result of India [to] ratify trade-related aspects of intellectual property rights (TRIPS) arrangements under the World Trade Organization that will bar [India] from exporting patented products. Should such a stoppage materialize, it will throw our strategies to contain these killer diseases into jeopardy. We will not only face a shortage but also experience a hike in prices rendering strategies like ARVS for all unviable. Uganda being among the world's least-developed countries (LDC), is exempt from enforcing this agreement until 2013" (see IGG Report 2011).

Patent 2012). However, sharing patents in a pool is essentially a voluntary decision, and pharmaceutical companies have to be convinced to join this patent pool. Esteban Burrone, who works for the Medicines Management Pools, explained to me that some pharmaceutical companies do, in fact, voluntarily share their patents. However, countries with the highest HIV burden, mostly African countries, only constitute a lucrative market if the procurement of these antiretrovirals is funded by donor agencies. Unlike in the past, these organizations prefer the procurement of generics for the developed world. Thus, donors like Global Fund and PEPFAR can, in theory, significantly influence the market. Sharing patents with generic producers would enable the pharmaceutical manufacturers in Europe and the United States to generate some profits in the form of royalties in a market, which is largely dominated by donor agencies.[79] However, only few pharmaceutical manufacturers like Gilead have joined the Medicines Patent Pool. Other international producers like Abbott Laboratories, which holds patents for the recommended second-line therapy Lopinavir/ritonavir, has rejected participation in the Medicines Patent Pool in general. Instead, Abbott introduced a tiered pricing scheme, and offers Lopinavir/ritonavir to least-developed and middle-income countries at a lower price. In combination with the enforced implementation of the TRIPS agreement, such tiered pricing schemes tend to delay generic competition and thus strengthen a company's monopoly on these products (Moon, et al. 2011: 4). For activists and researchers like Ellen T' Hoen, such developments are particularly disappointing as antiretrovirals were paradigmatic examples for the successful contestation of the pharmaceutical industry's monopoly in setting high drug prices (T' Hoen, et al. 2011). Stricter enforcement of the TRIPS agreement would ultimately amount to a "treatment time bomb" (T' Hoen, et al. 2011: 8; see also Ingram 2012).

In addition to stricter enforcement of the TRIPS agreement, global funding for ARVs also seems be stagnating instead of increasing. Tracking research on international aid for AIDS shows that funding was indeed sharply increasing between 2002 and 2008 from $1.2 billion to $ 7.7 billion across all donor organizations (Kates, et al. 2011). However, since 2008

[79] Interview EB, Medicines Patent Pool; 26.10.2012; Geneva/Switzerland.

funding has begun stagnating, and last year marked the first time that international aid has declined (see Figure 27).

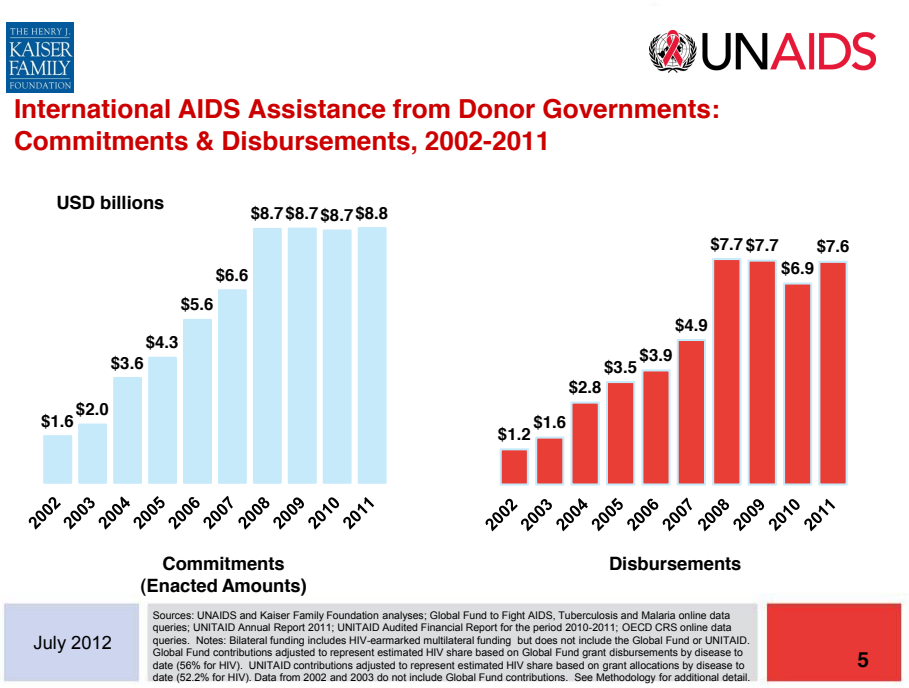


Figure 27: Stagnation in international AIDS assistance.
(Kates, et al. 2011).

