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Diffusion of evidence into public health policies and practice: Investigating the black box

Thesis for Doctoral Degree in Public Health

By

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The promises of God are like stars in the sky, the darker the night, the brighter they shine. “His strength and power are made perfected in our weaknesses”2 Corinthians 12:9 (Amplified Bible)

In honour of my mother A.T. Ssewanyana-Masembe who gave all to raise her children.

Jury

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List of abbreviations

ACF:	Advocacy Coalition Framework
ACTs:	Artemisinin combination therapy
AIDS:	Acquired Immune Deficiency Syndrome
AL:	Artemether/lumefantrine;
AMDP	Anti-malarial drug policy
AQ:	Amodiaquine
CIHR:	Canadian Institute for Health Research's
CQ:	Chloroquine
CSOs:	Civil society organizations
COHRED:	Council on Health Research for Development
DHO:	District Health Officer
EANMAT:	East African Network for Monitoring Antimalarial
HC:	Health Center
HSD:	Health Sub District
GAVI:	Global Alliance for Vaccines and Immunization
GHI:	Global health initiatives
GRIPP:	Getting Research into Policy and Practice
GFATM:	Global Fund for AIDS Tuberculosis, and Malaria
GMP:	Good Manufacturing Practice (GMP)
HPAC:	Health Policy Advisory Committee (HPAC)
HIPC:	Highly Indebted Poor Countries
HMIS:	Health Management and Information System
HSSP:	Health Sector Strategic Plan
IDRC:	International Development Research Centre
IEC:	Information Education Communication
IRB:	Institutional Review Board
ITNs:	Insecticide-treated bed nets
JMS:	Joint Medical Stores
KI:	Key Informant
KT:	Knowledge translation
LIC:	Low income countries
MCMWG:	Malaria Case Management technical Working Group
MDG:	Millennium Development Goals
M&E:	Monitoring and Evaluation
MoH:	Ministry of Health
MoF:	Ministry of Finance
MoFPED:	Ministry of Finance Planning and Economic Development
MRT:	Middle Range Theory
NDA:	National Drug Authority
NMCP:	National Malaria Control Programme
NMS:	National Medical Stores
NCDs:	Non Communicable Diseases
PARIHS:	Promoting Action on Research Implementation in Health Services
PEAP:	Poverty Eradication Action Plan
PFP:	Private-for profit sector

PMU:	Project Management Unit
PNFP:	Private not-for-profit
Qn:	Quinine
REACH:	Regional East African Community Health
SSA:	Sub-Saharan Africa
SWAp:	Sector Wide Approach
TDE:	Theory-Driven Evaluation (TDE).
UNICEF:	United Nations Childrens' Fund
UNMCP:	Uganda national Malaria Control Program
UPPA:	Uganda poverty participatory assessment
USAID:	United States Agency for International Development
WB:	World Bank
WHO:	World Health Organization

Executive Summary

Introduction: Uptake of evidence in public health policy development and implementation, also referred to as knowledge translation (KT) is poorly understood and as such remains a black box, especially in low income countries (LIC). The available KT models have mainly been developed in high-income countries with limited application in LIC that face specific challenges. In the case of Uganda, policy actors acknowledge the role of evidence in policy development but previous efforts have yielded mixed results. The realization of successful KT requires further exploration.

Objectives: The main objective of this study was to enhance our understanding of how evidence can be diffused into public health policies and practice (KT) in Uganda. The specific objectives were to: 1) assess what is categorized as evidence suitable to inform policy development, and by whom; 2) assess the barriers and facilitating factors to uptake of evidence in policy development; 3) develop a middle range theory (MRT) that can contribute to better understand and explain KT in a developing country like Uganda and; 4) assess how the different stakeholders shape evidence uptake in health policy development.

Methods: Our methodological approach was theory-driven inquiry and we developed the MRT in three phases. **In phase 1,** through a two-step study using qualitative approaches, we constructed MRT 1 which was a detailed hypothesis on what is required for evidence uptake into public health policy and practice. Step 1 involved a literature review and identification of common themes. The results informed the development of the initial MRT. In Step 2, these were further refined through key informant interviews with policy makers and researchers in Uganda. **Phase 2** involved studying KT processes and outcomes in carefully selected cases. Cases were selected to enhance the likelihood of contrasting the elements of MRT 1. Selected cases were the malaria treatment policy change and the abolition of user fees for health care in public facilities. Using a case study approach and mixed methods, perceptions of respondents on whether evidence was available, had been considered and barriers and facilitatory factors to the uptake of evidence were explored. In addition, the respondents' rating of the degree of consistency between the policy decision and available evidence was assessed. We further assessed the influence of the actors and the context on the uptake of evidence. Data collection methods included key informant interviews and document review. We reviewed the policy process in the two cases and developed a timeline of events which guided the purposive sampling of respondents and identification of relevant documents. Qualitative data were analysed using content thematic analysis, whereas quantitative data were analysed using Excel spreadsheets. The two data sets were eventually triangulated. Testing MRT 1 in each concrete health policy case eventually provided insights into the explanatory power of MRT 1, and led to additional refining steps. **In Phase 3** through a cross-case analysis of the case studies and comparison of their resulting MRTs, we sought to consolidate our MRT on improving KT.

Results: In phase 1, the review of the literature revealed that the most common emerging facilitating factors could be grouped under Ministry of Health (MoH) institutional capacity to lead the KT process, research characteristics, effective dissemination of evidence, partnerships for KT and political context. The analysis of interviews, however, showed that policymakers and researchers ranked MoH institutional capacity to lead the KT process, research characteristics and partnerships for KT as the most important. New factors emphasized by

respondents were the use of mainstreamed structures within MoH to coordinate and disseminate research, the separation of roles between researchers and policymakers, and the involvement of the community and civil society in KT. Whereas actors were perceived to play different positive roles in KT, they were negative roles identified as well. They faced certain challenges they needed to overcome in order to play the positive roles effectively and links and necessary platforms need to be put in place in order to realise synergies in KT. This lead to the construction of MRT 1 which was detailed as "High-quality and contextualised evidence will be taken up in policies so as to lead to evidence-informed policies in instances where the MoH leads the KT process and there are partnerships for KT in place".

In phase 2: MRT 1 was used to analyse the uptake of evidence in the case of the malaria treatment policy change in which instrumental use of evidence was realised although the consistency between evidence and policy decisions varied along the policy development cycle. The availability of high-quality and contextualized evidence, including effective dissemination, MoH institutional capacity to lead the KT process, intervention of the WHO and a regional professional network, the existence of partnerships for KT with mutual trust and the feasibility of implementation were the most important facilitatory factors that enhanced the uptake of evidence. Among the barriers that had to be overcome were resistance from implementers, constrained health system capacity to implement evidence, and limited financial sustainability. Stakeholders played multiple roles in evidence uptake and exerted varying levels of support and influence for different reasons, highlighting the need to devise a mechanism for their objective engagement and resolving conflicts of interest. We refined MRT 1 into MRT 2a which was detailed as "High quality and contextualized evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process, there are partnerships for KT in place, WHO and regional professional bodies play a role and implementation is feasible in that tools and inputs required to implement evidence are available".

In the case of abolition of user fees, symbolic, conceptual and instrumental uses of evidence were made although MRT 1 did not adequately explain the uptake of evidence. Evidence was available but there was no consideration for scientific rigor and different actors were influenced by different types of evidence. The capacity of the MoH to lead the KT process was weak and although partnerships for KT were in place, they were informal and of limited involvement. The political window and the alignment of the evidence with overall government discourse enhanced uptake of evidence. Stakeholders played multiple roles and had varying levels of support and influence impacting the uptake of evidence highlighting the need to devise a mechanism for their objective engagement and resolving conflict of interest. Noteworthy, the stakeholders were divided and seemed to be polarized for various reasons. We refined MRT 1 into MRT 2b which was detailed as "Evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process, there are partnerships for KT in place and the nature of the policy issue under consideration, the overall government agenda and the political situation can be expected to play a role**".**

Conclusion: There is no simple formula for improving evidence uptake in policy making but better understanding of facilitatory factors and the interactions of stakeholders in KT can help researchers and policy actors improve the uptake of evidence. We refined our MRT in line with the cross-case analysis looking at repeated patterns and differences between the cases, and

discussing these in light of the published literature. Emerging facilitatory factors were grouped under the characteristics of the available evidence, strengthened MoH institutional capacity to lead the KT process, partnerships for KT, feasibility of implementation, availability of a favourable political context and evidence aligning with the overall government policy discourse. Such KT processes contribute to more ownership and adoption, and to better application of evidence, but the nature of the problem may moderate this uptake: evidence concerning non-contested, 'technical' issues will be more easily taken up than evidence of contested issues. We eventually refined our MRT which was detailed as "High quality and contextualised evidence will be taken up in policies so as to lead to evidence informed policies through a process of KT, whereby the nature of the problem, stakeholder interactions, the overall government policy and the political agenda can be expected to play a role".

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Introduction

This study seeks to improve our understanding of the process of evidence uptake in public health policy development and implementation in low-income countries (LIC). This subject is particularly important in resource-constrained settings that face challenges in scaling-up coverage with essential interventions, such that investment decisions must be made wisely. The process of translating evidence into policy and practice, also referred to as knowledge translation (KT), is poorly understood and as such remains a black box, especially in LIC. The available models have mainly been developed in high-income countries (HIC), and are inadequate to explain the factors at play [1]. Previous attempts to develop KT theories have yielded only limited insights with limited application in improving uptake of evidence, more so in LIC [2-3]. Following their review of available models and theories on KT, Estabrooks et al noted the complexity of the health care setting and the varying contexts within which KT processes take place and concluded that there is need to develop multiple theoretical perspectives on improving KT, reflective of the different contexts [4]. KT processes are context specific, and models developed in HIC have limited application in LIC due to various contextual, social, and cultural issues [1, 5]. Furthermore, successful KT requires that a number of systems and capacities be in place, including competent human resources, adequate financing and required inputs to support evidence implementation, an open and participatory policy development environment, political stability, and good governance. Many of these conditions are not met in LIC [3]. Past efforts have been made to improve KT in LIC. For example, the Council on Health Research for Development (COHRED) explored ways of improving the linkage between research and action [6]. Following a review of case studies from seven countries, the Council proposed a holistic framework encompassing five components: the process of research generation and decision making; stakeholder involvement throughout the process; mediators to link research and policy processes; the research products, with consideration of a series of outputs beyond the research report; and the larger context within which decision-making and research processes occur [6]. This framework was developed as part of the review process, but has not been tested.

Conceptual clarity on the definition of KT continues to be debated. Cordero et al. 2008 documented a multiplicity of KT definitions used by various research funding agencies, and concluded that this discrepancy in itself was a hindrance to realization of successful KT [7]. Different forms of the definition of KT include dissemination in different formats (e.g., reports, web sites, publications), proper linkage between researchers and potential users, and focus on country-specific research priorities. Researchers and policy makers also continue to hold different views regarding the definitions of what evidence is, and how much is adequate [8-9].

Development of evidence-based service delivery guidelines is one way to ensure that practice is guided by available evidence. Guidelines can be used as a knowledge source, as well as a way to translate evidence into practice [10]. However, the presence of guidelines does not guarantee their implementation or utility [11-12]. Guidelines in Uganda are poorly disseminated, are

inadequately clear, lack the required inputs to support implementation, fail to account for government-wide policies, and are weakly monitored—all of which has been shown to impede their effective utilization [13].

KNOWLEDGE TRANSLATION IN UGANDA

In several instances, scientific evidence has positively influenced policy in Uganda-for example, in the case of the uptake of prevention of mother-to-child transmission (PMTCT) into policy following pilot studies [14], as well as the uptake of co-trimoxazole preventive therapy into routine service delivery following randomized clinical trials [15]. In these situations, the following factors favored the uptake of evidence into policy: existence of shared platforms for learning and decision-making involving all relevant stakeholders; availability of local capacity to undertake operational research; availability of high-quality evidence generated by trustworthy researchers; visibility of policy benefits; feasibility of implementing research recommendations; donor interest and involvement; and strong government structures to lead the process [14-15].

In other instances, high-quality evidence has failed to influence policy and practice-for example, in the case of medical adult male circumcision (MC) as an intervention to prevent HIV transmission. Despite the availability of high-quality evidence presented by credible researchers and the involvement of policy makers in the research process through regular updates, the KT process encountered long protracted debates. Identified barriers to the uptake of this evidence included the demand for more evidence to assess implementation feasibility, the presence of divergent views from the highest political level casting doubt on the evidence credibility, and the lack of community appreciation for the potential benefits of the policy [14]. Another example of unsuccessful KT is the failure to implement the research recommendations of the Uganda Task force on Maternal and Child Mortality, despite the strong stakeholder engagement under the leadership of the Ministry of Finance, Planning and Economic Development (MoFPED) and the Ministry of Health (MoH) serving as the secretariat [16].
Several KT activities have been attempted, including conducting research dissemination workshops, development of policy briefs that are discussed with policymakers, and provision of regular updates to policymakers during the research process; however, results have been mixed regarding KT realization [17-18]. Mbonye & Magnussen documented four years of experience conducting workshops that brought together researchers and policymakers in Uganda; their results showed the promotion of mutual learning, evidence sharing, and networking, but no clear demonstration of successful KT [19].

In each of these cases, efforts were made to ensure that evidence influenced policy, but success was variable. Although policy actors in Uganda acknowledge the role of evidence in policy development, the realization of successful KT requires further exploration [20]. It is still unclear what KT activities, and what combination of factors to facilitate evidence uptake will result in successful KT. It also remains to be determined how such activities should be timed, the relevant importance of each factor, and the role and influence of the different actors in a

LIC, such as Uganda. Further research is required to understand what works, why and in what context. The present study aims to contribute to filling in this knowledge gap.

Our justification for undertaking this study in Uganda is supported by the highlighted need to improve uptake of evidence among policy actors in Uganda, the need for conceptual clarity on the notion of KT and, an understanding of the most appropriate KT strategies.

Published article

Juliet Nabyonga Orem, David Kaawa Mafigiri, Harriet Nabudere and Bart Criel "**Improving Knowledge Translation in Uganda: More needs to be done**" *Pan African Medical Journal*. 2014; 17(Suppl 1): 14

Furthermore, guidelines serve as a means to ensure that practice is guided by available evidence, the processes of developing guidelines in Uganda has been shown to compromise their use.
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Research

Improving knowledge translation in Uganda: more needs to be done

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Introduction: Meeting the health-related Millennium Development Goals in Africa calls for better access to and higher utilisation of quality evidence. The mechanisms through which research evidence can effectively guide public health policy and implementation of health programmes are not fully understood. Challenges to the use of evidence to inform policy and practice include the lack of a common understanding of what constitutes evidence and limited insight on the effectiveness of different research uptake activities. Available Knowledge Translation (KT) models have mainly been developed in high income countries and may not be directly applicable in resource-limited settings. In this study we examine the uptake of evidence in public health policy making in Uganda.

Methods: We conducted a cross-sectional qualitative study consisting of in-depth interviews with 17 purposively-selected health policy makers and researchers. The study explored respondents' perceptions of the role of evidence in public health policy development, their understanding of KT and their views on the appropriateness of different KT activities that are currently implemented in Uganda.

Results: Although all respondents stated that evidence should inform health policies and programmes, they noted that this occurred infrequently. We noted a lack of conceptual clarity about KT and what precisely constitutes evidence. Respondents reported having been involved in different KT activities, including partnerships and platforms created for knowledge sharing between researchers and end users, but with very mixed results.

Conclusion: There is need for conceptual clarity on the notion of KT and an understanding of the most appropriate KT strategies in low-income settings.

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Introduction

Most African countries are unlikely to meet the health-related Millennium Development Goals' (MDGs) targets by 2015 [1,2]. Accelerated progress can only be realised if the coverage of effective health interventions is scaled up. However, this remains a challenge partly as a result of weak health systems [3]. Existing evidence on validated interventions to strengthen the health system rarely informs health policy development and programming. Uptake of evidence in public health policy development and programme implementation has been a subject of research, mainly in high income countries. Several facilitating factors for knowledge translation (KT) have been documented including timely availability of good quality evidence, credibility of researchers, effective interactions between researchers and policy makers', availability of funding to implement research recommendations, and effective dissemination of evidence, among others [4,5].

Efforts to improve research uptake have involved the development of models that can explain interactions between stakeholders and the evidence generated, and relationships between evidence and policy processes. Armstrong and colleagues [6] defined several models among which is the linear model which posits that evidence will lead to action. They argued that evidence that responds to identified knowledge gaps will guide policy [6]. The linearity model, however, does not take into consideration other factors that influence policy development, such as the political context and external influence. Enlightenment models highlight the importance of gradual sedimentation of ideas which over time may lead to change [7, 8]. Enlightenment models assume that policymakers stay in office for a fairly long time to allow for sedimentation; however, frequent turn-over of staff in policy making positions limits this model. Political and tactical models, where research is used by policy makers to justify government positions or to reduce the pressure to respond to a given problem, have been criticised for putting emphasis on research processes as opposed to getting evidence into policy [9]. Other KT models have focused on linkages between stakeholders, dissemination modalities of evidence and structures for decision making without adequate attention to the peculiar context of LIC [10,11]. These

peculiarities as pointed out by Young [12] include the chaotic policy making process characterised by donor influence, exaggerated role of civil society, and limited supply of good quality research.

Among the frameworks specifically proposed for low-income countries (LIC) is the Council on Health Research for Development (COHRED) framework encompassing five components namely; 1) research generation and decision making; 2) stakeholders involvement; 3) the mediators who help to link research and policy processes; 4) the research products – consideration for a series of different outputs beyond the research report; and 5) the larger context within which the decision-making and research processes take place [13]. This framework, however, does not specify capacity and institutional requirements for the framework to be applied. The Regional East African Community Health (REACH) policy initiative was established as a knowledge broker to bridge the gap between research and health policy decision making in East African countries. Efforts under REACH focused more on brokering between researchers and policy makers [13,14]. However, we note that uptake of evidence takes more than dissemination and linkage. Several KT activities have been tried in LIC including putting in place platforms bringing together researchers and policy makers, dissemination in various forms, use of policy entrepreneurs, building capacity of implementers to implement research recommendation but with varying results [5,13,15,16]. Several terminologies have been used to describe the research to action process among which is research application, getting evidence into policy and practice, evidence application, and 'making that leap between what we know and what we do'. The lack of appreciation of the role of evidence [4] and the lack of common terminology to describe the research to action processes have been cited in literature as possible hindrances to KT [17]. In this paper, we adopt the Canadian Institute for Health Research's (CIHR) definition of KT as "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products and strengthen the health care system"[18] This implies that KT is a process spanning the pre-evidence generation stage, evidence generation, synthesis, dissemination to application. Although this definition is widely accepted, there is a lack of clarity of the conceptualization of KT and multiple definitions still exists [17, 19]. Lack of conceptual clarity not only poses a challenge to putting in place mechanisms and activities to promote KT, but also monitoring the extent to which evidence is taken up into policy. Tetroe and colleagues underscored the need to understand the effectiveness of different KT activities [20].

Improving uptake of evidence in public health policy development and programming in low-income settings requires the generation of context-specific evidence on effective KT activities. Understanding stakeholders' perspectives of the KT process is a starting point. This study investigates the importance of evidence in public health policy making and programming in Uganda, and assesses stakeholders' conceptualization of KT and involvement in different KT activities.

Methods

Study design: We conducted a cross-sectional qualitative study comprising in-depth interviews with key informants (KI) to explore their perceptions on the importance of evidence in public health policy development and programming, their understanding of KT, and their involvement in different KT activities.

Participants: Respondents included 15 health policy makers and two researchers who were purposively-selected on the basis of their day-to-day involvement in policymaking or research in health systems. All policy makers were members of the Health Policy Advisory Committee (HPAC), the policy advisory body for the health sector. The HPAC comprises of senior government officials from the central and district levels, and representatives of donor agencies, civil society organisation (CSOs), private not for profit (PNFP) organizations and the private-for profit sector (PFP). Details of selected respondents are shown in Table 1.