It stood at $7.6 billion, raising concerns about the future of HIV treatment (Kates, et al. 2011). Against this background, the stock-out of antiretrovirals would, indeed, not be an indicator for future rationing of antiretrovirals. In regards to further reports on stock-outs in other countries, the newsletter by International Health Policies warned "ARV stock-outs are no longer the exception."[80] As David McCoy argues in the light of the current insufficient funding-level for HIV treatment and the "financial constraints" on donor programs, such long-term cost projection brings "to the surface a sobering picture in which the need for treatment is likely to increasingly outstrip the available supply of funding" (McCoy 2011: 14). The more recent literature in the science of ART confirms that Uganda is certainly not

[80] IHP News 137 "ARV stock outs"; 11.10.2011; [http://e.itg.be/ihp/archives/ihpnews-137-arv-stock-outs/].

a singular case. Stock-outs are also reported in other sub-Saharan African countries: Malawi (Schouten, et al. 2011), Central African Republic (David, et al. 2012), Mali, Côte d'Ivoire (Pasquet, et al. 2010) and most recently in South Africa.[81] Against the background of increasing number of stock-outs the pharmaceutical politics of generics and the limitations in lowering drug prices might mean that antiretrovirals have to be rationed not only within these countries, but even on a larger scale.

> *In eagerness we await a history's end. It is this eagerness, which makes us firmly orient ourselves toward the future, although we know all to well, that the only certain end we can be assured of, is our own death. That we as living beings endure to exist in the face of death, that we do not act as if we were awaiting this unavoidable death imposed upon us by birth, that we do not wait until death is ultimately inflicted upon us; all this might be related to our entanglement in a genuinely captivating story, of which we do not know how it will end.*
>
> *—(Arendt, 1967).*[82]

Means and ends in ART

As Nelson Bahame said to calm the clients waiting for antiretrovirals at Clinic U, nobody is going to die (Chapter 6). Nelson's reassurance that nobody will die despite of the stock-outs at Clinic U and at other Ugandan ART programs demonstrated more drastically that HIV can be managed as an almost ordinary chronic illness—if a set of logistic, technical,

[81] *IRIN News* "South Africa: stockouts continue"; 9.7.2013.

[82] Own translation of the original German text: "Es ist diese Spannung, mit der wir den Ausgang einer Geschichte erwarten, die mit dazu beiträgt, daß wir so unbeirrbar uns auf die Zukunft ausrichten und an ihr uns orientieren, obgleich wir doch nur zu gut wissen, daß das allein sichere Ende dieses Zukünftigen der eigene Tod ist. Daß wir es als Lebende überhaupt aushalten, mit dem Tod vor Augen zu existieren, daß wir uns nämlich keineswegs so verhalten, als warteten wir nur die schließliche Vollstreckung des Todesurteils ab, das bei unserer Geburt über uns gesprochen wurde, mag damit zusammenhängen, daß wir jeweils in eine uns spannende Geschichte verstrickt sind, deren Ausgang wir nicht kennen" (Arendt 1967: 298).

economic, and political conditions for the supply of antiretrovirals are put in place.[83] As Nelson put it, "you take this pills until god calls you." The stock-out of antiretrovirals, by contrast, reveals the frailties of the techno-scientific apparatuses in ART to carry the humanitarian burden expected of it. Throughout the chapters, I have examined how the organization of the supply of antiretrovirals brings HIV as a chronic illness into being. An infrastructural breakdown, which in this case manifests as stock-outs, does not lead to apathy. Stock-outs elicit the permanent reorganization of the AIDS crisis around scarce antiretrovirals.