Procedures: Interviews followed a guide that included probes on the informants' perception of the role of evidence in health policy development and programme design, their conceptualization of KT, and their involvement in various KT activities. The interview guide was pilot tested and revised accordingly. KI were initially contacted by email or telephone and invited to participate in the study. All interviews were conducted face-to-face by the first author. All interviews were audio-recorded and transcribed verbatim. The interviewer also took notes during the interviews.

Table 1: Key informant respondents

Sector		No. in HPAC	No. selected
Public	Ministry of Health (5)		
	Central level	9	4
	District level	1	1
	Researcher from School of Public Health*	-	1
Private	Private not for profit (Civil society) (4)		
	Facility based	2	2
	Non facility based	2	2
	Researcher*	-	1
	Private for profit	1	1
Donors	Bilateral	4	2
	Multilateral	3	3
Total			17

HPAC: Health Policy Advisory Committee; *Researchers are not members of HPAC

Analysis: Data were manually analysed following the precepts of content analysis. Key stages in analysis included all authors independently identifying codes from which emergent views were developed and refined. Efforts were made to determine adequacy, credibility, usefulness and consistency of data in relation to the general objective of the study. Where interpretation differed, consensus was achieved through revisiting the raw data and discussions

Ethical considerations: This study was approved by the Institutional Review Board of the Institute of Tropical Medicine, Antwerp (Belgium) and the Uganda National Council for Science and Technology. All respondents provided informed consent prior to the interviews.

Results

Role of evidence: Almost all respondents noted that evidence is important in guiding health policy and programming decisions because it shows what can and cannot work. However, several respondents stated that the use of evidence in policy development was limited and that politics and previous experience played a greater role in policy making. A Ministry of Health (MoH) official noted, *"Currently there is little or no use of evidence, we are relying more on previous experience, politics and previous views on issues. We are developing so many polices that are not evidence based." A donor similarly remarked that "…policy in Uganda is guided by political influence not research evidence".*

Some respondents raised a concern of a limited understanding of what evidence is as one of the hindrances to its uptake as elaborated in the following quotes:

"The challenge is the narrow view of what evidence is. People think that evidence is what has been published in peer reviewed journals and this in a way limits the evidence that goes into our policy process. Evidence could be in a report that was done following a systematic approach" Donor respondent

"Evidence is very important for practice but also we need to define what is called evidence. Sometimes evidence to one is not evidence to another. Is it empirical or scientific? We need to know that policy development is sometimes driven by people who even do not sit to formulate the policy so what evidence do you give them?" CSO respondent.

Definition of KT

We noted significant variations in respondents' conceptualization of KT. The study identified 14 definitions of KT from our respondents (Figure 1). Some respondents defined KT as a relationship between stakeholders, between an idea documented in available evidence and action. Others referred to KT as taking action based on research while others defined it as having policies supported by evidence.

Involvement in KT activities

Respondents reported having been involved in several KT activities as shown in Table 2. Majority of respondents reported involvement

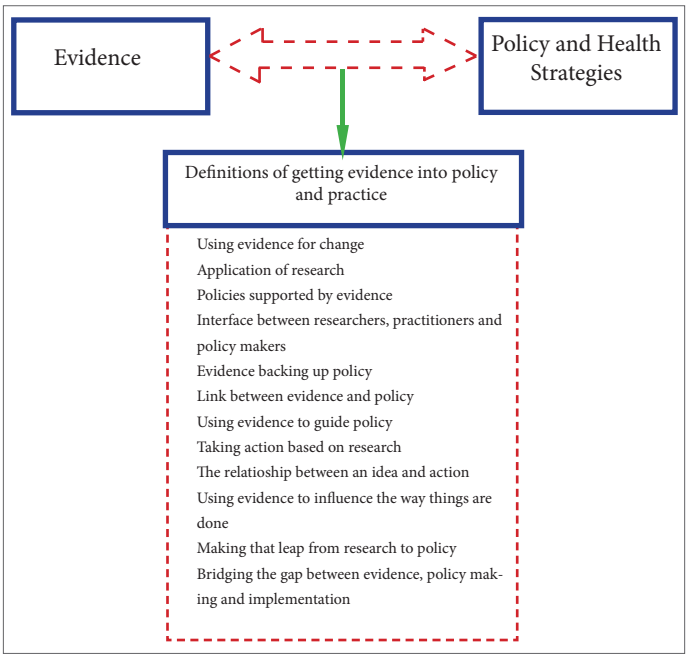

Figure 1:
Definitions of getting evidence into policy given by policy actors in Uganda

Table 2: Number of respondents who reported trying the different KT activities in Uganda

	MoH	Donors	CSO/PNFP)	PFP	Researchers
Building partnerships/participation in partnerships	2	2	4	0	1
Putting platforms in place including researchers, policy makers, CSOs	4	1	2	0	0
Ensuring that Prioritized/commissioned research undertaken/supported	4	1	2		1
Dissemination	0	3	3	1	2
Ensuring MoH leadership in the KT process	1	0	0	0	0
Building capacity of implementers to implement research results	1	1	0	0	0
Demonstration that a given intervention works	0	1	4	0	0
Involving communities in research processes	0	1	0	0	0
Hiring independent credible researchers	0	1	0	0	0
Building basic research skills among stakeholders	0	0	1	0	0

MoH: Ministry of Health; CSO: civil society organization; PNFP: private not for profit; PFP: private-for profit sector

in partnerships at several stages including, research priority setting, undertaking research and policy development where they advocate for the adoption of evidence-based decisions. Partnerships in KT were described by some as difficult to define and implement. A donor respondent remarked that *"What is the best way to involve all stakeholders through the whole process? Should it be through regular updates, should it be in analysis? But how do you ensure independence of researchers?"*

Some respondents reported having put in place platforms for stakeholder engagement; however, the participation in and life span of these platforms varied considerably. Many platforms were implemented as a one off to follow a certain research process through, while one had been in place for a longer duration (up to four years). Platforms for KT were in most cases between two categories of stakeholders for example, civil society and policy makers, civil society and researchers, researchers and policy makers, or donors and policy makers. No respondent reported a platform purposively for KT involving more than two categories of stakeholders. A MoH focal person explained that interactions between researchers and policy makers were often limited to presentations by researchers to an audience of policy makers. Respondents emphasised the need to evaluate the effectiveness of these platforms as illustrated in the following quote by a researcher, *"Previous exercises of bringing policy makers and researchers together have not been reviewed, even WHO has not done any systematic evaluation on effectiveness of KT platforms"*

Undertaking or supporting commissioned research was identified as an activity that facilitated KT because this ensured that research undertaken was addressing information gaps highlighted by policy makers. For example, the MoH had commissioned research on priority areas that had resulted in changes in the logistics systems as highlighted in the quote below from a MoH official:

"Efforts undertaken include commissioning research. We as policy makers' perceived the need for evidence and commissioned studies. We discussed results in technical fora that bring together researchers and policy makers specifically in the technical working groups (TWG). Here I have several examples where actually research has influenced policy. For example, the study on tracking medicines, we commissioned the research, good quality research was undertaken which was then discussed in the technical working group. This informed development of the medicines logistics system and quantification of medicines requirements"

Dissemination took several modalities including meetings to present research reports, sharing policy briefs with senior health officials, publication in peer-reviewed journals and on websites, and face-to-face discussions with policy makers. Respondents reported that none of these methods worked consistently.

KIs from the CSOs mentioned sharing of evidence from their implementation research where they have demonstrated that a given intervention works. A CSO KI stated that "*In the case of TB/HIV integration, we noted that the programmes were running parallel and thought of ways we could gain from integration. We then decided to pilot integration to see what benefit it has and how it actually works and we got good results. We shared this with policy makers and it was easy to convince them"*

A donor respondent reported successful KT following implementation research stating, "An example is the community HIV/AIDS programme. We demonstrated that it works through implementation research. Although global evidence was available that it was successful, people here were not convinced that it works. We undertook implementation research and we kept addressing problems as they arose, eventually people were convinced that it works." *Similarly, an MoH official reported, "We piloted injectable depo-provera at the community level, finalised the implementation research process and it is now policy"*

However, in some instances, despite demonstration that a certain intervention works through implementation research, KT has not been successful. For example, a respondent from a CSO stated that although there was evidence demonstrating the feasibility of task shifting to address the human resources for health challenges in Uganda, there has been little success in developing a task shifting policy. Additional efforts to influence the development of a task shifting policy were also unsuccessful as highlighted in the quote below by a researcher: *"We produced policy briefs on task shifting, we went ahead and disseminated them to policy makers and parliamentarians and they were discussed in these fora. This may not have been used as expected at country level (Uganda), but has been taken up by WHO and the global guidelines are being developed on task shifting"*

Discussion

Our study aim was to increase our understanding of the utilization of evidence in health policy making and programming in Uganda, and to assess stakeholders' conceptualization of KT and involvement in different KT activities. Majority of respondents agreed that although policies should be informed by evidence, this was not always the case in Uganda.

We noted that respondents had multiple, often limited, definitions of KT. The multiplicity and limited nature of definitions of KT may be a hindrance to KT in Uganda. None of the definitions provided showed an appreciation of understanding of KT as a prolonged process starting with the generation of evidence, synthesis, interpretation and subsequently application. Some respondents defined KT as a link between evidence and policy which infers a notion of a linear model. Previous studies have shown that linear models are not effective [2]. Most definitions were limited to one step in the research generation and application process and in most cases, when results were available [13]. Cordero et al, in their survey of funding agencies supporting KT in low-income settings, also noted a multiplicity of definitions [17].

Although respondents had been involved in several KT activities, the

outcomes of these activities varied. Partnerships between stakeholders were frequently mentioned. However, majority of partnerships were short lived and largely involved researchers and policy makers. In contrast to Armstrong et al [6] who emphasised the importance of a two way participation involving translation and exchange amongst stakeholders, we noted that knowledge sharing in these partnerships was mostly uni-directional with researchers sharing their results to an audience of policy makers.

The limited success of partnership may stem from several factors. First, it may imply presence of a very bureaucratic policy making process where the issue of providing evidence and policy development is restricted to a few stakeholders. Indeed, in an earlier study on use of evidence in policy development in Uganda, CSO respondents highlighted the bureaucratic policy making process as a hindrance, citing government restrictions on who participates in certain processes [21]. Second, the limited nature of partnerships could reflect people's understanding of who qualifies to be a stakeholder in KT. For example, a study carried out in Uganda by the COHRED revealed the limited involvement of civil society in health research [22]. Donors, on the other hand, have been shown to have un-due influence [12] and have in some instances required the undertaking of research as a pre-requisite to providing funding [23]. Third, the limited success of partnerships may stem from the challenges of engaging some of the stakeholders. Partnerships are more complex than perceived by the respondents in this study. Successful partnerships take into account varied capacity of stakeholders and the need to invest both time and resources [7]. Bergstrom et al, in their study on the relevance of the Promoting Action on Research Implementation in Health Services (PARIHS) framework in Uganda, identified the importance of community involvement [24] but noted that modalities of engaging the community effectively were not in place [24, 25]. The need to map out all relevant stakeholders and tailored modalities of engaging them has been emphasised in literature [26]. Theobald et al elaborated the need to develop partnerships at multiple levels and with multiple layers within the health system [26].

Respondents identified instances where evidence has informed policy and strategy development, for example, in cases of commissioned research. In the case of demonstration through implementation research, we see a mixed picture. On one hand, evidence demonstrating that a given intervention works may fail to lead to change because of the implementation costs, for example in the case of task shifting [27]. On the other hand, where there is extensive support, successful evidence uptake may occur following implementation research as happened with the community HIV programme. Donor influence may have played a role here, although we did not assess this specifically.

Dissemination of research findings took several forms and was not always systematic and audience-tailored. This could be explained by the nature partnerships reported in this study which may not allow mapping relevant stakeholders and developing tailored messages. The importance of using several modalities for disseminating evidence that are audience-specific has been emphasised [17]. Ineffective dissemination may also stem from the lack of an institutional set up for dissemination of evidence. An earlier study in Uganda highlighted the need to establish a unit within the MoH that would be charged with the responsibility of disseminating evidence [21].

Overall, the effectiveness of KT strategies is highly variable and dependent on the setting. Success hinges on whether the strategies have been sufficiently tailored to target audiences. The effectiveness of the different KT strategies is not known and Cordero et al pointed the need for further research in this area specifically to evaluate KT activities to learn what works, why and in what context [17]. Working through government institutions has been emphasised as a way of ensuring that government takes ownership of the KT process [21]; but, relevant government institutions must be strengthened. In the case of Uganda, the Uganda National Health Research Organization is legally mandated to coordinate KT efforts. However, the institution is not sufficiently resourced to play that role effectively. Inadequate investment in improving KT may partly stem from the low prioritisation of research. Although Uganda recognises the importance of evidence as a critical factor in public health policy development, there is no system in place to track research undertaken and over 90% of health research is funded by external sources whose priorities may not align with country priorities [22]. Use of evidence in public health policy development in resource-constrained settings is of paramount importance because meagre resources must be invested wisely to ensure maximum return. In light of this, investment in KT needs more emphasis.

Study findings should be interpreted in light of the following limitation. The study reported respondents' perspectives about KT in general and not in reference to on-going specific policies or research project activities. Therefore, responses provided in this study did not refer to a specific research and policy. We note that different KT activities may work for different policies and the generalised responses may not clearly highlight this fact. In this regard, generalised application of our findings may be limited. We however provide a basis for further research on this subject.

Conclusion

Strategies to improve KT are context-specific. Although a lot of work has been done on KT in high income countries, LIC, where the use of evidence would help countries use limited resources in more effective ways, still face a dearth of context-specific literature on this subject. There is need for conceptual clarity on KT, adoption of a systematic KT framework and, further understanding of the effectiveness of the different KT strategies in low-income settings.

Competing interests

The authors declare no competing interests.

Authors' contributions

JNO participated in the conceptualisation of the study, data collection, data analysis and interpretation and led the drafting of the manuscript. DKM participated data analysis, interpretation and in the drafting of the manuscript. HN participated in data analysis and interpretation and in the drafting of the manuscript. BC participated in the conceptualisation of the study, data analysis and interpretation. All authors reviewed and approved the final manuscript.

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IMPLEMENTATION SCIENCE

RESEARCH Open Access

Do guidelines influence the implementation of health programs? — Uganda's experience

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Abstract

Background: A guideline contains processes and procedures intended to guide health service delivery. However, the presence of guidelines may not guarantee their implementation, which may be a result of weaknesses in the development process. This study was undertaken to describe the processes of developing health planning, services management, and clinical guidelines within the health sector in Uganda, with the goal of understanding how these processes facilitate or abate the utility of guidelines.

Methods: Qualitative and quantitative research methods were used to collect and analyze data. Data collection was undertaken at the levels of the central Ministry of Health, the district, and service delivery. Qualitative methods included review of documents, observations, and key informant interviews, as well as quantitative aspects included counting guidelines. Quantitative data were analyzed with Microsoft Excel, and qualitative data were analyzed using deductive content thematic analysis.

Results: There were 137 guidelines in the health sector, with programs related to Millennium Development Goals having the highest number (n = 83). The impetus for guideline development was stated in 78% of cases. Several guidelines duplicated content, and some conflicted with each other. The level of consultation varied, and some guidelines did not consider government-wide policies and circumstances at the service delivery level. Booklets were the main format of presentation, which was not tailored to the service delivery level. There was no framework for systematic dissemination, and target users were defined broadly in most cases. Over 60% of guidelines available at the central level were not available at the service delivery level, but there were good examples in isolated cases. There was no framework for systematic monitoring of use, evaluation, and review of guidelines. Suboptimal performance of the supervision framework that would encourage the use of guidelines, assess their utilization, and provide feedback was noted.

Conclusions: Guideline effectiveness is compromised by the development process. To ensure the production of high-quality guidelines, efforts must be employed at the country and regional levels. The regional level can facilitate pooling resources and expertise in knowledge generation, methodology development, guideline repositories, and capacity building. Countries should establish and enforce systems and guidance on guideline development.

Keywords: Guidelines, Implementation, Health services, Planning, Management, Uganda

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Background

Although a guideline has been defined in several ways, the free online dictionary defines it as a rule or principle that provides guidance to appropriate behavior [1]. It has also been defined as a document that aims to streamline particular processes according to a set routine [2], and as a document that contains recommendations about health interventions, whether they be clinical, public health-related, or policy interventions [3]. In this article, we define a guideline as a written document containing processes and procedures to guide health service delivery and management that is issued by the Ministry of Health (MoH). Guidelines are developed for various reasons, including: to bridge the gap between evidence and practice; to minimize variations in practice; to improve health outcomes; to improve quality of care; to reduce costs; where the topic is complex; and in cases where valid guidelines are lacking [4-8]. Evidence of inconsistencies between available research and expert recommendations and practice has raised the demand for guidelines to be informed by the best available evidence [8,9].

Research is undertaken to identify solutions to complex health problems and health system challenges, and it must be translated into practical recommendations that are then implemented. Guidelines can be used as a knowledge source, but also as a way to translate evidence into practice [10]. This is even more important in low-income countries, where resources are scarce emphasizing the need for evidence-informed decisions. However, the presence of guidelines may not guarantee their implementation or utility, and some studies have documented the failure of guidelines to influence the implementation of health programs [7,11-13]. Much of the published work that reviews the utility of guidelines stems from a clinical perspective [12,14]. Health services planning and management is a relatively new discipline, and much less work has been carried out on the subject [5]. The increase in the production of guidelines in health services planning and management will likely occur as the discipline matures. For example, the number of guideline documents on the websites of the World Health Organization (WHO) and other agencies has increased significantly in the last decade. At the country level, decentralization and the subsequent separation of tasks between the management and operational levels seems to have spurred an increase in the number of guidelines. It is not clear whether this increase has been matched with reviews to assess the utility of these guidelines in influencing implementation.

Several reasons have been documented for the failure of guidelines to achieve their objectives, including inadequate consultation and consensus-building among stakeholders, lack of consideration of available resources, technical capacity, attitude and behavior of health professionals, tradition of using expert opinion-based approaches, lack of training on use of the guideline, lack of ownership, organizational barriers, and competing priorities [5,6,14-16]. Even when these broad strategic concerns are addressed, factors at the operational level such as lack of clarity, lack of familiarity with the content, and poor dissemination to end users derail the effectiveness of implementation [6,8].

The process of development, dissemination, implementation, and evaluation of guidelines has been shown to impact their effectiveness [4]. Schunemann *et al.* stated that a lack of standardized guideline development leads to widely varying recommendations [5]. Several organizations have provided guidelines for developing guidelines that spell out the components that must be incorporated [4,5]. Guidelines for the development of WHO guidelines consist of 19 components that deserve attention (Table 1) [3].

The framework in Table 1 was primarily developed for the WHO and works well for a global public health body with many more skills, resources, access to a large body of evidence, and partnerships than a low-income country such as Uganda. Low-income countries face specific situations that will make following these criteria a

Table 1 Components highlighted in the protocol for development of WHO guidelines

No.	Components
1	Priority setting—addressing what guidelines need to be developed
2	Group composition and consultation – composition of the group that develops the guidelines and the consultation process
3	Declaration and avoidance of conflicts of interest
4	Group processes—how the group undertakes the process, leadership of the group
5	Identification of important outcomes
6	Explicit definition of the questions and eligibility criteria
7	Type of designs for different questions
8	Identification of evidence
9	Synthesis and presentation of evidence to inform guideline development
10	Specification and integration of values
11	Making judgments about desirable and undesirable effects
12	Taking account of equity
13	Grading evidence and recommendations
14	Taking account of costs
15	Applicability, transferability, and adaptation
16	Structure of reports
17	Methods for peer review
18	Planned methods of dissemination and implementation
19	Evaluation of guidelines

challenge, such as a lack of readily available evidence, limited capacity to synthesize and apply evidence, dependence on donors, limited domestic funding, an exaggerated role of civil society, and the chaotic nature of decision-making [17-21]. Systematic reviews, the recommended source of evidence, takes time, resources, and skills that may not be readily available in low-income countries [22-24]. Use of existing systematic reviews is an option, but still requires the establishment of structures to improve knowledge translation [20,25-27]. In addition, some components are more pronounced at a global level than at a country level, for example transferability of guidelines, variations in values, and legal standards. An analysis of WHO guidelines indicated that even within WHO, some of the reviewed guidelines fell short of these criteria [5,28-31].

Thomson *et al.* [3] proposed a framework highlighting the chain of events to produce effective guidelines: choice of topic; development group; development and presentation of guidelines; dissemination of guidelines; implementation of guidelines; and evaluation and revision of guidelines. Although this strategy is not as elaborate as the WHO framework, these steps are more focused on country-level processes and are more feasible in a low-income country like Uganda. In this study, we followed this framework as much as possible to assess how the process of developing guidelines in the Uganda health sector facilitates or abates their utility. Table 2 lists the facilitating factors at various stages of guideline development that must be taken into consideration. The literature, however, emphasizes that there is no international standard for guideline development, implying that there is room for country specificity [4,5].

The main objective of this study was to describe guideline development, dissemination, monitoring, evaluation and revision within the health sector in Uganda, with a view to understanding how these processes facilitate or abate guideline utility. We assessed health planning, services management, and clinical guidelines using the framework in Table 2 as much as possible. We have drawn on the literature from a clinical perspective to assess the process of developing health services planning and management and clinical guidelines. Oxman *et al.* argued that clinical, public health, and health management guidelines require similar processes to ensure quality [32]. This study did not explicitly assess guideline implementation, but focused on the presence of factors that favor the ability of guidelines to influence health service delivery.

Table 2 Factors that favor guidelines influencing practice

Development group	▪ Right people with appropriate skills in the group
	▪ Including representatives of people expected to implement the guidelines and beneficiaries
	▪ Working of the group – group process, dialogue, consensus building, effective leadership
Development and presentation of guidelines	▪ Are end users clearly defined?
	▪ Is the problem or issue clearly defined?
	▪ Is the presentation clear? Do we need to test for clarity?
	▪ How we should we present the guidelines for the different target audiences?
	▪ Will the chosen medium (booklet, posters, pocket card) be sufficiently durable?
Dissemination of guidelines	▪ Are we sure about the target users of the guidelines? How can we best reach them?
	▪ In what form should the guidelines be published and disseminated?
	▪ Systems of regular dissemination may be considered
	▪ Monitoring and evaluating dissemination
	▪ Planning for financial costs of dissemination
Implementing guidelines	▪ Having means to support implementation
	▪ Incentives to implement guidelines
Evaluation and revision of guidelines	▪ How will we know the guidelines have been received, read, respected, and locally promoted?
	▪ Methods required for assessment
	▪ Is there a clear means of evaluation?
	▪ Are there key indicators to measure implementation?
	▪ What is the expected outcome and how can it be measured
	▪ How often should the guidelines be reviewed or reformulated?
	▪ Who is responsible for initiating review?
	▪ How will reviewed guidelines be disseminated to replace redundant versions?

Adapted from Thomson *et al.* 1995 [3].

Methods

Study setting

The health system in Uganda is managerially organized at three levels (Figure 1); the roles and responsibilities of the different levels are well defined [33]. Policy formulation, guideline development, resource mobilization, capacity building, setting standards, monitoring and evaluation (M&E), and quality assurance are the mandate of the MoH (central level), while service delivery, planning

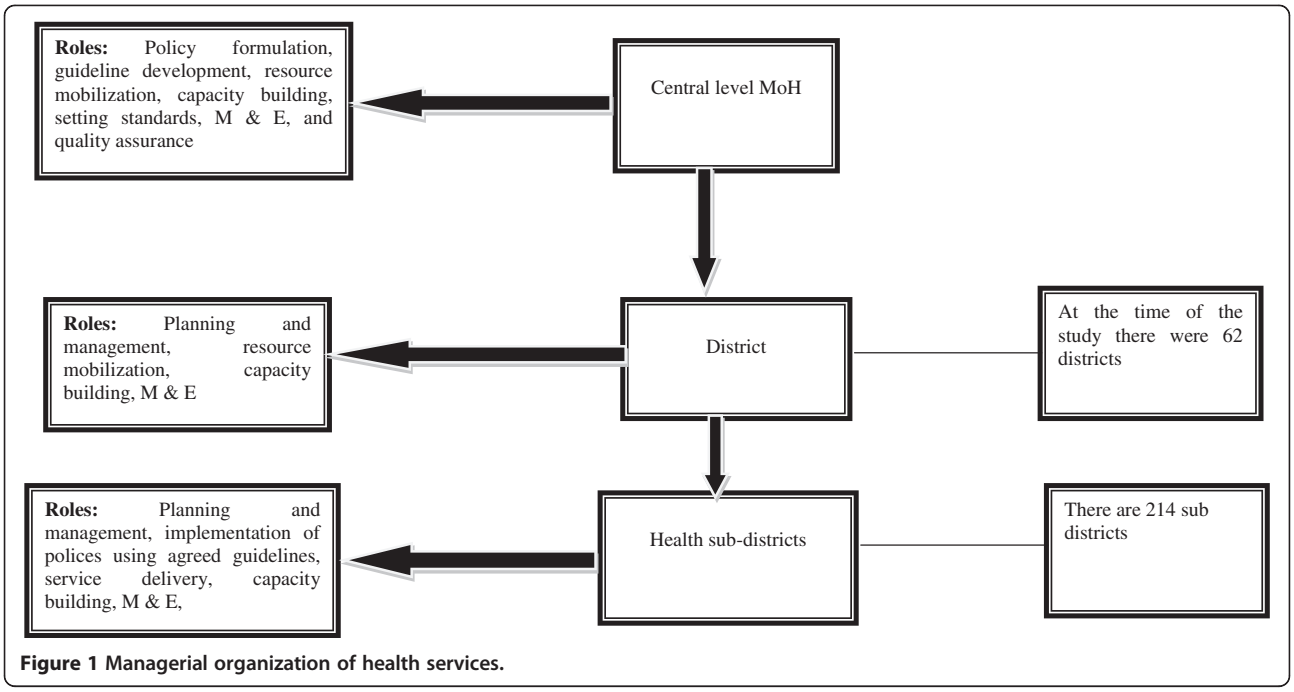

Figure 1 Managerial organization of health services.

and management, resource mobilization, implementation of polices using agreed guidelines, capacity building, and M&E are the responsibility of decentralized units (districts and health subdistricts in their areas of jurisdiction) [34]. The district, headed by a district health officer (DHO), is comprised of three health subdistricts on average, and the health subdistrict is headed by a health subdistrict in-charge.

Health services are delivered through a tiered system, as shown in Figure 2. The National Referral Hospitals provide complex specialist services and are involved in teaching and research. Regional Referral Hospitals provide referral services, specialized care, teaching, and research. The Health subdistrict is the health services delivery zone comprising a network of health centers (HCs) II and III and a referral facility (general hospital or HC IV). General hospitals provide general preventive and curative services. HC IV facilities provide curative and preventive services, emergency surgery, and blood transfusion services. HCs III and II, which are lower-level health facilities, provide mainly ambulatory services.

Policy and guideline development is carried out by the MoH (central level; organogram in Figure 3). The Quality Assurance Department is responsible for coordination of guidelines development and maintains an updated inventory of all guidelines developed by the various departments. The actual development of guidelines is undertaken at the department level. The Policy Analysis Unit, on the other hand, is responsible for technical guidance on the relevance of guidelines and for ensuring that there is no contradiction with existing government policies.

National-level guidance on the development of polices and guidelines for the country is provided by the cabinet in the document '*Policy and Guideline Making in Uganda: A Guide to Policy Development*' [35]. This guide details key principles of good policy-making and emphasizes early engagement of frontline workers involved in service delivery to help gauge what is deliverable and what matters to citizens. The policy and guideline development processes integrate the views of implementers through consultation and participation of service delivery-level workers right from the drafting process [35].

Research methods

Qualitative and quantitative research methods were used for data collection and analysis. Qualitative aspects included review of documents, observation of guideline storage at all levels, and key informant interviews. Data were collected at the central (MoH), district, and service delivery levels. Quantitative aspects included counting of guidelines.

Review of documents

All available guidelines were reviewed to ascertain: total number of guidelines; which departments had developed them; subject of the guideline; date of publication; group that developed the guideline; overlap in content and purpose; the impetus and process for guideline development; clear identification of end users; durability of the

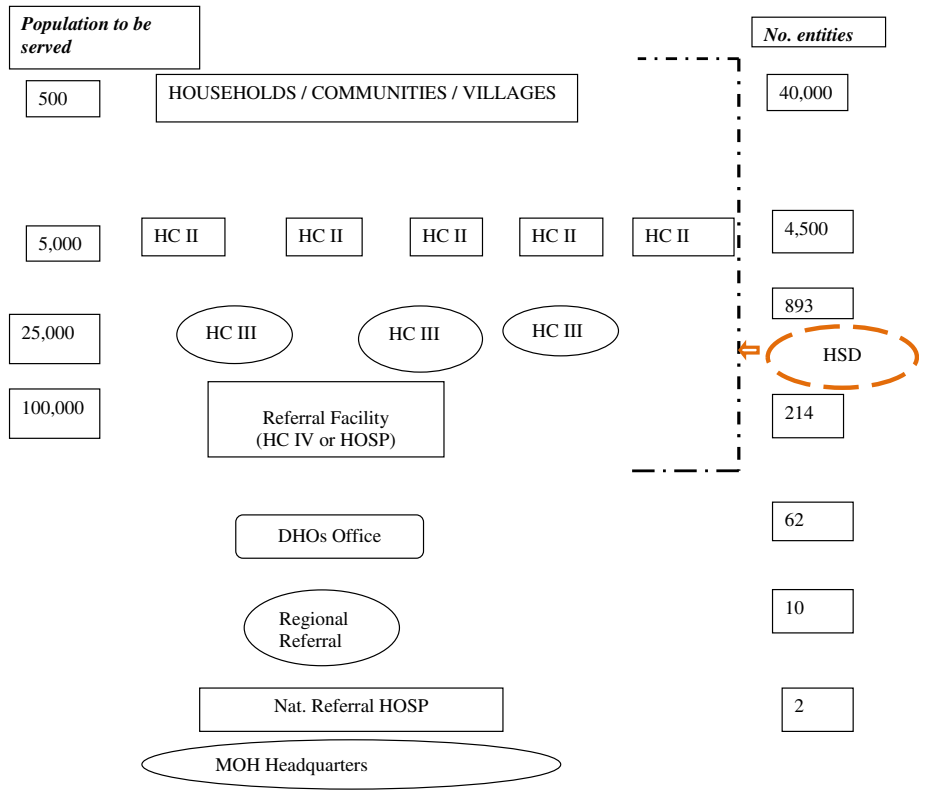

Figure 2 Organization of health service delivery.

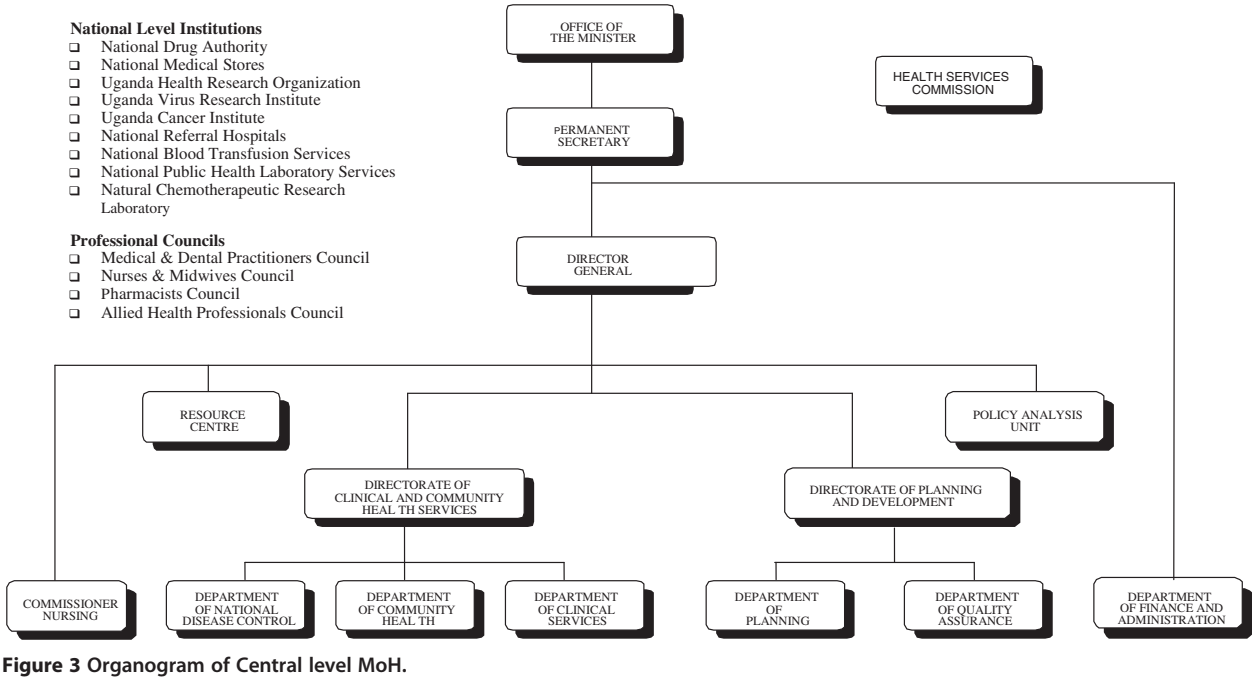

Figure 3 Organogram of Central level MoH.

materials/format used to present the guidelines; and the process of consultation during guideline development.

Selection of districts and health facilities

Table 3 contains details of selected district and health facilities. Twenty-two out of 62 districts were selected based on regional representation. Within the district, one health facility for each level of care was selected based on proximity to the district headquarters. Several of the selected districts did not have hospitals; in total, only five hospitals were sampled. Only 15 districts had HC IV facilities, 21 had HC III facilities, while HC II facilities were selected from only six districts.

Selection of key informants

Key informant interviews were undertaken at the central, district, and service delivery levels with respondents who were purposively selected. At the central level, managers of programs with the highest number of guidelines as identified at the document review stage were selected for interviews. Two officers were purposively selected from the Policy Analysis Unit and two from the Quality Assurance Department. At the district level, respondents were members of the District Health Team. The research team interviewed the DHO, who chairs the District Health Team, in addition to one randomly selected District Health Team member. At the hospital level, the research team interviewed the medical superintendent and the senior administrator. At HC II through IV facilities, the in-charge of the health facility, one randomly selected technical/clinical staff member, and one administrator were interviewed (except at HC II facilities, where administrative roles are undertaken by clinical staff). Some staff members were not available at the time of the survey; the final list of respondents included 102 technical officers and 14 administrators (Table 4).

Interviews were conducted using a semi-structured questionnaire, with each interview lasting one hour on average. At the central level, information was sought on the development group, development process, guideline presentation, dissemination, implementation, evaluation, and revision. Respondents were also asked to confirm the number of reviewed guidelines and comment on their content and relevance to the National Health Policy and Health Sector Strategic Plan. At the district and service delivery levels, our purpose was to ascertain the extent to which the key informants were consulted in the process of developing and reviewing guidelines, the availability of guidelines collated at the central level, and the key informants' views on the utility and clarity of the guidelines.

Table 3 Selected districts and health facilities

No.	District	DHO's office	General hospital	HC IV	HC III	HC II
1	Bullisa	1		1	1	1
2	Butaleja	1	1		1	
3	Bukedea	1		1	1	
4	Dokolo	1		1	1	
5	Gulu	1	1		1	
6	Isingiro	1		1	1	
7	Jinja	1				
8	Kabale	1		1	1	
9	Kabarole	1		1	1	1
10	Kampala	1		1	1	
11	Kamwenge	1			1	
12	Kapchorwa	1	1		1	
13	Kisoro	1		1	1	
14	Kumi	1	1		1	1
15	Lira	1		1	1	
16	Luweero	1		1	1	1
17	Masindi	1		1	1	1
18	Namutumba	1		1	1	
19	Nakasongola	1		1	1	1
20	Pallisa	1	1		1	
21	Sironko	1		1	1	
22	Oyam	1		1	1	
	Total	**22**	**5**	**15**	**21**	**6**

Table 4 Details of the key informants selected for interview

Central level	Respondents	
	Technical staff	Senior administrators
Central level	**8**	-
Directors	1	-
Program managers	3	-
Officers from the Policy Analysis Unit	2	-
Officers from the Quality Assurance Department	2	-
District level	**28**	
DHO	9	
Other District Health Team members	19	
Service delivery levels:	**64**	
Hospitals (10)	6	4
HC IV (28)	22	6
HC III (34)	30	4
HC II (6)	6	-
Total respondents	**102**	**14**

Before the field visits, research teams comprising of social scientists, medical doctors, and public health specialists were familiarized with the purpose of the study and the questionnaire. The data collection tool was developed and pilot-tested in one district at the different levels of care (district, HC IV, and HCIII) and adjusted in accordance with the findings. Data collection took place between September and November 2008. Each team was led by a public health specialist who cross-checked the data at the end of each day. Gaps were filled in where they existed and clarity sought where required.

Data analysis

Quantitative data were analyzed with Microsoft Excel, while qualitative data were analyzed using deductive content thematic analysis in line with a pre-conceived framework (Table 2).

Ethical consideration

This study underwent a review by a team of officials from the MoH Quality Assurance Department, the Policy Analysis Unit, and the WHO country office (WHO) in Uganda. Furthermore, ethics review was sought from Uganda National Health Research Organization, which granted an IRB waiver for the following reasons: 'the study being a routine assessment that will review the MoH policies and guidelines and is not testing or attaining a research hypothesis. The study aims to generate information for improving service delivery.'

Results

Overall study statistics

There were 137 guidelines in the health sector by 2007 (Table 5). We noted an increase of slightly more than two-fold in the number of guidelines issued between 2003 and 2004 (Figure 4). Thirty-one (23%) of the reviewed guidelines were not dated, and it was not clear when they were developed. The three programs—Malaria, Human Immunodeficiency Virus (HIV), and Tuberculosis (TB)—under the National Disease Control Department accounted for 39% of the total number of guidelines. Programs under the Community Health Department accounted for 37% of the total number of guidelines. Of the individual programs, the HIV/AIDS, Malaria, Child Health, and Reproductive Health programs had the highest numbers of guidelines.

Development group

Guidelines were developed by officers working on different programs and/or in different departments. These

Table 5 Details of guidelines reviewed

Guidelines by dept. & program		no. (%)	By year of development	no. (%)
Department	**Community Health**		2000	3(2%)
Programs (37% of total)	Child health	18 (13%)	2001	9 (7%)
	Control of diarrheal diseases	3 (2%)	2002	10 (7%)
	Nutrition	11 (8%)	2003	7 (5%)
	Reproductive health	17 (12%)	2004	18 (13%)
	Zoonotic diseases	2 (1%)	2005	25 (18%)
Department	**National Disease Control**		2006	14 (10%)
Programs (39% of total)	HIV/AIDS	23 (17%)	2007	20 (15%)
	Malaria	18 (13%)	Not dated	31 (23%)
	TB/Leprosy	7 (5%)	**Total no.**	**137**
Department	**Quality Assurance**		**Guidelines by format**	**no. (%)**
Program (5% of total)	Quality assurance	7 (5%)	Booklet	109 (80%)
Department	**Clinical Services**		Chart	18 (13%)
Programs (10% of total)	Mental health, disability prevention, and rehabilitation	13 (9%)	Leaflet	8 (6%)
	Clinical division	1 (1%)	Desk aides	2 (1%)
Department	**Finance and Administration**		**Total no.**	**137**
Program (4% of total)	Finance and administration	5 (4%)		
Department	**Planning**			
Programs (9% of total)	Human resources	2 (1%)		
	Planning department	1 (1%)		
	Resource center and surveillance division	9 (7%)		
	Total no.	**137**		

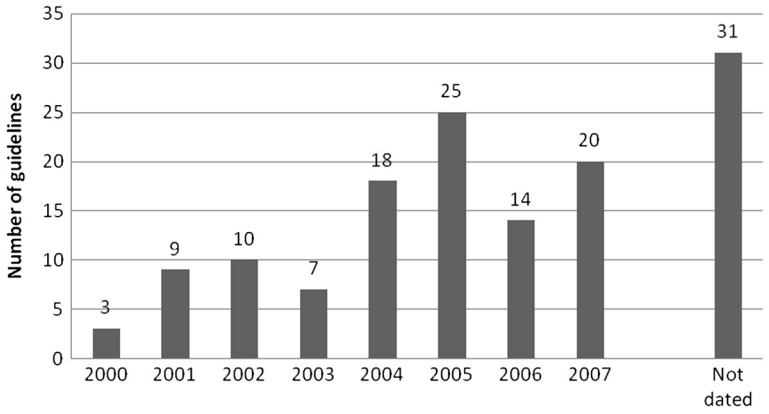

Figure 4 Number of guidelines by year of development.

senior health professionals possess relevant qualifications and advanced degrees, for example in public health, social sciences, environmental health, economics, and specialized medical disciplines.