In a few years time the humanitarian biomedicine of antiretroviral therapy has been quickly transformed into the global health of mass HIV treatment. The more money followed the global enthusiasm to improve people's health, the more was the nature of global health becoming obscure. For commentators in public health and social science, global health was raising questions like "How, if at all, is global health different from other configurations of health? What are global health interventions perceived as a response to? What are some of the effects and unintended consequences of such interventions?" (McGoey, et al. 2011: 3). Along these lines of questions, I pursued asked how does global health differ from previous concept of public health? How are the circuits in supplying medicines for programmatic diseases, most notably HIV, differ from models like the essential drugs concept (Greene 2011).

This dissertation aims to show that concepts like global health instantiate extremely complex and hybrid institutional arrangements that are manifested in a multiplicity of projects: a diversity of rules in ART, practices of sharing and borrowing medicines during drug shortages, new health insecurities in rationing antiretrovirals that emerge amidst the rapid proliferation of global health technologies and models to 'improve access to treatment.' Opaque itineraries of medicines, and the entanglements of logistical circuits in the supply of medicines seem to be characteristic for the expansion of global health. Following Theodore Schatzki, this nexus of things and social practices are better

[83] I want to add here that the young man mentioned in Chapter 4, eventually was put on ART after Nelson Bahame asked the doctors to make an exception. Nelson found a formal employment as a security officer at an NGO but volunteers at Clinic U once a week.

understood as 'therapeutic orders,' which include the "haphazard and fortuitous coupling of things" (Schatzki 2002, 18). More specifically, as a "[...] a nexus, things can hang together in a unique way that instantiates *nothing at all*: The 'structure' of such a nexus is its particular contingent de facto layout or reticular composition, not any schema, pattern, or formula" (ibid.; my emphasis). In other words, although the therapeutic orders described in this dissertation appear to be arbitrary, they nevertheless constitute distinctive institutional arrangements that include social practices to provide treatment, produce scientific knowledge and moreover constantly rearrange the institutional fabric of mass HIV treatment. As my analysis wants to show, these therapeutic orders unfold around diseases and the publics they father, the social organization of treatment in a multiplicity of global health projects, and the kind of biomedical knowledge and ideas of global justice that emerge only around the therapies and for this disease in this context.

These therapeutic orders in global health challenge the rational-technical premises in defining and promoting the building of health institutions in Uganda. The circulation of biomedical technologies indicates that rational-technical categories do not adequately capture the fluid, loose, or even arbitrary way things hang together and constitute the context of our empirical research. Following Hans Joas' argument, much of prevalent social theoretical presumptions are not able to capture the creativity and indeterminacies in human practices, which continuously create new institutional orders in care and treatment (Joas 1989; 1996). At the same time, what constitutes an institution in these rather uncertain contexts certainly remains a crucial question, if one wants to take the insecurities and moral dilemmas in care and treatment seriously. In this regard, the circulation of life-extending global health technologies and their moral implications on decisions of care and treatment require an alternative understanding that relates the importance of institutions to the situatedness and creativity of collective practices in global health. Such practices are not limited to social practices only, but include scientific and legal practices in global health as well.

Organizing access to treatment requires a constant adjustment and adaptation to situations

of insecurity. It is better described as the permanent reorganization of the AIDS crisis. This permanent reorganization entails the constituting authority and credibility of specific scientific explanations and conceptualizations of the supply, which are required in staging a new project and a new intervention in global health pharmacy to prevent the stock-outs of antiretrovirals. The staging global health pharmacy entails that problems like the fragmentations of the supply side of ART are made visible, while other problems like the lack of funding are ignored. For good reasons maybe as funding in global health by donors or nation-state government is the most difficult area science can influence. Yet in ignoring this problem, the pharmaceutical politics that arise around the economic rationalities in administering scarcity are also blended out or even ignored. This pharmaceutical politics however is not limited to the lower end of the supply side of antiretrovirals but integrates countries like Uganda into intellectual property rights regimes and the production of global pharmaceutical markets.