All respondents at the central level reported that efforts were made to consult all stakeholders, including implementers, in the development process, although document review revealed a varying degree of consultation. Consultations also took place with related line ministries, including the Ministries of Education, Public Service, Finance and Economic Development, Labor, Gender, and Social Development, and Environment and Water. There appeared to be a clear consultation process; the development process included reference to existing national strategic documents such as the Constitution and the National Health Policy, and a range of relevant stakeholders within and outside the sector were engaged. For 40% of the guidelines, developers had consulted stakeholders at the district and service delivery levels. In a majority of cases, consultations were limited to national-level stakeholders. Representatives of civil society organizations had been consulted in almost 42% of the guidelines, and the understanding was that these personnel represented communities/beneficiaries. However, the representatives of civil society were based at the national level, and it was not clear to what extent they gathered views from the communities. Respondents at the district (57%) and health facility levels (61%) expressed a lack of user involvement in the development process, highlighting the absence of a bottom-up approach as contributing to the development of ineffective guidelines. Other stakeholders, especially at the service delivery level, were often excluded, even though they are considered to be vital for the development of realistic and practical guidelines. The consultative process was also reported to exclude existing administrative structures such as the local governments in which district health services are embedded, making it difficult to implement guidelines and to attract the support of local government officials when requested. One DHO remarked that:

> 'Guidelines fail to influence the agenda at the service delivery level [and yet] everyone should know the content and implication of health guidelines. There is little input from sub-national levels, leading to unrealistic guidelines.'

Development and presentation of guidelines

Of the reviewed guidelines, 78% articulated the aspects of service delivery that were to be strengthened, as well as the impetus for developing the guidelines. Target users were generally defined as health workers, without categorization by cadres or level of care. Only 38% of reviewed guidelines clearly defined target users.

Conflict

Several of the guidelines duplicated content, and some conflicted with each other. Overlap in content was reported for certain guidelines, including Reproductive Health, HIV/AIDS, Anti-Retroviral Therapy, and Prevention of Mother-to-Child Transmission (PMTCT). This finding was corroborated by document review, which revealed considerable overlap in the content and purpose of guidelines within and across departments. Examples of such documents included: *Infection Control and Prevention Guidelines (2004, 2nd ed.)*, produced by the AIDS Control Program, *Policies and Guidelines on Infection Control (2005)*, produced by the Quality Assurance Department, *TB Infection Control Guidelines (2007)*, produced by the National TB/Leprosy Program, and *Infection Control at Health Facilities—Management of Epidemic Diarrheal Disease Outbreaks (2005)*, produced by the Community Health Department. The overlap of purpose and content also occurred within departments. For example, the Community Health

Department published, *Oral Health Guidelines for Teachers in nursery and primary schools, (School Health Series, 1st Ed, 2002)*, as well as *Oral Health Guidelines for schools, (not dated)*. The Nutrition Division released *National Guidelines on the Management of Severe Malnutrition, (not dated)*, *National Guidelines on the Management of Moderate Malnutrition at supplementary feeding centers (August 2005)*, and *Management of Severe Malnutrition in Uganda: Guidelines on Specific Needs of Therapeutic Feeding Centers (2005)*.

The majority of guidelines were presented as booklets (80%), with a few presented as charts (13%), leaflets (6%), or desk aides (1%). Respondents at the central level reported that desk aides and charts were meant for quick reference, and should be given to all health workers irrespective of the level of care and training. These respondents also reported that there was no systematic mechanism for pre-testing guidelines for clarity before finalization. One district member mentioned the internet as an alternative source of health service guidelines, which were accessed through the MoH website. While some of the guidelines were published electronically and in paper format, the latter was more common. In all cases, dissemination emphasized the paper format.

At the service delivery level, respondents reported that charts were more convenient to use because of the simple language and illustrative diagrams. For this reason, charts for the integrated management of childhood illnesses, malaria treatment, and syndromic management of sexually transmitted infections were considered to be the more appropriate format for lower-level units such as HC II facilities, as elaborated in the following quotes:

> 'A chart in front of a health worker is a ready reference; otherwise one can easily miss signs and symptoms.' Clinical officer at HC IV.

> 'A chart is sometimes better than someone explaining, and they are also good for health education.' Health worker at HC II.

Although charts were the preferred format, they were not properly mounted on the walls for display in nearly all health units visited, and therefore the charts exhibited a tendency to fall and to damage the underlying wall.

Several recommendations for improving guideline clarity were provided by district-level and service delivery-level respondents. Twenty-nine percent and 82% of district-level and lower-level respondents, respectively, mentioned that guidelines should be translated into local languages. Fourteen percent of district-level respondents reported that every guideline should have a training manual to explain its use, thus improving clarity. There were conflicting views on the level of detail expected in the guidelines. Some respondents expected guidelines to be brief and user-friendly. Others preferred detailed guidelines that covered common conditions as well as emergencies.

Dissemination within the MoH and to the districts

The Quality Assurance Department, which should have a copy of all developed guidelines, had less than 60% of the documents available at the departmental level. A number of these documents were shelved in stores and offices, lying unused. Departments lacked storage facilities for easy document retrieval, and guidelines were piled in the central store, calling into question their utility or need for development in the first place.

Forty-eight percent of respondents at the central level reported that there was no clear dissemination process for newly developed guidelines. Lack of funds for dissemination was cited as the main hindrance at both the central and district levels. Fifty-two percent of respondents at the district level noted that the dissemination process was unclear and was occasionally untimely; in some cases, documents were received when they were already out of date. It was felt that dissemination of documents should receive the same level of priority as other medical supplies. One DHO remarked that:

> 'The problem is in dissemination—they remain at MoH headquarters. Only a few are disseminated. The only chance for dissemination is when an issue is on the agenda; up to 90% of documents are not [available] at [the] district level. If they are not at the district level, how can health subdistricts be expected to access them, let alone implement them?'

Two main modes of dissemination to the district level were noted. One mode involved giving out copies of the guidelines to district officials attending MoH workshops, while the other method was to courier copies directly to the districts. Occasionally, copies of the guidelines were handed to district personnel when they visited the MoH headquarters for meetings or other assignments. Respondents found the workshop dissemination mode to have some shortcomings. One DHO remarked that:

> 'A distribution system [for service guidelines] is lacking—if there is no workshop, districts may not get copies; there is [a] need for a clear system for dissemination and storage right from the center to districts, *e.g.*, there is [a] need for an inventory to determine which guidelines have been distributed to which district.' At the service delivery level, a health worker at HC IV stated that 'at this facility, these guidelines are not collected from the MoH [. . .] I have my own copy but I teased them [the managers] and

requested a copy of the Uganda Clinical Guidelines for the unit in 2006, but have since not obtained a copy.'

Within the district, the respondents identified three main concerns regarding the process of guideline dissemination to lower levels. First, there were rarely enough copies for all lower-level facilities. Second, documents handed to some health subdistrict in-charges tended to remain at that level, and were not disseminated to lower-level facilities. This issue was thought to be related to the management performance of the health subdistrict in-charge, as illustrated by the following quotes:

'Often the health subdistrict in-charges do not implement what is agreed on, *e.g.*, do not report back on work-plan implementation, and yet they get the money. They are never available at workstations, yet they control resources. Immunization outreaches are not done; health workers are not paid for outreaches. Could this be the result of weak management skills? The health subdistrict policy needs to be reviewed—the assumption that all doctors are good managers is not true. Senior clinical officers have proven better in some cases. A medical officer can control resources and frustrate everyone.' DHO.

'Guidelines in the lower-level units never reach the health workers because the in-charges individualize them.' District Health Team member.

'I have never seen any guidelines. The former in-charge personalized them and used to keep them at home. One time I wanted to prepare a talk on health unit management committees, but could not even trace a copy.' Health worker, HC IV.

The third concern was the inability of some districts to effectively disseminate guidelines. Sixty-two percent of respondents at the district level noted the need to support guideline dissemination by districts, including provision of adequate copies, training of health workers on how to use the guidelines, and follow-up supervision by the MoH after guidelines were disseminated. One DHO mentioned that:

'When guidelines are formulated and handed out, there is no orientation of staff and inadequate copies are given out, *e.g.*, PMTCT: new drugs were introduced to the treatment regimen and yet staff were not oriented. Other examples are in ART [anti-retroviral therapy] [and] child counseling. It is difficult in such circumstances to implement changes when no orientation has taken place and only one guideline has been given to the whole district.'

At the service delivery level, 78% of respondents felt that there were inadequate copies of the health service management guidelines. The district with the most documents had less than 40% of the 137 guidelines at the MoH, a number that was less than 20% at the health subdistrict level. On the other hand, respondents perceived that there were too many documents relating to certain areas, such as PMTCT. Respondents further stated that at the district and health subdistrict levels, there should be a complete set of guidelines for each area of service delivery, regardless of the frequency of reference to a document. One health worker in a health subdistrict stated that 'even if a document is just for reference and [is] not in frequent use, there is still a need to have all.'

There are examples of good practices to improve awareness and access to health service guidelines. In one district, all new guidelines were brought to the attention of the District Health Team at the monthly staff meeting. Some of the health facilities reported organizing continuing medical education sessions to keep staff updated, but it was felt that higher profile sessions organized by the district would be more motivating. One HC III health worker stated that:

'If the district were to organize workshops for lower staff cadres this could motivate them [to read the guidelines]. Continuous medical education sessions organized by the DHO outside the health facility should include nurses, as there is no feedback from the other staff who attend these sessions.'

There was no systematic process for monitoring and evaluating the dissemination of guidelines at both the national and district levels.

Implementing guidelines

Not all guidelines were being implemented, for a number of reasons. Among the constraints was limited funding to ensure the availability of the required inputs. One DHO remarked that 'the new malaria treatment policy cannot be implemented adequately—Coartem© as a first-line anti-malarial is not available in adequate [amounts] to support compliance.' Forty-two percent of respondents at the district level noted the disconnect between the MoH and the decentralized levels. One DHO stated that:

'Decentralization detached lower local governments from the center. The MoH sees their role as developing policies and guidelines, but who are they making them for? No one sees to it that there are

enough resources to implement these policies and guidelines. When [the] MoH makes guidelines and they look for resources, this money remains at the central level'

The mismatch between policy expectations and the reality on the ground was also mentioned. One DHO remarked that:

'The human resource policy is not cognizant of the staffing needs, *e.g.*, recommended staffing norms of four midwives for a HC IV with a theater and maternity ward are inadequate. Our HC IV conducts 160 normal deliveries per month and attends to about 500 ANC [antenatal care] new clients and re-attendances. We have adjusted this to 10 [midwives], but the staff are still overstretched.'

Failure of guidelines to account for potential conflict with other related sectors was also cited as a hindrance. Guidelines from other sectors can be in conflict with those of the health sector, sometimes putting health sector managers employed by local governments in a dilemma as to which guidelines to follow. At times, solutions adopted by health sector managers to solve this dilemma conflict with other regulations. The following quotation from a DHO highlights this challenge:

'The fiscal decentralization strategy led to collapsing of bank accounts at the Local Government level in order to minimize expenditure in bank charges. This meant that health units (institutions by right of having an in-charge, work plan, and budget) had to close accounts and transactions conducted from a central account. The result is that now health unit money is given to individuals by checks in their names. There is [a] loss of money during the banking process, which is not accounted for, and the temptation to divert funds for personal use is strong. Moreover, keeping public funds on a personal account is against the financial accounting regulations.'

Some DHOs stated that the absence of a reading culture constrains the utility of health service guidelines. In one hospital, guidelines in the office of the medical superintendent were covered with dust, and the officer was not sure when they had been received. Health workers at the same hospital were aware that guidelines were available, but confessed that they had not read them.

It was also felt that the utility of service guidelines could be improved if staff handling the day-to-day services under the relevant programs had prior update training on the use of the guideline. A HC IV midwife stated that:

'Voluntary Counseling and Testing is offered as an outreach to this health facility by the DHO staff, and yet none of us who deal with the patients on a day-to-day basis have been trained. We would also like to be updated on this service.'

Evaluation, revision, and review of guidelines

The majority of respondents at the MoH level stated that there was no mechanism for ensuring that guidelines are received, used, and promoted at the service-delivery level. The means of evaluation were not stated, and there were no indicators to measure guideline implementation. Criteria for reviewing guidelines were not in place, and the person to initiate the review was vaguely referred to as 'the department responsible.'

The mechanism for disseminating revised guidelines to replace old ones was not established. There were several outdated and draft documents in circulation. Districts had various versions of the same guideline with different production dates, for example guidelines addressing PMCTC for HIV that were published in 2001, 2003, and 2006. There were no references to earlier versions, and it was not clear whether more recent guidelines were addenda or were intended to replace the old guidelines. Some documents (23%) lacked publication dates, and it was difficult to know whether a guideline was current or outdated. One DHO stated that 'some of the guidelines are in draft form, and one is not sure whether to consider it as a pre-test or [a] final version.' The process for testing, withdrawing, and introducing guidelines was not laid down explicitly.

The system for reviewing guidelines with reference to the responsible center was in place. Respondents were aware that the Quality Assurance Department was responsible for coordinating this process. However, departments were not following this protocol for several reasons including, time constraints and the weak performance of the Quality Assurance Department. The Quality Assurance Department is understaffed, which compromises their ability to execute their mandate. The need for regular guideline updating was noted by 72% of respondents at the MoH level, for reasons such as the emergence of 'new' diseases such as Ebola virus disease, rapidly changing medical technology, and new medicines.

Discussion

This study has shown that there are numerous health service guidelines in the health sector in Uganda, several of which overlap in content and purpose. We noted that programs targeted by health-related Millennium Development Goals (malaria, HIV, reproductive health, and

child programs) had the highest number of guidelines. The special attention paid to these programs to achieve the Millennium Development Goals may have sparked guideline development in an effort to improve the delivery of health interventions. We also identified a substantial increase in the number of guidelines beginning in 2003, when Uganda started benefiting from the Global Fund Against HIV, TB, and Malaria [2]. In the same year, Uganda also began to receive funding from the President's Emergency Fund for AIDS Relief, and USAID/President's Malaria Initiative funding was directed to Uganda starting in 2006 [36]. Increased funding enabled the scaling up of health interventions, and guideline development may have been seen as an input to scaling-up service coverage. On the other hand, these grants were time-bound, and guideline development may have been an activity that could be implemented rapidly, demonstrating the country's absorption capacity. This high number of guidelines hinders their use; as noted by Armstrong that large numbers of guidelines may be overwhelming to any user, impacting negatively on their use [14]. In addition, guideline development consumes both time and resources, requiring the sector to lay down explicit criteria to decide which areas need guidelines [29].

In terms of the nature of the teams within guideline development groups, we found that they were multidisciplinary and that, furthermore, they engaged with key stakeholders from other disciplines. Consultations also took place with related line ministries. Involving all important stakeholders and beneficiaries as much as possible, especially individuals with the right skills, enhances guideline acceptability, ownership, and credibility [8,31,37]. Multidisciplinary teams, help to balance individual biases resulting in more valid guidelines [31]. Although the team members at the MoH were skilled in their respective areas, we did not ascertain whether the stakeholders being consulted had the necessary skills to support the process. Training sessions are necessary for the people responsible for guideline development, especially in low-income countries harboring stakeholders of varied capacities. Effective leadership of the group has been noted to be crucial [31]. In our study, the team leaders were senior MoH officials heading divisions or departments. We however did not assess their leadership of the guideline development process. The leader must be neutral and have the capacity to facilitate team spirit, consensus building, collaboration, and engagement of relevant stakeholders [30,31].

This study has also revealed a limited involvement of operational-level users of health service guidelines. Reasons for lack of adequate consultation during the development process could be several; if funding from Global Health Initiatives is used to develop guidelines, the time bound nature of these grants may not allow enough time for consultation. On the other hand, inadequate consultation may be the result of the lack of an established, systematic process for consultation. Excluding a wider range of stakeholders risks limiting guidelines to technical concerns without addressing the broader environment, as evidenced by key informant responses about the ineffectiveness and/or impracticability of some of the guidelines. Insufficient active user and relevant administrative structures involvement, are among the documented barriers to guideline use [38]. It is important to consider gaining the participation of those with the power and authority to implement guidelines or to persuade others to do so [4]. Some researchers have urged for the consideration of consumer/community values during guideline development [37]. Challenges of achieving effective community involvement have been identified, and focus group discussion has been highlighted as an approach to integrate the community into guideline development [37]. However, this approach may be costly in resource-constrained settings. In our study, we found that community integration is implied in civil society involvement; strengthening the capacity of civil society to gather the views of the community may be a cheaper option.

Regarding guideline development and presentation, we noted a poor definition of end users, with a tendency to view users as one group irrespective of their training. Guidelines need to be tailored to the cadre and technical plateau of the different levels in the healthcare delivery system. Users operating at a lower level of care appreciate simplified language and a visual presentation that provides a quick reference, as opposed to booklets. Some organizations use different formats for different types of guidelines, others produce various versions of the same guideline, and others have a standard format for all guidelines [32]. A case has been made for target audience-tailored formats; we also urge that the format be tailored to the level of care, taking into consideration the technical capacity at the different levels of the healthcare delivery system. Health workers identified the need for training manuals on how to use guideline, which may point to complicated guideline presentation and content, lack of clarity, or both. Insufficient clarity and capacity for implementation, especially at lower levels, were cited as factors affecting the use of guidelines. Schunemann *et al.* also discussed the need for detailed manuals to enhance guideline use [5]. However, even a detailed manual may not suffice, because it is impossible for a nationally developed guideline to cover all operational details for all implementation settings. In addition, other researchers caution that guidelines need to be clear and easy to understand, without much reference to other supporting materials [32,39]. Francke *et al.* found that guidelines that were easy to understand had a large chance of being implemented [15]. Some studies have raised the issue of guideline-related barriers

affecting use, specifically complexity and whether a behavior is being eliminated or added [40,41].

This study has revealed poor dissemination and unavailability of guidelines where they should be implemented. Many of the guidelines were in storage at the central level, calling into question the need for their development in the first place. Evidence shows that access plays a role in improving use [5,6,42]. We found that dissemination strategies were largely passive and unclear, and guidelines were frequently distributed at workshops that did not necessarily address the issues outlined in the guideline in question. Studies have shown that passive attempts to distribute information have little success [6,38,39,42,43]. This issue is compounded by the lack of a reading culture, which further negatively impacts on guideline use even where they are available [20]. Organizing training sessions on new guidelines has been shown to enhance guideline uptake and implementation, and some organizations have used education materials and workshops as part of their guideline implementation strategies [6,39,42,43]. Some researchers however caution that groups must be small, focused on the topic, and multiple training methodologies used [39]. This strategy can be further mainstreamed in supervision where supervisors explain guidelines and can possibly take the initiative to organize local seminars for HC and hospital staff at the district or even subdistrict levels. Insufficient awareness and a lack of familiarity with existing guidelines and their content have been documented as barriers to guideline use [15,44]. Multifaceted interventions targeting different barriers to change are more effective than a single intervention; a combined strategy of training, supervision, joint consultation sessions, audit, and passive dissemination would be more effective than any element implemented in isolation [16,39,45,46]. However, this integrated strategy has cost implications that may challenge low-income countries.