The permanent reorganization of the AIDs crisis points toward a more fundamental tension between contemporary humanitarian interventions and the chronic dimension of crises like the AIDS epidemic (Redfield 2013). The permanent reorganization suggests that a crisis is not adequately captured by the distinction between disorder and order. Instead, we see a constant ordering or reorganization of the AIDS crisis. This is a tentative ordering of disorder, as Vigh put it (Vigh 2008: 11), for which institutions are not solutions but windows for the understanding the permanent tinkering and adjustment of institutional mechanisms to deal with situation of normalcy and of crises. That is, the stock-outs are neither an indicator for a permanent state of exception in the AIDS crisis, nor is the supply of antiretrovirals turning HIV into an ordinary chronic illness. In-between actors are constantly moving back and forth and reorganize access to treatment around the scarcity of antiretrovirals and the life-long fiscal commitment made by the introduction of antiretroviral therapy. In this regard, the notion of a permanent reorganization is an attempt to move beyond a dichotomy between the normal and the crisis as a 'rupture' of the order of things. Definitions of a crisis as a temporal abnormality do not aptly capture the chronicity of the AIDS epidemic nor the more fundamental scarcity of resources in any kind of public health system.

The preceding section discussed how the final harmonization also revealed the expectations in a new funding gap. I suggest that Dr. Isaac's worries are shared by a variety of critical voices. In brief, contemporary pharmaceutical politics of access to treatment is to a great extent built on the lowering of costs by raising the competition with generic products. However, the stricter enforcement of the TRIPS' arrangements in countries like India threatens this logic. To paraphrase Cori Hayden (2011), without patents, no generics; without generics, strategies to lower the prices through generic competition to broaden access to treatment would not exist either. Conversely, the stricter enforcement of TRIPS shows that this logic fails to challenge the basic structures, which prevent the broadening of access to treatment as quickly as necessary. In any case, the scale-up of access to treatment will have to be achieved differently.

Are stock-outs on the rise? If so what does it mean for the global public health in Uganda and elsewhere? Is the "Kampala situation," as Eric Goosby described the stock-outs in Uganda, becoming the norm? Will antiretrovirals be rationed on a larger scale in the future? Or, will new funding initiatives emerge to broaden access to treatment? I would like to rephrase the question of whether stock-outs will amount to a treatment crisis and ask instead in which direction is the permanent reorganization of the AIDS crisis leading to? Is this reorganization of access to treatment leading to a continuous increase of funding or an increase in the supply of pharmaceuticals such that ultimately more patients will have access to treatment? Or, is the future of ART uncertain and insecure as the stock-outs of antiretrovirals demonstrated?

The rephrasing of stock-outs as the permanent reorganization of the AIDS crisis reveals a teleological pattern in the political and scientific expectations to return to a state of normalcy after a crisis. This teleological reasoning is expressed in the desire for greater treatment numbers, more antiretrovirals, more funding, more holistic approaches, or stronger institutions directed toward the renormalization of a society in crisis. The teleological expectation is that this crisis can be overcome by antiretroviral therapy. As crisis and normality are continuously ordered, there is not *return* to a normal situation. ART in particular has irreversible altered the political and moral expectations in global public health. I have tried to show that making antiretrovirals requires a range of technical,

financial and political conditions put in place, which ultimately create expectations of another order. As the key opinion leaders in global health Michel Sidibé, Peter Piot, and Mark Dybul stated recently "AIDS is not over" (Sidibé, et al. 2012: 2058). In a short commentary, these authors caution the initial "public enthusiasm fuelled by news about the rapid scale-up of antiretroviral therapy" by stating "it will be impossible to sustain current efforts to tackle HIV and AIDS with current levels of funding" (ibid.). Such warnings suggest that, in fact, the AIDS crisis was too often ignored as a long-wave event that constitutes a lifelong fiscal commitment to treatment.

The scarcity in mass HIV treatment by contrast suggests that there is no clear sense of an ending of the AIDS epidemic, but instead it is the permanent reorganization of the AIDS crisis, which reminds that AIDS is a long-wave event, carrying a life-long fiscal commitment. It suggests that temporalities evoked in the teleological reasoning do not fit in the way HIV is brought into being as a chronic illness. However, it also shows that there is no need to imagine a clear end of the AIDS crisis. Nelson Bahame's statement that everyone is going to die at some point resonates with Hannah Arendt's account of our expectation in the end of a story (Arendt 1967: 298ff). This is known with absolute certainty, while the story itself is full of indeterminacies. One cannot or, really needs to 'know' with absolute scientific certainty in which direction the organization of the supply side of antiretrovirals and the reorganization of the AIDS crisis is heading. What can be observed, however, is that people confront these indeterminacies by improvising therapy and by reorganizing the AIDS crisis itself, producing novel orders in global public health. As Dewey had it, this reorganization is a form of experimentation in a pragmatist sense. In reorganizing the way HIV is enacted and continuously re-enacted, actors try to foster practical certainties to handle the chronic insecurities in the AIDS crisis.