Under implementation, this study also found that reference to guidelines was varied. Some existing guidelines did not account for all possible scenarios, likely due to the exclusion of key stakeholders during guideline development. Consultation with all relevant stakeholders, including users of guidelines, is crucial for effective guideline utilization [29]. Consultation enhances participation of stakeholders and subsequently promotes ownership [7]. Other factors known to facilitate guideline uptake include provision of incentives to implementers and health-worker attitude toward the guideline, both of which can also be enhanced through consultation [16,29,39,42,47]. The poor consultation process possibly contributes to the conflict with other government sector/local government guidelines. In decentralized settings where power lies with local governments, efforts must be made to align sector guidelines to local government guidelines. Furthermore, resources and the broader environment within which guidelines are expected to be implemented need to be taken into consideration. Resnicow *et al.* raised the issue of environment-related barriers to guideline use; they noted that guideline implementation may be affected by factors not under the implementer's control like availability of resource, required inputs such as medicines and staff, which we also found in our study [48]. Feasibility of implementation, required organizational changes, affordability, and acceptability of the guidelines must be considered [7,8,29,49]. In a systematic review of integrating primary healthcare in low- and middle-income countries, authors noted that in success cases, required inputs were provided alongside guidelines which enhanced their implementation [50]. Another systematic review of improving outpatient referral from primary to secondary care also noted that the referral process improved if guidelines for referral were provided along with referral forms [45].

Under evaluation of guidelines, respondents at the service delivery level pointed to the need for continuing support supervision after guidelines were distributed, stating that guidelines should not replace the needed supervision. The MoH established area teams, which comprise of multidisciplinary teams overseeing a group of districts in a consistent manner. These would ideally supervise and evaluate implementation of guidelines as well. Performance of these teams has been suboptimal for several reasons including lack of funding, logistical challenges, lack of effective follow-up on issues, and inadequate human resources [51]. The challenges of undertaking effective supervision have been raised in the literature, and include a lack of tools, logistics, and support from superiors, as well as being burdened with administrative responsibilities [39]. The need for supervision and audit to enhance guideline implementation has been documented in several studies [6,39,52]. Supervision would provide feedback on clarity and utility of guidelines as a way of guiding improvements in format and consultation. Some researchers have highlighted the multiple benefits of supervision in improving guideline uptake, such as professional development, improving job satisfaction, and enhancing motivation [39]. At the utilization level, there was no consensus on the level of detail expected in the guidelines, which may be partly explained by the different levels of training of the respondents. There is currently no clear means of evaluating whether guidelines are being implemented and no means to measure outcome. Schunemann *et al.* underscored the challenge of building consensus on which outcomes are most important [53]. Thomson *et al.* also caution about measuring outcomes, noting that it is impractical and complex to do so. They suggest that

outcome measurement should instead consider the entire process of development, dissemination, implementation, evaluation, and review, because failure can occur at any of these steps [4].

Under review of guidelines; although the Quality Assurance Department is responsible for coordinating the development and review of guidelines, this study has shown that this process is not centralized, with departments and programs developing guidelines without involving the coordinating unit. The overlap in content and purpose seems to be linked to the decentralized nature of the development process, which occurs without a central monitoring/checking mechanism. Although a majority of respondents identified factors that would necessitate revision of guidelines, the criteria were not explicitly laid out. Shekelle *et al.* stated that guidelines should include a scheduled review date, although they again caution that this may lead to premature guideline revision, especially if changes in a given area are not rapid and/or use of outdated guidelines in fast-changing fields [54]. It may be reasonable to reassess validity every three years after publication, with room to incorporate smaller, earlier updates if required [5]. Additional considerations may include the emergence of new diseases and availability of new evidence [29].

Limitations of the study

There are important parameters that were not assessed in this study, including the use of evidence in guideline development and the management of conflict of interest in the development group. Evidence has shown that locally developed guidelines are more likely to be implemented compared to guidelines developed in response to intervention by international organizations, but we did not investigate this aspect. However, we believe that we have identified important issues that can guide future improvements in guideline development and subsequent utilization in a low-income country.

Conclusion

The development of guidelines consumes resources, and to ensure a return on investment the guidelines must achieve their intended objective. Low-income countries need to appreciate that the process of guideline development and review is both time- and resource-consuming. Achieving guideline effectiveness is partly predicated on the process followed in development. This study has shown that the process of developing, disseminating, and implementing guidelines needs to be improved to enhance their utility. There are some aspects that can easily be handled at a country level, while a regional approach may be beneficial for other aspects, given the potential to pool expertise and financial resources.

At the country level, there is a need to develop and adopt a standard guide for developing guidelines in the health sector. The process must be consultative; guidelines must be disseminated, enforced, and accompanied by the required capacity building and inputs for implementation. Adaptation of the WHO handbook for guideline development to specific country contexts may be considered. Committed teams with necessary skills and leadership, a system for dissemination, routine monitoring of use of guidelines, introduction of new guidelines, withdraw of old ones and criteria for revision must be in place. The option of strengthening civil society to harness the contributions of communities and beneficiaries in guideline development should be explored. Guideline development and implementation must be planned for and resources mobilized. Required funding must be mobilized within government budgets and/or project proposals developed to access health grants if a guideline is expected to be developed.

At the regional level, regional professional bodies, the WHO inter-country support teams and the Africa Regional Office can support the development of high-quality, evidence-based guidelines for countries in the region by fostering evidence generation, synthesis, and capacity building. WHO may also create a repository of guidelines to serve as a resource if a country needs to develop a guideline similar to an existing guideline from another country in the region. The regional level can also provide technical guidance in areas, such as external validation mechanisms and the development of possible methodologies for assessing guideline use that countries in the region can adapt.

Abbreviations

DHO: District health officer; HC: Health center; M & E: Monitoring and evaluation; MoH: Ministry of health; PMTCT: Prevention of mother-to-child transmission; TB: Tuberculosis; WHO: World health organization.

Competing interests

The authors declare no competing interests.

Authors' contributions

JNO contributed to the conception and design of the study, data analysis and interpretation, and led the drafting of the manuscript. JBW contributed to the conception and design of the study, data interpretation, and participated in the drafting of the manuscript. SKB contributed to the conception and design of the study, data analysis and interpretation, and participated in the drafting of the manuscript. BC contributed data analysis and interpretation and participated in the drafting of the manuscript. All authors reviewed and approved the final manuscript.

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Research objectives
The main objective of our study was to enhance our understanding of whether and how evidence can be diffused into public health policies and practice in Uganda (knowledge translation).

Specific objectives
- What is categorized as evidence suitable to inform policy development, and by whom?
- What are the barriers and facilitating factors to uptake of evidence in policy development?
- What frameworks can feasibly improve KT in a developing country like Uganda?
- How do the different stakeholders shape evidence uptake in health policy development?

Our methodological approach to address this research question was a theory-driven inquiry. By systematically investigating KT processes and building onto existing knowledge, we constructed plausible explanations rooted in contextual realities on what it takes to get evidence into policy. These were detailed in a middle range theory (MRT). We then sought to test and refine the MRT through its application in two selected case studies.

Structure of the thesis
The research thesis is organized into five chapters.

Chapter 1 presents the general methodological approach employed in undertaking the study, including an overview of the methods used and the key definitions adopted.

Chapter 2 provides an overview of KT in reference to LIC. It also presents further details regarding MRT development and the roles of policy actors in KT in Uganda.

Chapter 3 and 4 present the two Ugandan case studies that were chosen to test and refine the MRT. Chapter 3 includes a detailed analysis of the changes in malaria treatment policy. More specifically, the case study investigates the role of evidence in the policy change, the various barriers and facilitating factors to KT, and the roles and influences of the different stakeholders in the KT process. Chapter 4 investigates the abolishment of user fees in Ugandan public health facilities, and examines the role of evidence in the policy process, the barriers and facilitating factors to the uptake of evidence, and the roles and influences of stakeholders in the KT process. Both case studies analyze the extent to which the initial MRT succeeds in clarifying the evidence uptake in policies and practices. Based on these findings, the MRT is fine-tuned whenever appropriate.

Chapter 5 presents the general discussion and conclusion, including lessons learnt regarding KT in Uganda. This discussion includes a detailed presentation of the KT framework as it was developed and fine-tuned over the course of the research while the conclusion shows the refined MRT.

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Chapter 1: Overview of methods

Assumptions

Knowledge translation (KT) processes are complex and occur amidst multiple stakeholder interactions embedded in a given context. Conceptual clarity of the term "complex" continues to be debated [1-2]. Glouberman & Zimmerman provide useful insights into the distinction between complicated and complex [3]. They argue that complicated issues are comprised of many components, such that the application of high-level expertise in repeated attempts to address them is likely to yield positive results and outcomes can be predicted (to some extent). On the other hand, complex issues are characterized by uncertainty, non-linearity, and a variable path to success.

In our study, we consider that the uptake of evidence/KT in policy development presents many features of a complex process: it is iterative, largely unpredictable, and the outcomes are impacted by stakeholder interactions and contextual issues [4-5]. Evidence is just one input in policy development, with other factors also coming into play. For example, Kingdon documented that political agendas and stakeholder interests influence the agenda setting stage of policy development [6], while Weible et al. stated that policy development was impacted by external events, such as social economic conditions, public opinion, and coalitions [7]. On the other hand, Walt and Gilson reported that three key components were particularly important in the policy process: the policy content, the process of policy making and how power is used in policy making, and the context in which processes and actors interact [8].

It has been demonstrated that KT processes are context-specific and influenced by the nature of the available evidence, the policy under discussion, political and economic contexts, and the extent to which stakeholders' interests impact the process [5]. In light of this, we cannot expect to develop any all-unifying theory that can fully predict all KT process outcomes. However, by systematically investigating KT processes and building on existing knowledge and empirical research, theory-driven scholars believe that patterns and regularities may be identified, which can allow for plausible explanations rooted in contextual realities. This is the best possible outcome that can be achieved when dealing with complex issues.

Methodological approach

Detailed methods are provided in the cited papers.

We used a comparative case study design, inspired by the principles of theory-driven evaluation (TDE). This approach was justified based on its ability to address complexity [9], and its previous use in health services research [10-11]. Theory driven evaluation has been used mainly for evaluation of programs to assess an intervention's implementation and effectiveness, as well as to explore the causal mechanisms, intervening factors, and contextual issues underlying observed changes [12]. The details of an investigation of how an intervention leads to a given outcome are formulated as a programme theory. In the literature, the terms 'programme

theory' and 'middle range theory' are increasingly used interchangeably [13]. Both terms refer not to grand universal theories but rather detailed explanations of how and in which conditions an intervention will achieve its results. In the present thesis, we will use the term 'middle range theory' or MRT. Merton defined MRTs as "theories that lie between the minor but necessary working hypotheses (…) and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behaviour" [14]. MRTs are intermediate in scope and are testable, but they are narrow enough to permit guidance in research [15-16]. Thus, MRTs provide a hypothesis or framework that enables systematic data collection while allowing for identification of emerging issues [16].

We studied complex KT processes and, more specifically, investigated the roles, interactions, and influences of the different actors in KT processes. We further examined how context impacted evidence uptake, as well as how the nature of the evidence and the policy under consideration impacted the KT processes. These elements were made explicit in an MRT.

Scholars advise the use of a combination of methods and data collection tools [17-18] for eliciting the initial MRT. In practice, we developed the initial MRT (MRT 1) on KT processes based on a combination of reviewing the relevant literature, reviewing the policy documents, and interviewing key informants (KI) (Figure 1, phase 1). An MRT is expected to further evolve and mature iteratively through a process of induction and deduction [19]. In our study, we tested the MRT in two empirical studies, which eventually led to a refined MRT.

The overall structure

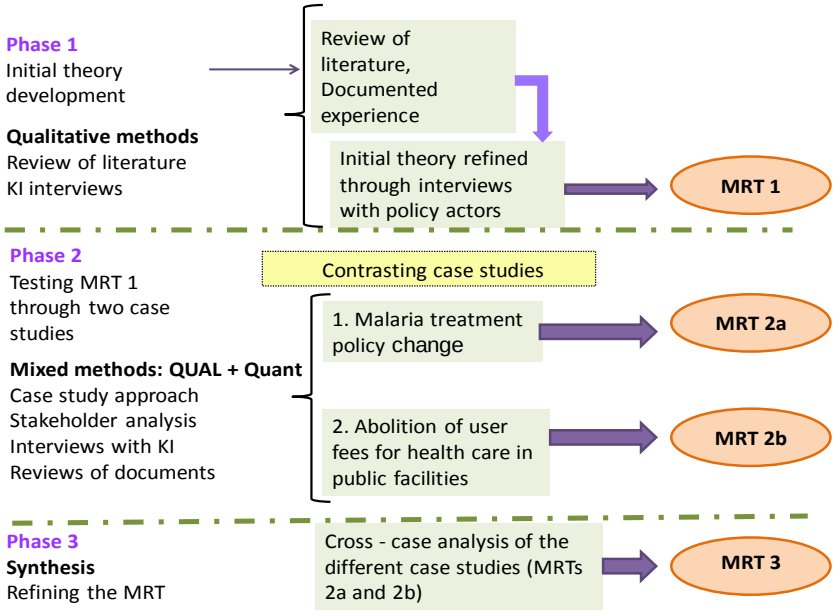
Our study was undertaken in three phases (Figure 1).

Phase 1: This study began with the construction of MRT1-or detailed hypothesis-on what is required for evidence uptake into policy and practice/implementation, based on a review of both published and grey literature, experience, and common sense. This initial MRT was further developed through interviews with key informants (KI) among health policy actors in Uganda. This led to a refined initial MRT (MRT 1) that was the starting point for specific policy case studies in phase 2.

Phase 2: This phase involved studying KT processes and outcomes in carefully selected cases, to assess whether and to what extent MRT1 on KT explained the evidence uptake in policy development from a policymaking perspective. 'Testing' this MRT in each concrete health policy case eventually provided insights into the explaining power of the initial MRT, and led to additionally refining steps (MRT 2a and 2b).

Phase 3: Through a cross-case analysis of the case studies and comparison MRTs 2a & 2b, we sought to consolidate the MRT (MRT 3) on improving KT, thus contributing to increasing our understanding of this subject.

Figure 1: Structure of the study



Study design

Case study approach

Yin [20] reported that one strength of case study research is "the ability to undertake an empirical inquiry of a given phenomenon within it's real life context, when boundaries between the phenomena and context are not clearly evident". Case study methodology has been deemed suitable for health systems research given the fact that health policy and systems are embedded in, and are influenced by, contextual factors that must be included in the inquiry [21-22]. Case study evaluation responds to the need to study how complex behaviors and relationships among actors influence change [23]. Case studies have previously been used for studying KT processes in Africa [24].

The uptake of evidence into policy is intricately connected to prevailing contextual factors and local stakeholder interests. This further justified the use of case study methodology, given its ability to enable detailed contextual analysis of complex issues and their relationships. We sought to answer the following questions. Was evidence used in policy development? If yes, what sort of evidence was used, why and how was it used, and how did the stakeholders and context impact this use?

Our case studies were strengthened by the use of mixed methods. In line with the method-neutrality of theory-driven inquiry, we used both qualitative and quantitative methods. Furthermore, we used multiple data collection methods, in accordance with Yin's

recommendation that this can enhance the validity of case study results [25]. Validity was further enhanced by member checking, in which preliminary results were reviewed prior to finalisation by actors (two from the WHO and two from the MoH) who were central to the policy cases. In addition, preliminary results were also presented to actors in KT who encompassed researchers and policy makers. Recall bias was ameliorated by interviewing a wide range of knowledgeable stakeholders and through the use of multiple data sources.

Selection of cases

Case selection was guided by MRT 1 on KT which was developed in phase 1 of our study [26], which was constructed around three elements that seemed particularly important in Uganda, namely ministry of health institutional capacity to lead the KT process, characteristics of the evidence, and existence of KT partnerships. Cases were selected to enhance the likelihood of contrasting these elements. In one case, MRT 1 seemed more likely to explain the evidence uptake given the nature of the policy, while this seemed less likely in the other case[26]. The selected cases were the following policies:

- The change in the national malaria treatment policy
- The case of user fees abolition in public health facilities

Contandriopoulos et al argue that even when evidence is available, the success of efforts to effectively disseminate, legitimise and consider evidence objectively in policy development, will be impacted on by the characteristics of the issue under consideration [27]. Characteristics of the issue encompass the extent to which it is polarizing that is whether it is likely to cause fragmentation (high polarization) among the actors involved given their positions on a given issue, whether it is highly salient in that it will attract a lot of attention and, whether actors are familiar with the issue and as such it gains prominence on the agenda [27-28]. In cases of low issue polarisation potential users share similar opinions and preferences, they all see the issue as a problem and discussions are more likely to be technically focused and instrumental use of evidence realised. On the other hand, in cases of high issue polarisation, discussions are likely to be entangled in political debates and unbalanced power plays and in such instances, evidence may not be central to decision making [27]. In addition, Moat et al also point out the need to understand how the context in which evidence is produced, the issues it addresses and issue-context resonance, influence the producers and users of evidence [29]. Context encompasses the government policy making structures involved in policy making and the extent to which they are open to participation, the characteristics of political actors whether they stand to win or lose given the policy choices made and societal values [27]. These will impact on how evidence is viewed and taken up in policy development.

The case on abolition of user fees seemed likely to predict contrasting results given the nature of the policy. The high issue polarization tendency was eminent in that the World Bank (WB) was supporting user fees because on their concern to ensure loan sustainability, while the government was keen to address hindrances to realization of the poverty eradication action plan (PEAP) objectives, user fees for health care being one of them. It was highly salient given

the fact that a significant percentage of the population are categorised as poor [30] and stood to benefit from the abolition of user fees. Regarding the context, user fees for health care is a social policy which directly concerns peoples' welfare and this engenders a political currency reflected in popular support and close engagement of politicians, civil society and the community. In such a case, consultative mechanisms and inclusive policy development processes are unlikely. Indeed Moat & Abelson in their analysis of the influence of institutions in the decision to abolish user fees in Uganda, highlighted the weaknesses of government structures to impact on the decision making process to abolish user fees concluding that "Big man" presidentialism and clientelism thwarted the role of formal institutions [31]. In addition, with the abolition of user fees, some actors stood to win while others stood to lose. Politicians stood to win votes, managers of the health services and health service providers stood to lose a source of revenue, while communities stood to benefit from free health services. In such a case, evidence may not play a central role in decision making.

On the other hand, the malaria treatment policy change seemed likely to predict similar results given that it is a biomedical policy. Importance would first be placed on the scientific rigour of the evidence regarding its effectiveness and patient safety, and affordability would be secondary. This then calls for the close engagement of professional bodies, with technocratic decision makers and researchers as key partners. The malaria treatment policy change is a low issue polarisation and potential users of the evidence are likely to share similar opinions and preferences. Discussions are more likely to be technically focused and instrumental use of evidence realized.

Use of mixed methods

In theory driven evaluation (TDE), methods for data collection and analysis are chosen guided by the research questions and the initial MRT, rather by than a preference for particular methods. In essence, TDE is hypothesis-driven, not method-driven. In practice, this means that both quantitative and qualitative data will typically be collected, and both quantitative and qualitative data analysis methods will be used. Quantitative data are used to assess the effectiveness of the investigated intervention, and may enable identification of regularities and patterns. Qualitative data are used to describe how actors react to the intervention or problem, examine processes, and identify context factors. In other words, qualitative analysis contributes to our understanding of why and how the observed outcomes occurred.

Creswell defined mixed methods "as a procedure for collecting, analysing, and 'mixing' both quantitative and qualitative research and methods in a single study to understand a research problem" [32]. In a quest to improve the comprehensiveness and validity of the findings, mixed methods are increasingly being applied for investigating complex issues in health systems research [33-34]. O'Cathian et al. further justify the use of mixed methods in health services research based on the need to effectively address complexity in the health care delivery system, as well as the subsequent requirement to capture the multiple perspectives of the involved stakeholders [34].

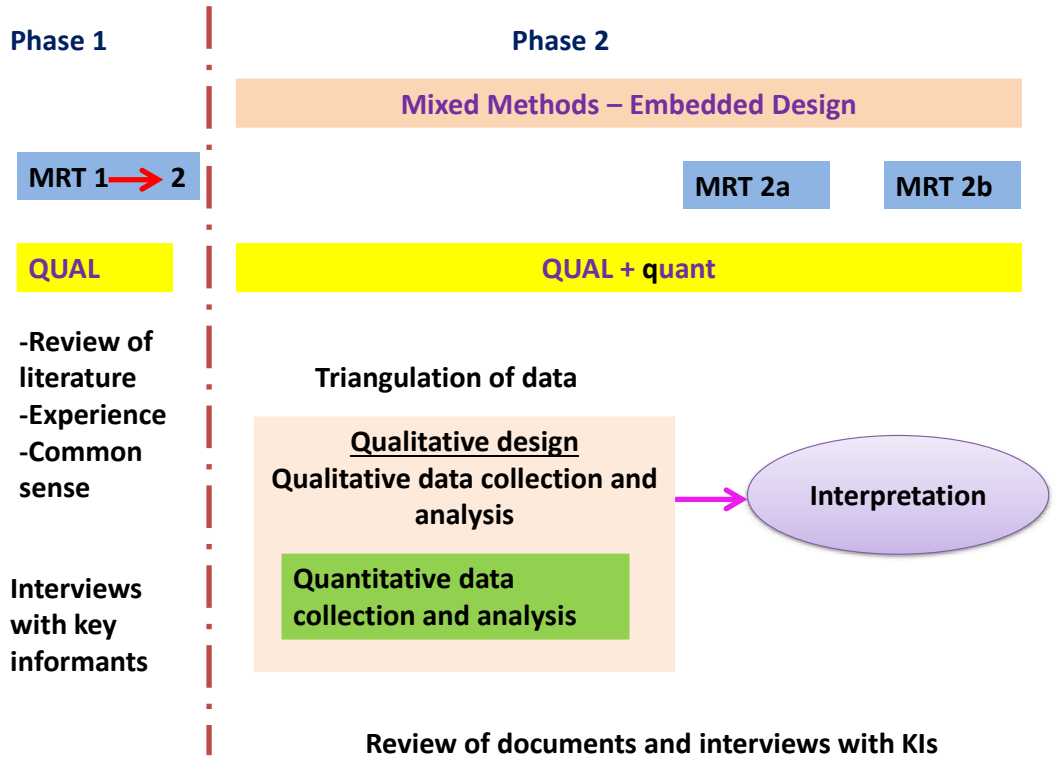
Our study was predominantly qualitative (QUAL) in order to capture the complexity of KT processes, but both qualitative and quantitative (QUAL–quant) methods were used for data collection and analysis. Using mixed methods enabled us to increase the validity of our findings through triangulation of data collection methods and analysis, as well as to attain a more complete understanding of the KT processes [35].

Stakeholder analysis

The roles and influences of stakeholders in KT have previously been highlighted [36-37]. Sauerborn et al. further state that evidence can only be relevant if it is known and used by stakeholders [38]. Stakeholder analysis is a powerful tool that can be used retrospectively and prospectively to investigate the roles, interests, and influences of the different stakeholders in policy processes [39]. Although stakeholder analysis originated in the management of organisations [40], it has also been used in policy analysis in the health sector [40]. In our study, stakeholder analysis was undertaken to assess the influence of the different actors on uptake of evidence into policy. The roles, and levels of interest and influence were assessed by drawing upon the works of Eden & Ackermann and Bryson in undertaking the analysis and classifying the stakeholders using the influence/power–support/interest grid [40-41].

Figure 2 shows the methods that we used in the different phases of the study.

Figure 2: Study methods



Adapted from Creswell & Plano Clark (2011) [42]

Ethical approval

Ethical approval was obtained from the Institutional Review Board of the Institute of Tropical Medicine, Antwerp (Belgium) (IRB number IRB/AC/ac/197) and the Uganda National Council for Science and Technology (number SS 2920). Informed consent was obtained from all respondents prior to the interviews.

Study definitions

- **Evidence:** Some scholars have stated that, in the case of developing countries, evidence is much broader, consisting of monitoring reports, experience, and know how [43]. Bowen Zwi et al also defined evidence broadly to encompass research, opinion and views of individuals or groups, results of consultative processes and published reports and documents [44]. Lomas et al on the other hand argues that evidence concerns facts which may be actual or asserted and these may be known through experience or observation[45].

Scholars have further emphasized the importance of integrating research evidence and other types of policy relevant evidence, especially that which is considered as evidence by policy makers and stakeholders, without prioritizing one over the other but as complimentary input into policy development [29, 46-47]. In this paper, we thus define evidence broadly to encompass published and unpublished research, routine monitoring and evaluation reports, community complaints, clinician observations, and population-based surveys.

- **Policy:** For this study, we adopt the definition of Buse, which states that a policy can be explicit with a written document or implicit and unwritten [48]. We further considered policy intention to be actual policy if there was a written document, or if there was a confirmed government position even without a written document.

- **Policy implementation:** Considered to have started upon the implementation of any aspects of the policy, irrespective of the scale.

- **Knowledge Translation (KT):** This term was used as defined by the Canadian Institute of Health Services Research as "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products and strengthen the health care system"[49]. In our study, we used "diffusion of evidence" and "knowledge translation" interchangeably.

- Uptake of evidence: Evidence may be used to support a position already taken (symbolic use), to inform discussions and debate about a topical issue (conceptual use), or to actually create guidelines or directly change practice (instrumental use) [50-51]. In our study, we considered symbolic, conceptual, and instrumental use as forms of evidence uptake.

- **Stakeholder:** Defined as an individual who and/or an institution which is affected by the policy change, directly influenced it, or has an interest in the outcome even when not directly involved [52].

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Chapter 2: Knowledge translation: An overview

The majority of low income countries (LIC) are lagging behind meeting the millennium development goals (MDG) targets and are faced with several challenges among which are a double burden of communicable and non-communicable diseases, inadequate funding for health and weak health systems that are failing to meet the needed level of coverage with essential health interventions. Funding for health in LICs has however been increasingly realised from donors and global health initiatives (GHI), offering an opportunity to strengthen health systems. In addition, evidence exists regarding effective interventions but the uptake of evidence into policy and implementation is not yet fully realised. In this chapter, we explore factors hindering the uptake of evidence, herein also referred to as knowledge translation (KT), in health policy in LIC.

We explored challenges to KT and highlighted what can feasibly be done to enhance uptake of evidence in Africa. We highlighted the need to exploit factors that are known to maximize uptake of evidence and a clearer appreciation of what KT entails.

Published article

Nabyonga Juliet, and Jackson Orem. "**From knowledge to policy: lessons from Africa**" *Science translational medicine* 6, no. 240 (2014): 240ed13-240ed13

We further undertook a review of published and unpublished literature on KT in LICs and also assessed the limitations in applying the available KT models in LICs. We then developed a middle range theory (MRT) by combining results of the literature review with knowledge based on our own experience on this subject and common sense. The MRT details factors that facilitate uptake of evidence in health policy in a LIC like Uganda. Review of the literature revealed that the most common emerging facilitating factors could be grouped under the MoH institutional capacity to lead the KT process (institutional strengthening for KT), characteristics of the available evidence, effective dissemination of evidence, partnerships for KT and the political context. This theory was then validated with key informants (KIs). These were health policy makers and researchers in Uganda, who then prioritised the most important facilitatory factor to enhance uptake of evidence. The analysis of KI interviews showed that policymakers and researchers ranked the MoH institutional capacity to lead the KT process, characteristics of the available evidence and partnerships for KT as the most important facilitatory factors. Respondents also emphasized the use of mainstreamed structures within MoH to coordinate and disseminate evidence and the separation of roles between researchers and policymakers especially in undertaking research.

Published article

Orem, Juliet Nabyonga., David K. Mafigiri, Bruno Marchal, Freddie Ssengooba, Jean Macq, and Bart Criel. "**Research, evidence and policymaking: the perspectives of policy actors on improving uptake of evidence in health policy development and implementation in Uganda**." *BMC public health* 12, no. 1 (2012): 109.

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Scholars have highlighted the importance of stakeholders in KT stating that the roles they play and their level of influence impact on the uptake of evidence in health policy development. We explored positive and negative roles of actors in KT in Uganda, the challenges they need to overcome to enable them to play their roles and, the necessary links that must be built to enhance complementarities in KT. Identified stakeholders included CSOs with perceived roles of advocacy, community mobilization, and implementation. These stakeholders may however ignore unconvincing evidence. The community's role was perceived as advocacy and participation in setting research priorities. The key role of the media was perceived as knowledge dissemination, but respondents noted that the media may misrepresent evidence if it is received in a poorly packaged form. The perceived positive roles of policy makers were evidence uptake and establishing platforms for KT and stewardship, while negative roles included ignoring or even misrepresenting evidence that is not in their favor. The roles of parliamentarians were perceived as advocacy and community mobilization, but they were noted to pursue objectives that may not be supported by the evidence. The researchers' main role was defined as evidence generation, but focusing disproportionately on academic interests was cited as a concern. The donors' main role was defined as funding research and KT, but respondents were concerned about the local relevance of donor-supported research. Respondents reported that links among stakeholders were weak due to the absence of institutionalized, inclusive platforms. There is need to consider the roles that various stakeholders are best placed to play and links and necessary platforms need to be put in place to achieve synergy in KT. Relevant capacities need to be built to overcome the challenges faced by the various stakeholders.

Published article

Orem, Juliet Nabyonga, Bruno Marchal, David Kaawa Mafigiri, Freddie Ssengooba, Jean Macq, Valeria Campos Da Silveira, and Bart Criel. "**Perspectives on the role of stakeholders in knowledge translation in health policy development in Uganda**" *BMC health services research* 13, no. 1 (2013): 1-13.

Our MRT 1 was stated as follows: "High quality and contextualised evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process and there are partnerships for KT in place"

Evidence must be of high quality, contextualised, providing economically feasible recommendations and produced in a timely manner by credible researchers. Use of local researchers is helpful but there is need for separation of roles between researchers and policymakers.

KT requires strengthened **MoH institutional capacity to lead the KT process**. Institutionalized platforms for engagement between researchers and policymakers including CSOs need to be in place and mechanisms to coordinate evidence generation and synthesis need to be mainstreamed within the MoH. The capacity of policy makers in knowledge management needs to be strengthened and the policy making process need not to be very bureaucratic.

Partnerships for KT need to be in place and all stakeholders must be involved throughout the process to improve trust and build interest. Communities need to be involved in evidence generation and KT as well. There is need to take into consideration the roles different stakeholders can play best and challenges they have to overcome. Links must be built and necessary platforms put in place in order to realize the synergies in KT among stakeholders.

These contribute to higher ownership, adoption and better application of evidence.

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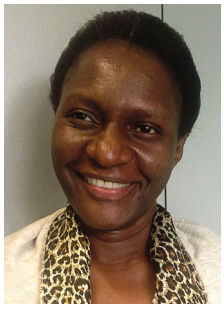

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GLOBAL HEALTH

From Knowledge to Policy: Lessons from Africa

LOW-INCOME COUNTRIES ARE FACED WITH THE DOUBLE BURDEN OF COMMUNICABLE and noncommunicable diseases (NCDs), such as diabetes and cancer, and several of these countries are unlikely to meet the Millennium Development Goals laid out by the United Nations (www.un.org/millenniumgoals). High-quality, essential health interventions are scarce in low-income countries, partly because of a lack of local financial investment in health care and weak health care systems. However, there are other opportunities to increase financial investments in health care in these countries. Indeed, financial commitments have already been made by some African heads of state and by World Health Organization (WHO) member states (*1*). Moreover, substantial funding has been solicited from and awarded by global health initiatives such as The Global Fund against AIDS, Tuberculosis, and Malaria (www.theglobalfund.org/en), and the Global Alliance for Vaccines and Immunisation (GAVI; www.gavialliance.org), among others.

Despite all these efforts, the majority of low-income countries still have a long way to go to achieve universal access to essential health interventions. New technological developments may provide some solutions to increase this access in low-income countries, especially in Africa, but the disciplines of science and technology are still in their infancy in these countries. Moreover, high production costs and a limited market for health care technologies in low-income countries hinder efforts to create locally produced, cost-effective solutions. This is especially apparent in the unfolding challenge of NCDs in sub-Saharan Africa. Therefore, when tackling these health issues we need to maximize the potential offered by translational science and innovation from high-income countries and apply it in low-income countries. There are opportunities to apply findings, or replicate research from high-income countries in low-income countries (*2*). We need to explore how we can ensure the rapid transfer of high-quality, low-cost innovations and technologies that are developed in high-income countries to these low-resource settings.

Funding bodies, researchers, and policy-makers tend to focus on the role of evidence for new technologies, without investing enough effort in ensuring their wide application and sustainability in communities that could benefit from them the most. If the goal of application and sustainability is to be achieved, several factors must be addressed. Policy-makers and communities in the recipient country must be involved in the generation and application of knowledge. This involvement has to go beyond the current emphasis on sharing research reports and publishing in scientific journals. Indeed, in order to turn knowledge into policy, partnerships must be built and trust among relevant stakeholders cultivated early on; these partnerships can be realized in any forum in which researchers and policy-makers engage in a systematic manner. Policy-makers in low-income countries must also launch—and take responsibility for—the entire process, from the generation of evidence and new technologies to their application. Last, we need to be mindful of the fact that the translation of evidence must be performed within a given context and culture, because the critical lack of appreciation of these facts has curtailed the usefulness of some otherwise novel innovations and technologies that have been generated in high-income countries for use in low-income countries. A case in point is a perception that chemicals in insecticide-treated nets are harmful to pregnant women and unborn children, which has negatively affected uptake of bed nets in some parts of Uganda (*3*).

If our desire is the successful diffusion of new technologies from developed to developing countries, we must concentrate on exploiting factors that are known to maximize the transfer of innovation, and a clear definition of knowledge translation must be understood and appreciated because it embodies the entire spectrum: from evidence generation to synthesis, to interpretation, and last, application (*4*). We need to tap into unexplored potential in the populations of low-income countries and all stakeholders have a potential role to play. For example, communities can put pressure on their leaders and demand that scientific evidence be translated into policy and applied in the implementation of health programs; research institutions and hospitals can both generate evidence and implement corresponding health services; the media can effectively disseminate research results, transmitting them to com-

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munities at the grassroots level; politicians can not only influence resource allocation but also disseminate evidence to the communities that elected them, as can local leaders who are respected by the communities they lead. To achieve the diffusion of new technologies, we need to understand the positive roles these parties can play and identify and address the challenges they face (*5*). The role of professional associations and multinational agencies, such as the WHO, needs to be capitalized on by interested researchers because they are respected partners with influence on health policy in low-income countries.

Researchers from high-income countries must take the time to interface with their peers from low-income countries. Although research capacity is limited in low-resource settings, local researchers are still effective conduits for interaction with local policy-makers. Given the enormous technological advantages that exist in high-income countries, proper synergy with low-income countries can be used to meet the challenges of health care delivery in low-income countries by building partnerships that focus on the research and implementation of low-tech innovations (*5*). If properly implemented, an inadvertent benefit of this synergy could be more cooperation between low-income countries themselves. The key middlemen in this process are the policy-makers in these countries; the sooner they become involved in the process, the greater the impact will be on communities in need in low-income countries.

The advantage of this strong synergy could go even further because it could build local research capacity and scale up the use and sustainability of innovations, with local researchers in charge—even after researchers from high-income countries leave—bringing services closer to the communities that need them the most. This will extend the usefulness of innovation from the notion of "bench to bedside" to "bench to the communities in most need."

– Juliet Nabyonga and Jackson Orem

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BMC Public Health

RESEARCH ARTICLE Open Access

Research, evidence and policymaking: the perspectives of policy actors on improving uptake of evidence in health policy development and implementation in Uganda

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Abstract

Background: Use of evidence in health policymaking plays an important role, especially in resource-constrained settings where informed decisions on resource allocation are paramount. Several knowledge translation (KT) models have been developed, but few have been applied to health policymaking in low income countries. If KT models are expected to explain evidence uptake and implementation, or lack of it, they must be contextualized and take into account the specificity of low income countries for example, the strong influence of donors. The main objective of this research is to elaborate a Middle Range Theory (MRT) of KT in Uganda that can also serve as a reference for other low- and middle income countries.

Methods: This two-step study employed qualitative approaches to examine the principal barriers and facilitating factors to KT. Step 1 involved a literature review and identification of common themes. The results informed the development of the initial MRT, which details the facilitating factors and barriers to KT at the different stages of research and policy development. In Step 2, these were further refined through key informant interviews with policymakers and researchers in Uganda. Deductive content and thematic analysis was carried out to assess the degree of convergence with the elements of the initial MRT and to identify other emerging issues.

Results: Review of the literature revealed that the most common emerging facilitating factors could be grouped under institutional strengthening for KT, research characteristics, dissemination, partnerships and political context. The analysis of interviews, however, showed that policymakers and researchers ranked institutional strengthening for KT, research characteristics and partnerships as the most important. New factors emphasized by respondents were the use of mainstreamed structures within MoH to coordinate and disseminate research, the separation of roles between researchers and policymakers, and the role of the community and civil society in KT.

Conclusions: This study refined an initial MRT on KT in policymaking in the health sector in Uganda that was based on a literature review. It provides a framework that can be used in empirical research of the process of KT on specific policy issues.

Keywords: Research, Policy, Practice, Implementation gap, Uganda, Low income countries

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Background

Use of evidence in health policymaking and health systems development plays an important role in guiding investment decisions, improving service delivery and health outcomes, even more so in resource constrained settings where informed investment decisions are paramount [1,2]. Over the last decade, much attention has been paid to this process. Several terminologies have been used for uptake of evidence including Knowledge Translation (KT), research utilization, evidence based decision making and Getting Research into Policy and Practice (GRIPP). In this article, we use KT as an all-encompassing term defined as 'a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products and strengthen the health care system'[3].

Review of available KT frameworks

Several KT frameworks have been developed and arguments for and against each of them have been raised. Some have been judged as un-realistic, like the linear model which implies that disposing of research findings will impel action [4]. The problem-solving model, which starts from identifying a problem and searching for evidence to address it, has not always been successful [4]. The incremental models, including the enlightenment and interactive models infer the notion of gradually influencing ideas among policymakers, but have been criticized for failing to make a direct link between research and its use [5,6]. In the political model, research findings are used by politicians to justify their actions, while in the tactical model, policymakers' commission research when faced with pressures. The latter 2 have been criticized for putting emphasis on the process rather than research findings [7]. The diagonal model focusing on the interactions between researchers, policymakers and lay people has been noted to be complex [4,5].

McDonald raised the issue of research being seen as a retail commodity that is relevant, easy to understand and easily accessed [8]. In practice, the contrary is often seen and relying on passive diffusion and acquisition of knowledge by policymakers is unlikely to result in changes in practice [9]. Young (2005) suggested a more comprehensive framework identifying 4 groups of factors that influence uptake of evidence by decision-makers: (a) external influences; (b) the context encompassing politics and institutions; (c) the type of evidence, its quality and how it is communicated and; (d) stakeholders, their links and their roles, including legitimacy of researchers [10]. While this presents the elements of a comprehensive framework, it still lacks a systematic approach that explains KT from the point of setting the research agenda to actual implementation.

Some frameworks have been criticized for putting emphasis on evidence, how it is disseminated and implemented with limited attention paid to the highly political and rapidly changing policy making context which is common in low income countries [11-16]. Other frameworks have proposed a range of activities along several domains without prioritization [17,18]. Oxman et al noted that little is known on how best to organize these range of activities to improve uptake of evidence in policy development [19]. Lomas and Dobrow et al's frameworks focused on the nature of the evidence, linkages between policy makers and researchers, structures for decision making and contextual issues with limited attention to the involvement of stakeholders deemed important in low income countries specifically communities and civil society [18,20]. Sauerborn et al developed a stakeholder orientation model for policy making to enhance use of health system research in health sector reform [6]. The main focus of this framework is how evidence interfaces with stakeholders with minimal attention to the context. The COHRED Working Group [21] proposed a holistic framework encompassing paying attention to the process of planning and executing research and, decision-making; having platforms for researchers and policymakers'; stakeholders identification and involvement; proving high quality and relevant research; fostering linkages between the research and policy processes and; context- the environment surrounding the research and decision making processes. This framework however does not highlight capacity requirements for the framework to be used.

There are other political science frameworks that have looked at how issues get on to the policy agenda acknowledging that there are multiple streams, research being just one of them [22,23]. These two frameworks highlight the importance of a "policy window". They use a different approach where the starting point is the policy process as opposed to evidence and one cannot make a direct link between evidence and its uptake.