CONCLUSION

The three parts of this dissertation have discussed the mapping of the supply side of

antiretrovirals, the stock-outs of antiretrovirals, and finally, the harmonization of the supply side of antiretrovirals. The order of the three parts in this dissertation aimed to demonstrate that these three themes hang together in the examination of how HIV is enacted in the supply of antiretrovirals and moreover how HIV is brought into being in the logistic and infrastructural circuits in the global supply of antiretrovirals.

In the first chapter, I introduced the problem of stock-outs and proposed to analyze the supply side of antiretrovirals by examining practices in the organization and the permanent reorganization of access to treatment. Chapters 2 and 3 described the fragmentations in the supply side of antiretrovirals, in which the stock-outs were situated. In Part 2, Chapter 4 provides a brief historical overview of the AIDS crisis in Uganda and the beginning of the roll-out of antiretrovirals. This chapter pays attention to the emergence of the science of ART in Uganda, which revolves around the roll-out of antiretrovirals. This science of ART provides social and scientific reasons for providing free ART and thereby constitute a distinct therapeutic order of ART. This novel therapeutic order is manifest in the establishment of ART clinics like Clinic U. This Clinic U is, however, also described as an exemplary case for the way stock-outs elicit the fragmentations and frailties in the supply of antiretrovirals necessary for the conduct of a normal life. In Chapters 4, 5, 6 and 7, stock-outs provide a theoretical and ethnographic account of the calculative practices in organizing the supply of antiretrovirals. In these chapters, I raised the questions of how the stock-outs can be conceptualized and whether they may be indicators of a larger-scale treatment crisis. I followed this question by examining how a set of technological, economic, and scientific elements are cobbled together to enable a normal life with HIV. I use the notion of calculative practices as an analytical term to capture the rationalization of scarcity in mass HIV treatment. Part 3 then described efforts to prevent future stock-outs by stabilizing the supply of antiretrovirals. In this part, I recounted how the harmonization came to figure as a solution to the fragmentations in the health sector. The idea of harmonization is a globally circulating idea, which needs to be translated into a material object, like a map, to make problems in the supply of antiretrovirals visible. Mapping the supply side left me with the question of how the harmonization should prevent stock-outs and how harmonization would mitigate the financial gaps in financing ART and global

public health. Answering this question requires an understanding of the production of information as well as indicators necessary for calculating budgets and supplies of life-saving antiretrovirals for free ART in Uganda. This calculation requires technical devices like treatment slots, which make these calculations more flexible to adjust to changing situations. During an acute shortage they also show how the system of rationing underlying the use of treatment slots flips into a dangerous stock-out. The fragmentations in the supply side of ART, which I describe in the first part, and the problems they pose for measuring the availability of antiretrovirals, suggest that producing evidence cannot be separated from the production of epistemic order out of an institutional order. This is so because the empirical field of mass HIV treatment is not an isolated domain, like a chemistry lab, but a complex organizational field comprised of hospitals, drug suppliers, NGOs, and government agencies through which ART is institutionalized. I suggest that the lack of evidence is not only a scientific problem, but following Dewey's pragmatism, scientific problems are neither a given nor do they exist outside of the publics attention. Scientific problems are also practical problems in organizing the public[s] for which actors seek practical securities (Dewey 1929). This point was taken up in Chapter 9, which described that these practical problems are foremost problems of the public. Stock-outs of antiretrovirals incite the public, which asks where epistemic and political authority is vested in the complex fragmentations in the public sector and who determines the truth about stock-outs. In other words, the fragmentations in the supply side of ART do not only make visible the epistemic uncertainties but the practical insecurities as well. These practical insecurities matter in particular for a biomedical definition of a normal life with ART, which depends on the reliable and life-long supply of these antiretrovirals.

Part 2 focused on the logistic, scientific, and technical conditions in the conduct of normal life and the frailties of these conditions during stock-outs. Are the stock-outs of antiretrovirals eliciting a global treatment crisis? In order to approach this question, some of the prevailing assumptions about an abundance of resources in the scale-up of access to treatment—put forth by its proponents as well as its critiques—must be more rigorously questioned. Discussing stock-outs requires a conceptualization of the specific rationalities, which calculative practices refer to in making therapy and people calculable. Drawing on a

discussion of a Weberian notion of rationalization and Foucault's elaboration of this social theory of modern government, I propose that one must consider the economic rationalities expressed in making therapy calculable, in rationing therapy and, even more, in the rationalization of scarcity in order to understand how antiretrovirals are deployed as technologies of pharmaceutical government. This economic rationality must be put next to the humanitarian claims of saving lives in understanding the biopolitics of mass HIV treatment, the 'conduct of conduct' of a normal life, and the use of the rules of ART in governing a health population. As Weber suggests, ultimate values of saving the lives and formal values of correctness and accuracy are always ambivalent. This is particularly true when scarce resources have to be rationed and give rise to constant negotiation between the production and the conduct of a normal life and the conditions set by the AIDS crisis. These conditions are not only of an epidemiological and biological nature, but are essentially the product of technological and logistic innovations through which with humanitarian ideas to save lives and more importantly ideas of global public health circulate world wide.

It is against this background that Part 3 asks how public officials, experts, and pharmacists deal with stock-outs as an institutional problem and thereby constitute a novel scientific discipline of global health pharmacy. According to the new project the defragmentation should enable more efficient quantifications. Efficient quantification of needs, in turn, would enable a better prioritization of treatment and improve accountability of all organizations. This harmonization, as I have tried to argue, amplified the scope of the rationalization of scarcity in mass HIV treatment by situating the costs of antiretrovirals in the broader picture of a public sector with larger fragmentations and a greater lack of funding. In this picture, mass HIV treatment programs appeared like a financial bubble lacking the institutional foundation in the public sector necessary to make ART sustainable. In this context the harmonization of the supply of antiretrovirals was an essential step in redefining financial and political authority in global health care. But who are the publics in the public sector fraught with news about illicit transactions? How is stock-out calling a public into being, which questions the financial and political authority of organizations in the 'public sector'? The introduction of a new project shows how the

public is called into being as the audience in staging science advice on the harmonization of the supply side of ART.

The analysis of modes of coordination in free ART drew on the notion of enactment to conceptualize these modes of coordination as a site to explore the way HIV comes into being as chronic illness (Mol 2002). The fragmentations and complex entanglements in the supply of antiretrovirals display the multiplicity of organizations enacting HIV and bringing HIV into being as a chronic illness. Furthermore calculative practices in the management of these antiretrovirals constantly adjust and even improvise therapy during stock-outs to maintain a normal life with ART. The many organizations in the field translate ideas of global public health into a set of pharmaceutical practices (Rottenburg 2009a). Instead of considering the complex entanglements in the supply of antiretrovirals as the context, which explains who has and who does not have access, this study was chiefly interested in how access to ART is continuously contextualized by a range of calculative practices in the permanent reorganization of the apparatus of ART and the AIDS crisis itself. In doing so I am not ignoring the conditions, which explain, why patients have access or are rejected. Rather, I am interested in the ways a unpredictable set of technical, economic, and logistic conditions hang together in these calculative practices in organizing access to treatment.

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Ehrenwörtliche Erklärung zu meiner Dissertation

mit dem Titel:

„Pharmaceutical Government An ethnography of stock-outs and the institutionalization of free access to ART in Uganda“

Sehr geehrte Damen und Herren,

hiermit erkläre ich, dass ich die beigefügte Dissertation selbstständig verfasst und keine anderen als die angegebenen Hilfsmittel genutzt habe. Alle wörtlich oder inhaltlich übernommenen Stellen habe ich als solche gekennzeichnet.

Ich versichere außerdem, dass ich die beigefügte Dissertation nur in diesem und keinem anderen Promotionsverfahren eingereicht habe und, dass diesem Promotionsverfahren keine endgültig gescheiterten Promotionsverfahren vorausgegangen sind.

Berlin, den 7.3.2016

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Ort, Datum Unterschrift