Some researchers have argued that available KT models are academic and too complicated to capture the complexity of the processes involved and as such, not user-friendly for programme managers or policymakers [24]. Eastabrooks et al stated that there is no overarching KT theory and that available theories were focused on narrow areas [25]. In the case of low income countries, major shortcomings of all these models have been pointed out by Young [10]. These include the chaotic nature of policy making that may not allow enough consideration for evidence infusion, exaggerated role of donors, the problem of research supply and the role of

civil society [10]. Other studies have cited challenges with donor dependence in low-income countries where undertaking research has been set as a precondition to accessing external loans [21]. Cultural differences and contexts are important, and for KT models to explain uptake of evidence, the KT theory must fit into a given context [4,25]. Few studies exist on KT in low-income countries, and inconsistencies in factors identified as influencing use of evidence have been noted in the few studies that are available [26].

Shampa highlighted the need to look at KT as a process that should be addressed right from the pre research/evidence generation stage to actual utilization of results into policy and implementation [24]. Favourable factors should be identified at the different stages and likewise, anticipated barriers should also be identified and addressed. This paper aims at contributing to this. Its main objective is to elaborate a Middle Range Theory (MRT) of KT in Uganda that can also serve as a reference for other low- and middle countries. MRTs should be understood here as defined by Merton in 1968 as "theories that lie between the minor but necessary working hypotheses (...) and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behavior, social organization and social change"[27]. Our preliminary MRT is built on the basis of a literature review and we further refined it through Key Informant (KI) interviews with policymakers and researchers in the health sector in Uganda. We present a range of facilitators at the different stages of the policy development and implementation process as perceived by policymakers.

Methods

This two-step study employed qualitative approaches to examine the principal barriers and facilitating factors to KT. Step 1 involved a literature review and the identification of common themes, which were incorporated in a preliminary MRT. The latter was further refined through KI interviews with policymakers and researchers in Uganda in step 2.

Literature review

We located relevant articles by searching PubMed, Google Scholar and Entrez for empirical papers examining translation of research into policy. We used search terms including (OR) "research", "evidence" combined with (OR) "implementation", "uptake" combined with (AND) "health policy", "low income countries". Publication bibliographies of experts in the domain were searched to identify additional relevant literature.

The inclusion criteria were papers published between 2000-2010, with a focus on low income countries and on public health policy as opposed to clinical decisions and; providing facilitating factors and barriers to KT as shown in Figure 1.

Although this search was not systematic, we searched the major databases and believe the reviewed papers are a representative sample on which a plausible MRT could be based. Dixon-Woods et al state that this is warranted if the focus of the review is development of a theory rather than exhaustive summary of available literature [28].

Articles were reviewed in a two-step process. First, articles and abstracts were reviewed for inclusion criteria. Second, the remaining articles were read by the first author and vetted further by 2 of the co-authors on the basis of inclusion criteria. Articles were then coded by the first author and the reported findings grouped into facilitating factors and barriers to KT at the different stages of undertaking research, policy development and implementation in different contexts. Forty-nine articles met the inclusion criteria and were reviewed. Details of the reviewed papers are shown in Additional file 1:Table S1. The document review took place between February - October 2010. Emerging facilitating factors and barriers to KT were identified and integrated into a MRT on improving KT.

Key informant interviews

The second stage of the study consisted of in-depth interviews with key informants (KI). Seventeen health policymakers and researchers were purposively selected on the basis of their occupation as policymakers (n = 15) or researchers (n = 2) in the area of health system development.

Information regarding the selected KI is shown in Table 1. All KIs were members of the Health Policy Advisory Committee (HPAC), the policy advisory body of the health sector. It comprises of senior government officials from the central and district level, representatives of donor agencies, the private not-for-profit (PNFP) and the private-for profit sector (PFP). The process of policy development begins with technical discussions within technical working groups comprised of government officials, donors, researchers, civil society and private health providers. Technical working groups propose options which are discussed further in HPAC and a final decision regarding which final policy option to adopt is taken.

Officials in the HPAC are the most senior officers in their institutions/agencies. In the case of the PNFP and PFP organizations, they are delegated representatives of umbrella bodies. Districts are represented by officers of local government health services. Two researchers were selected on the basis of their previous work on KT and involvement in making research relevant to policy

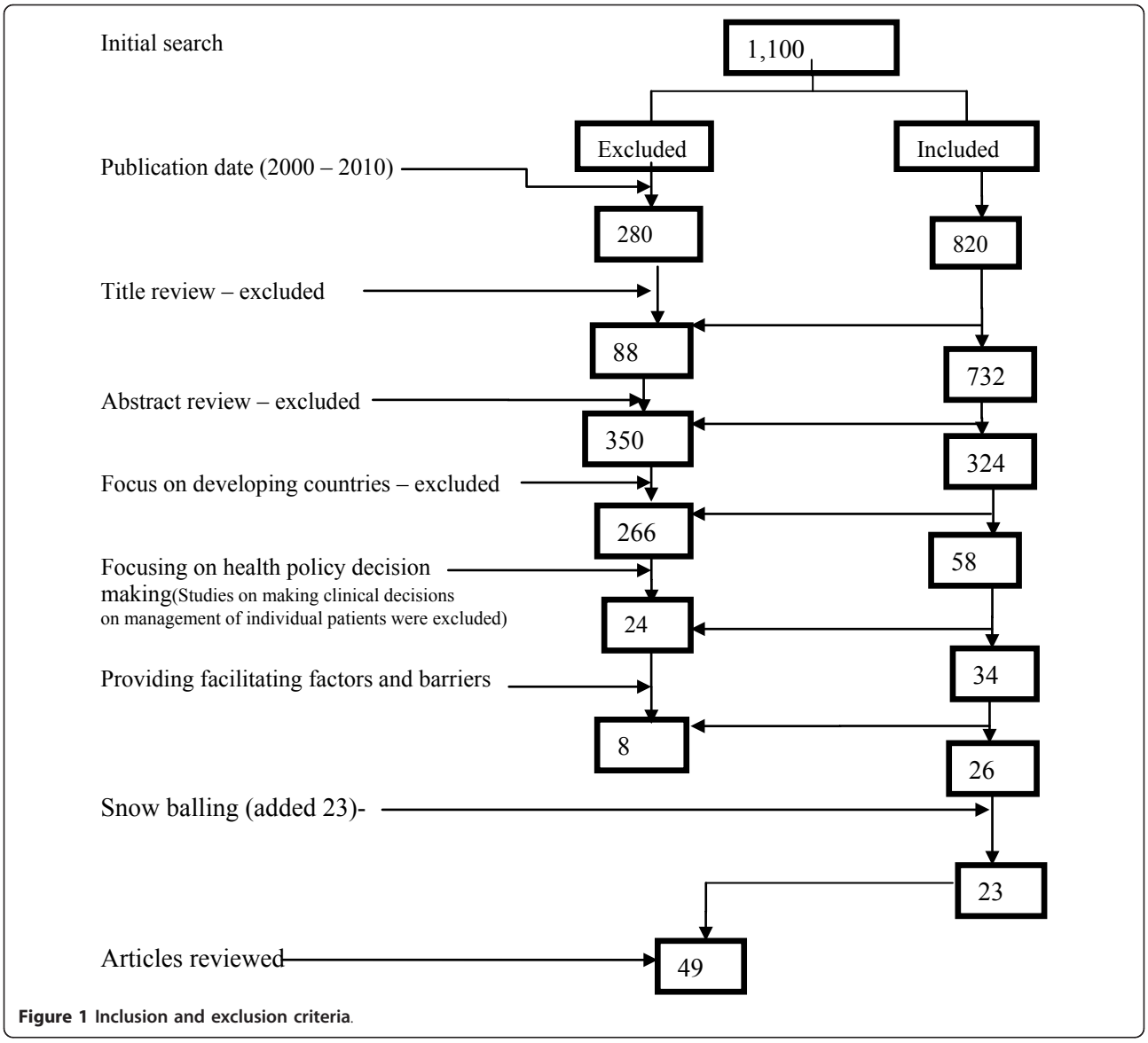

Figure 1 Inclusion and exclusion criteria.

development. Interviews were conducted between November 2010-January 2011.

An interview guide was developed in line with the MRT that was drawn from the literature review. The informants were not exposed to the MRT before the interview. Questions were open ended asking for the informants' perception of barriers and facilitating factors to KT. Further probing was done to elicit responses in line with the MRT. Once the informant had given responses of perceived barriers and facilitating factors, (she) he was then asked to rank the top three in order of importance, and to indicate the reason. The interview guide was pilot tested and revised accordingly. KIs were initially contacted by email or telephone and invited to participate in the study. Informed consent was solicited prior to the interview and all interviews were conducted face-to-face by the first author. All interviews were recorded and after each interview, the interviewer made additional notes to record initial findings and impressions. The interviews were transcribed verbatim. Deductive content and thematic analysis was carried out and responses were analysed on the basis of the elements of the MRT to assess the degree of convergence and identify other emerging issues Additional file 2.

This study was approved by the Institutional Review Board of the Institute of Tropical Medicine, Antwerp (Belgium) - IRB number IRB/AC/ac/197.

Results

In this section, we first present the summary of the findings from the literature review.

Table 1 Key informant respondents

Sector		No. in HPAC	No. selected
	Ministry of Health (5)		
Public	Central level	9	4
	District level	1	1
	Researcher from School of Public Health	-	1
Private	Private not for profit (Civil society) (4)		
	Facility based	2	2
	Non facility based	2	2
	Researcher	-	1
	Private for profit	1	1
Donors	Bilateral	4	2
	Multilateral	3	3
Total			**17**

Findings of the literature review

Facilitating factors for KT were identified from reviewed papers and categorized in 8 themes:

1. Institutional strengthening for KT
2. The pre-research phase: research priority setting
3. Research characteristics
4. Dissemination
5. Contextual issues: politics and economic considerations
6. External influences: global evidence and donor influences
7. Partnerships
8. Health System Strengthening (HSS) considerations

A summary of the commonly mentioned facilitating factors under each group is shown in Table 2. Facilitating factors under the themes 'strengthening institutional capacity for KT", research characteristics', 'dissemination', 'political context' and 'partnerships' were mentioned in more than 50% of the retained papers. We present these in more detail as they guided the development of the MRT.

Institutional strengthening for KT in the health sector

Thirty-nine out of 49 papers reviewed showed that efforts must be made to build relevant capacity among policymakers in research processes, synthesis and application of evidence. Having policymakers with a background in research has been noted to be beneficial to KT. This contributes to ownership of research results and better uptake in policy development and implementation. Institutionalized platforms for engagement between researchers and policymakers right from setting the research agenda to policy development and implementation need to be in place for effective and continuous dialogue. This enables policymakers to appreciate the research processes and ensure their involvement in evidence generation. On the other hand, it enables researchers to appreciate the policy process, implementation challenges and to develop relevant research questions. A supportive policy framework to enable implementation of research findings is also noted to be important.

Research characteristics

Forty out of 49 papers reviewed showed that evidence is taken up better, if it is (perceived to be) rigorous, contextualized and provided in a timely manner by credible researchers. Evidence must be comprehensive as much as possible, looking at several dimensions (for example cost implications and implementation feasibility) so as to enable decision making. If recommendations are provided, they must be feasible from an economic and implementation point of view and provide options for short-, medium- and long-term strategies. Local researchers are reported to have the advantage of engaging with policymakers for longer periods and to contextualize findings better as opposed to international researchers.

Dissemination

Thirty-five out of 49 papers reviewed highlight the importance of effective dissemination of evidence. Messages must be simplified, tailored to the different audiences and disseminated using multiple approaches (push efforts). Personal communication and face-to-face interactions between researches and policymakers are mentioned in several papers as effective strategies. Dissemination should be planned for right at the beginning of the research processes, target audiences mapped, dissemination activities agreed and funding provided. Knowledge brokers with the capacity to package evidence in several ways have been shown to facilitate dissemination efforts. Literature however shows that these must be independent and have the capacity to manage conflict of interests among stakeholders. Improving access to internet as ways of improving dissemination was mentioned in 6 papers. Three papers mentioned the use of demand-driven research networks/rapid response units that can respond to the needs of policymakers for evidence in a timely manner. Availability of a champion, who is passionate about KT and gets issues to the attention of policymakers, was found to be an additional facilitating factor.

Political context

Twenty-six papers stated that the political environment must be favorable and supportive to adopt and implement the generated evidence. Government stability,

Table 2 Summary of results (number of reviewed papers mentioning a specific facilitating factor) and themes for the MRT for KT

		Most commonly mentioned facilitating factors	Themes for the MRT for KT
	Strengthening institutional capacity for KT	- Capacity of policymakers for knowledge management (central depository, research processes, interpretation, synthesis and application)	- Capacity in knowledge management (central depository, research processes, interpretation, evidence based culture, ownership of results, synthesis and application)
1		-Ownership of research results by policymakers	(39)
		-Having policymakers with a research background and researchers skilled in policy making	
		- Availability of an institutionalized mechanism of getting researchers involved in policy making and policymakers involved in research	- Institutionalized mechanisms for researchers and policymakers engagements (26)
		-Supportive policy framework for implementing research results (guidelines, plans, monitoring frameworks)	-Supportive policy framework (7)
2	Pre-research phase	-Prioritization of research addressing policymakers information needs	-Research being part of a prioritized research agenda (21)
3	Research characteristics	- Timely, relevant, high quality and comprehensive evidence with recommendations offering policy options	-Timely provision of high quality and contextualized evidence with recommendations that are economically feasible and offering policy options
		- Contextualized evidence (Considering political, social, cultural, religious norms and	(40)
		- Credible researchers **(28)**	-Credibility of researchers (28)
		-Use of local researchers	-Local researchers (7)
	Dissemination	- Knowledge brokers play a role	-Use of knowledge brokers (9)
		- Publishing simple clear messages	
4		- Extensive dissemination using multiple strategies for different stakeholders	-Use of simplified language disseminated through multiple strategies that are audience tailored (35)
		- A dissemination plan, target audiences, dissemination activities, research products must be developed and funded	-Availability of a dissemination plan that is funded (10)
		Face to face interactions	-Meeting policy makers face to face (11)
		- Use of demand driven research networks that respond to national decision makers questions	- Use of demand driven research networks that respond to national decision makers questions (3)
		Providing access to internet and searchable databases	Improving internet access (6)
		-Presence of a champion passionate about translation of results and able to push issues to the policy table	-A champion who gets evidence to the policy table (6)
5 Context	Political	- Political stability	
		- A political environment that conducive to policy making and open to change	- A politically favorable environment that is open to change
		- Credibility of concerned government officials	(26)
		- Getting political involvement in research	
		- Presence of a policy momentum	
		- Availability of a political window **(7)**	-Availability of a political window (7)
	Economic	- Availability of funding for undertaking research, KT activities and implementation of recommendations	-Availability of funding (20)
6 External influence	Global evidence	-Support from global respected bodies like WHO	- Support from global respected bodies like WHO
		-Global evidence supporting local decision making	(13)
		- Global evidence in line with local evidence	-Global evidence supporting local evidence (10)
	Donor influence	-Donor influence on both the research process and policy development given donor dependence in low income countries	-Donor influence on research and policy making given their important financing role in low income countries (10)

Table 2 Summary of results (number of reviewed papers mentioning a specific facilitating factor) and themes for the MRT for KT *(Continued)*

7	Partnerships	-Mutual and trusted partnerships sustained through systematic platforms for interaction with all stakeholders right from the time of setting the research agenda to implementation of recommendations	-Mutually and respected partnerships involving communities spanning the whole process starting at setting the research agenda (35)
		-Specific involvement of communities	-Community involvement (7)
		-Use of regional networks as a way of creating interaction	-Use of regional networks as a way of creating interaction (8)
	HSS issues	-Monitoring system to enforce implementation of recommendations	
8		-Availability of guidelines to support implementation of research recommendations	
		-Giving appropriate financial incentives to implementers	-Capacity of the HSS to implement recommendations including provision of incentives to implementers
		-HSS capacity to implement recommendations in terms of HRH (numbers and skills), availability of inputs and infrastructure	(18)

openness to change and dialogue provide better chances for KT. Presence of a political window of opportunity and a strong policy momentum are also mentioned as facilitating factors.

Partnerships (exchange efforts)

Thirty-five papers showed that sustained partnerships spanning the whole process, from evidence generation to its application with all relevant stakeholders creates transparency in evidence generation. This subsequently increases the acceptability of evidence among stakeholders, which in turn facilitates KT. Oxman A. et al, however raises the question of how best to engage the different stakeholders in regards to the degree of involvement, forum for communication, method of recruitment and building their capacity for effective involvement [19].

Elements of the MRT emerging from the literature review can be summarized along the five themes as follows:

Institutional strengthening for KT

Adequate capacity for knowledge management and institutionalized mechanisms for researcher-policymaker interaction contribute to higher ownership and consequently, better application of evidence.

Research characteristics

Timely provision of high quality, contextualized evidence with feasible recommendations and policy options leads to higher adoption and implementation, especially if produced by credible, local researchers and if generated through demand-driven research networks that respond to national decision makers' priorities

Dissemination

Effective provision of research findings is facilitated by using knowledge brokers, audience-tailored formats, and dissemination through multiple channels. Policy champions enable evidence to reach the policy table.

Political context

A politically favorable environment open to change and the availability of a political window will make policymakers more receptive for evidence that has the above features.

Partnerships

Partnerships spanning the whole process from setting the research agenda to implementation are important and should include communities and implementing actors. Regional networks may contribute to better exchange of experience.

Figure 2 shows the diagrammatic presentation of the MRT. The figure presents the different elements of the MRT, showing how the elements dealing with research link with the policymaking process.

Further refining of the MRT through interviews

We sought to further refine the elements of the above MRT using data from KI interviews through assessing the degree of convergence or divergence and also sought to identify new emerging themes. As mentioned in the methodology section, we undertook KI interviews with officials involved in policymaking and holding senior positions in their agencies/institutions. KIs were all senior level officials 15 of whom were policymakers and 2 were researchers. Civil society respondents had been in post for at least 6 years except one who had been in post for 3 years. Ministry of health respondents had been in post for at least 6 years except one (3 years). Donor respondents had been in post for at least 6 years except two (six months and 2 years). In the case of researchers, one had been in post for 14 years and the other 2 years. The private for profit respondents had been in post for 2 years.

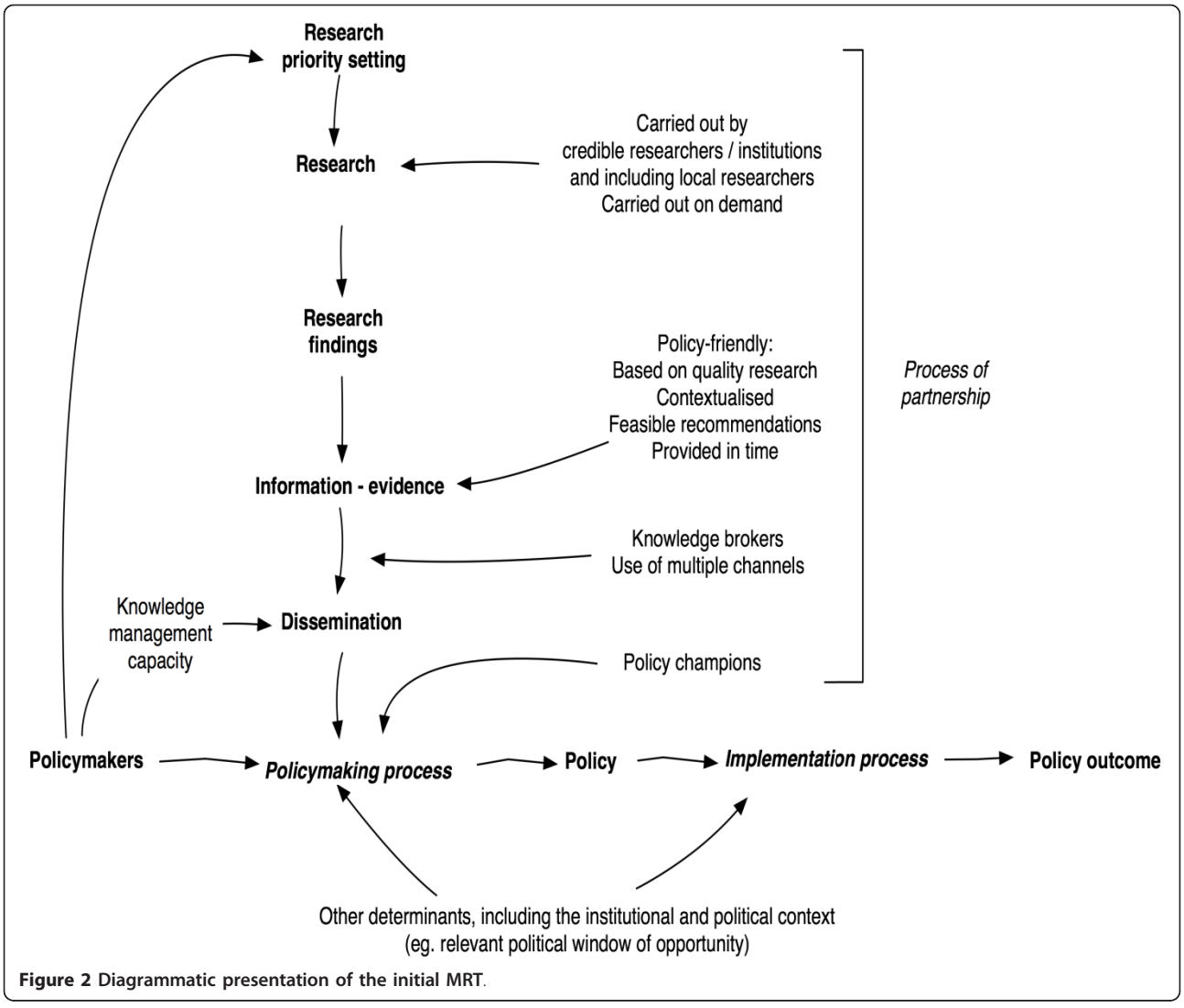

Figure 2 Diagrammatic presentation of the initial MRT.

The interviews were analyzed along the themes of the MRT.

A summary of the interview results shows that the interviewees focused most on institutional strengthening for KT, research, dissemination, political context and partnerships (Table 3).

Institutional strengthening for KT

Most respondents (11/17) highlighted the need to build the capacity of policymakers in research processes, synthesis and application. A civil society respondent mentioned that "*We need leaders who understand the evidence, this is very necessary- enlightened leaders can easily understand evidence and apply it*".

Researchers raised the issue of an improved reading culture as a facilitating factor for effective discussion and appreciation of research results. One researcher noted that *"The reading culture is poor among the stakeholders. You cannot disseminate through drama for these highly educated people. (...) Some officials come to the workshop when they have not read the research paper. You give them some hours to read and resume the workshop. This is also not good because within that short time, they will not understand everything to contribute new ideas"*.

Most respondents (12/17) stated that a systematic dialogue and engagement with all stakeholders through institutionalized platforms was one of the ways to ensure that the set research agenda is followed, and evidence is well disseminated and implemented. This helps researchers to participate in policy dialogue and understand the system, while policy makers on the other hand appreciate the research process better. A MoH respondent remarked that "*We need to institutionalize a framework of linking policy makers, researchers and implementers. There are weaknesses within the MoH to*

Table 3 Summary of results from KI - responses (number of respondents)

	Strengthening institutional capacity for KT	-A strong policy analysis unit within MoH (1)
		- Capacity in knowledge management (central depository, research processes, interpretation, evidence based culture, ownership of results, synthesis and application) (11)
		-Research advisory network bringing together researchers, civil society, knowledge brokers, policy makers (1)
		-Availability of an institutionalized mechanism/platform of getting researchers involved in policy making and policy makers involved in research (12)
		-We need to have an implementation and evaluation framework for KT in place (1)
		-Reduce the extent of bureaucracy in the policy making process (1)
	Pre-research	- Availability of a research agenda to ensure that research addresses gaps (12)
	Research characteristics	-Timely provision of high quality and contextualized evidence with recommendations that are economically feasible and offering policy options (15)
		-Credibility of researchers (6)
		-Use of local researchers (2)
		-Who commissions the research (1) -Separation of roles between researchers and policy makers (1)
	Dissemination	-Designated team in government to handle dissemination - knowledge brokers (1)
		-Simplified, well packaged and summarized messages disseminated using multiple channels tailored to targeted audiences (12)
		-Each research should have a communication strategy developed and funded (2)
		-Use of radio and also politicians can play a role in dissemination especially at community level(6)
		-Key role played by civil society but blocked by middle man, the government (5)
		-Use of electronic media (2)
		-Need a champion who gets to who the real policy makers (1)
Context	Political	-Favorable political environment open to change (7)
		- Availability of a political window especially around elections (5)
		-Politicians involvement in research including targeted dissemination to them (9)
	Economic	-Government commitment to implement recommendations from research (7)
		-Economically affordable recommendations (8)
External influence	Global evidence	- Interaction with WHO which gives authoritative advice (6)
		-Global evidence is guiding countries, if local evidence is in line, it helps (7)
	Donor influence	-Donors are helpful in providing funding to improve uptake of research (12)
	Partnerships	-Involvement of all relevant stakeholders throughout the process to improve trust and build interest (15)
		-Communities are very important (6)
	HSS	-Capacity of the HSS to implement recommendations including provision of incentives to implementers(9)

get in place formation of a research agenda in a consultative manner. The Uganda National Health Research Organization, that should play that role, is very weak. Research undertaken is largely not commissioned. Without a formalized way of using evidence to change policy, KT will continue to be a challenge."

Policymakers, however, stated that these platforms should include more than just policymakers and researchers. They should be broadened to include civil society.

A MoH respondent stated that the MoH should take over overall coordination of evidence generation and dissemination activities and mentioned that a policy analysis unit embedded within the MoH is best placed to coordinate the platform.

A PNFP respondent pointed out the need to reduce the bureaucratic and protracted nature of decision making and policy development and remarked that we need to "*Reduce the extent of bureaucracy within the policy making process, reduce the levels of decision making, in this way one can keep track of decisions being made at the different stages and use of evidence in decision making*".

Research

Virtually all respondents stated that the scientific soundness, relevance, timeliness, comprehensiveness of the evidence and feasibility of provided recommendations were important. One respondent remarked that "*Research must be credible if it is going to drive policy. There is no cause to fear if research has been done by WHO or the School of Public Health, there is no doubt of its credibility*. (MoH respondent)

The credibility of researchers was mentioned by 6 interviewees, who specified attributes like researchers of good standing, being reputable and being independent. One responded raised the issue of corruption affecting the research community and research in general: *Credibility of researchers matters also. You must get researchers who are respected, otherwise nobody will believe in the results. We, however, have a problem these days. Corruption is also affecting the research process. Some researchers undertake fieldwork and when you look at the data, you really wonder whether they actually went to the field. We are now tending to rely more on Uganda Bureau of Statistics and surveys supported by Macro international, whose quality is undoubtable. (*MoH respondent).

Two respondents mentioned that use of local researchers as a favorable factor, because they can easily contextualize research findings and engage more with policymakers. "*It is better to use local people in undertaking the research. In that case; results are more likely to be well received and used because they already take into account local context issues*" (Donor respondent).

The issue of who commissions the research was raised by a PNFP respondent, who stated that "*If research is not commissioned by MoH or WHO, it may not be taken seriously*".

One MoH respondent mentioned the need to separate roles between researchers and policymakers. He stated that "*We should separate roles, research should be undertaken by researchers who are independent, can assess issues critically and objectively. Policymakers should then receive results, discuss them, understand them and use them in policy development*".

Dissemination

The majority of respondents (12/17) raised the issue of better dissemination of evidence through well packaged and adapted messages, using multiple dissemination channels that are tailored to different audiences. One PNFP respondent stated that *"All stakeholders must be part of the dissemination. Simplified messages in several forms, policy briefs, report summaries, can be extensively circulated. We need to take advantage of existing fora; people should present their research results in these fora."*

One respondent mentioned the importance of face-to-face dissemination, especially to senior people in their offices, while 6 mentioned use of radio and politicians as the best way to reach the community. One donor respondent pointed out the need for multiple channels: *"We need to use various opportunities, formal and informal to disseminate research results. Radios can be used but must be repetitive short massages. Most important is to use various channels. One misses this one, but catches another channel."*

Four PNFP and 1 donor respondents mentioned the significant role that civil society can play in disseminating evidence, although they again noted the challenges that need to be addressed for this to be effective. One PNFP respondent stated that "*A well informed and knowledgeable civil society can play a role in dissemination, because we have roots in the community, advocacy, and community mobilization. We can put pressure on policymakers to implement evidence, but we are largely left out. The challenge is that we have to go through that middleman, the government. The government to some extent blocks civil society by putting restrictions on "who" should undertake dissemination*".

Two respondents mentioned use of electronic media although they acknowledged its limited accessibility and thus the need to assess its usefulness. One researcher remarked: "*Media and IT are not accessible by all. A lot of research is disseminated through electronic media, but some areas have no such infrastructures, same do not have e-mail, we need to evaluate its usefulness"*

One PNFP respondent mentioned the creation of a team within government structures to be charged with the responsibility of disseminating evidence and remarked that "*There must be a team in government unit who handle dissemination other than leaving to individual programmes and researchers. They should move quickly and reach out to the researchers and make sure that available evidence informs policy quickly*".

Four respondents stated that dissemination is a process that should be planned for at the very beginning of the research process, and that a communication strategy needs to be developed and funded.

One donor pointed out the importance of having a champion within the MoH who links up with higher-level officials who actually make policy decisions. Such champions are able to go and see the different officers and engage in face-to-face dissemination. The respondent stated that "*It helps a lot to have a champion within MoH who links up with higher officials, who actually make policy decisions. He can spend more time with senior officials and ensure that results are shared in important fora*".

Political context

Seven respondents mentioned the need for a favorable political environment that is open to dialogue and a political window that presents an opportunity for change. A PNFP respondent stated that "*The best time to disseminate results is when there is a political window like at the time of elections, then politicians pick it to their advantage. But if the research result is affecting the incumbent government, it may not be a good time for you to disseminate such a result*".

Specific mention by 9 respondents was made of getting politicians' involvement in research and among suggested strategies is targeted dissemination as stated by a MoH respondent that "*Politicians are very important, they should be a targeted group because they are in the community, and there are top policymakers so they should be given high consideration*".

Partnerships

Almost all respondents cited the importance of involving all relevant stakeholders throughout the process, right from setting a research agenda to policy development and implementation. Six respondents mentioned the need to involve communities who are often neglected. One PNFP respondent stated that *"The community is not involved at all. It's only policymakers and researchers, the community is neglected, yet they are the main beneficiaries who know their problems too well"*.

Ranking of facilitating factors by key informants

We asked respondents to rank the facilitating factors in order of importance (Table 4). The top 3 facilitating factors were 'strengthening institutional capacity for KT' (12 respondents), 'research characteristics' (9 respondents) and 'partnerships' (9 respondents). No respondent ranked political context among the top three facilitating factors. MoH and PNFP respondents emphasized the importance of institutional strengthening for KT. Donors emphasized research characteristics, while researchers emphasized partnerships.

Refining the MRT

Taking into account what is stated as most important by policymakers in Uganda, we refined the initial MRT that was based on the literature review under three themes as follows.

Institutional strengthening for KT

- Institutionalized platforms for engagement between researchers and policymakers including civil society
- Mainstreamed mechanisms (within MoH) to coordinate evidence generation synthesis and dissemination
- Build capacity of policymakers in knowledge management (central depository, research processes, interpretation, evidence based culture, ownership of results, synthesis and application
- Reduced bureaucracy in policy making

Expected outcome: higher ownership and better application of evidence

Research characteristics

- Timely provision of high quality and contextualized evidence with recommendations that are economically feasible and offering policy options
- Credibility of researchers
- Use of local researchers

Table 4 Number of respondents ranking facilitating factors among the top 3

	No. of respondents ranking as:	Institutional strengthening	Research	Partnerships	Dissemination	Political context
MoH	1	2	0	1	1	0
	2	2	0	2	0	0
	3	0	1	1	0	0
Donors	1	1	1	0	0	0
	2	1	1	0	3	0
	3	0	3	0	0	0
PNFP	1	2	0	0	0	0
	2	1	1	1	1	0
	3	1	0	1	2	0
PFP	1	1	0	0	0	0
	2	0	0	1	0	0
	3	0	0	0	0	0
Researchers	1	0	0	2	0	0
	2	0	1	0	0	0
	3	1	1	0		
No. ranking a facilitating factor among the top 3		12	9	9	7	0

- Separation of roles between researchers and policymakers

Expected outcome: higher adoption and implementation

Partnerships

- Involvement of all relevant stakeholders throughout the process to improve trust and build interest

- Community involvement in evidence generation and KT

Expected outcome: higher adoption and implementation

Figure 3 presents the modified MRT with the elements confirmed by the interviews now underlined and new elements in blue italic type. This shows that policymakers, researchers and other actors involved in policymaking in the health sector in Uganda believe that particular attributes of the research and the dissemination process influence the uptake of research and knowledge into decisions on health policies, but that this requires sound institutional capacities. They believe that several factors can facilitate such uptake: the presence of political windows of opportunity and the involvement of knowledge brokers and policy champions.

Discussion

Strengthening institutional capacity for KT, research characteristics and partnerships were ranked among the top three facilitating factors and these are discussed further. The analysis of the key informant interviews indicated that there was a convergence between the findings of the literature review, available frameworks and the perceptions of the key informants in many areas, but there were also divergences. Some other

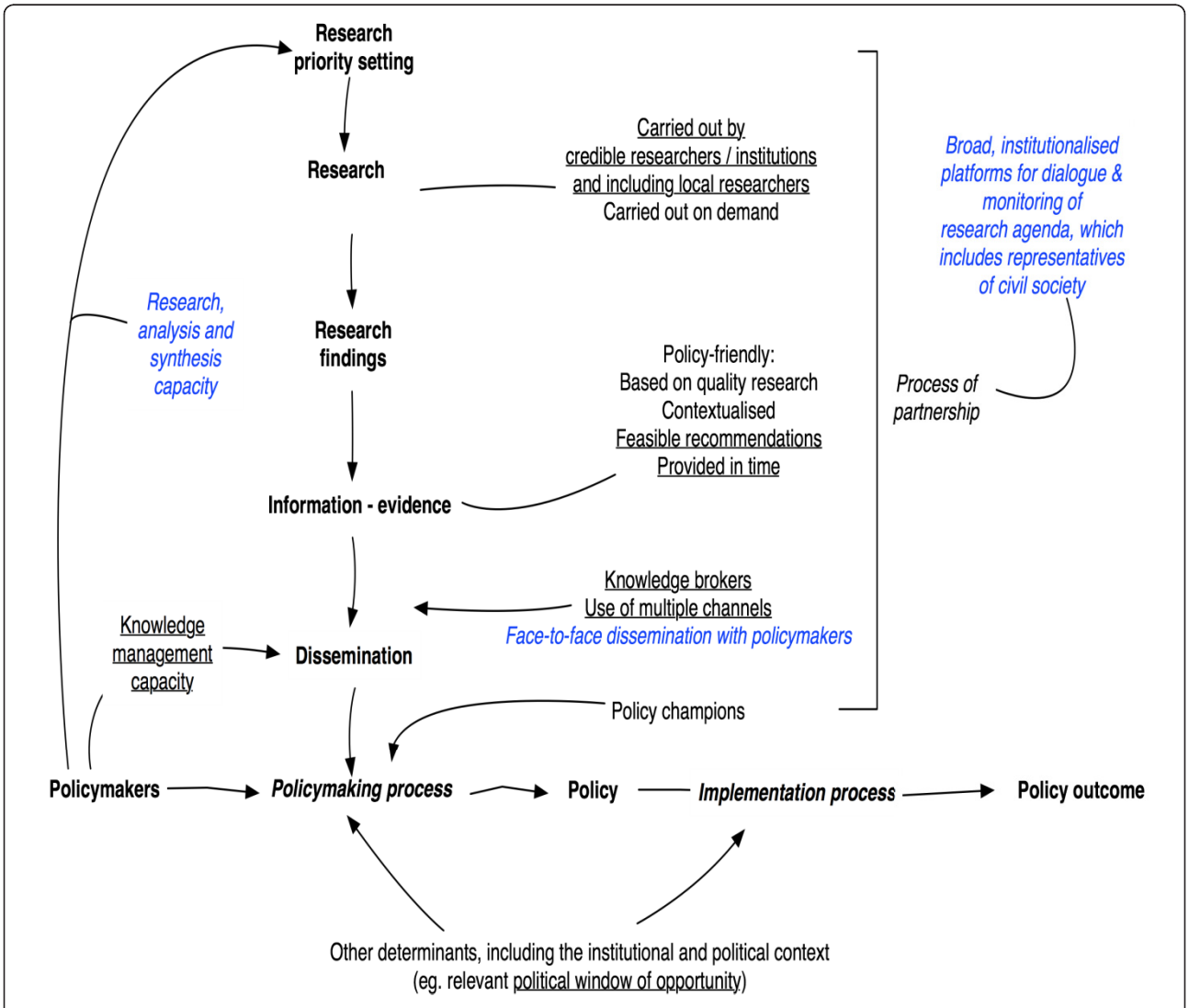

Figure 3 Diagrammatic presentation of the refined MRT.

issues emerged in regard to what policymakers felt were favorable factors to KT.

Concerning institutional strengthening, this study shows that policymakers favor broadening the institutional platforms for KT in the health sector beyond researchers and policymakers to include civil society. This is contrary to several of available KT frameworks where emphasis has been placed on having platforms between policy makers and researchers [6,14,17,18]. This may be because of the increasing role currently played by civil society in research, priority setting and KT in low income countries and, in that case their inclusion becomes important [29]. Sanders et al, for instance, stated the important role CSOs play in supporting innovations and making research relevant to communities [30]. Evidence shows that the role of civil society organizations (CSOs), the media and pressure groups in KT largely remains unexplored [4]. This study has also showed there are tensions between the government and civil society when it comes to advocating for uptake of evidence and these need to be addressed if civil society is to play its role in KT effectively. Lomas, in his framework of connecting research and policy, raised the issue of having a voice, conduct within an institution and organizational culture as an important factor for uptake of evidence [18]. Similar findings have been reported in other low income countries where successful involvement of civil societies in KT and policy processes was hampered by suspicions between the government and civil society [10]. The role of civil society in evidence dissemination needs further exploration through research as highlighted in previous studies [29,30].

Policymakers expressed preference for stronger structures within MoH to undertake overall coordination of research processes and KT. This is in line with ongoing efforts of strengthening government stewardship in research processes in low income countries [31]. Such structures are more likely to improve access to relevant audiences, have insights in topical policy issues and broader health sector concerns enabling them to engage more effectively in KT. Similarly, Varkevisser et al in their study on research in action for Southern African countries emphasized strengthening national structures to coordinate health systems research [32]. As a point of caution however, one needs to safeguard against government attempting to assume overall control over the KT process as has been highlighted by a civil society respondent in this study. Lavis et al also noted that government support units that were more focused on public health, involved target users more and had more informal relationships with policymakers [33]. Contrary to this however, Boween et al, in their framework on evidence-informed policy and practice; proposed use of external structures like professional bodies and networks [11]. Lavis et al also documented successful experiences with use of structures outside government although these were in the area of clinical practice guidelines and health technology assessment [33,34]. This may imply that, where polices are of a public health nature as opposed to health care/clinical, mainstreamed structures may do better that structures outside governments.

Respondents stated that required capacity must be built among policy makers in research processes, interpretation, synthesis and application of evidence. They must have an evidence based culture if they are to own and use evidence. Several KT frameworks have emphasized the importance of capacity among policy makers in knowledge management as important for uptake of evidence [11,12,15,17,20,21]. We also found that policymakers believe that besides a body dealing with research coordination, there is also a need for a designated team within MoH charged with the responsibility of synthesizing and disseminating evidence. They argued that it may enhance ownership of generated evidence and commitment to implementation of recommendations by the government. The use of demand driven research networks responding to policymakers' evidence needs, as identified in the literature, was not much mentioned as a facilitating factor by policymakers. Reasons for this could be twofold: either the interviewees believe that they indeed play no role or it could be that policymakers' lack of experience of using these networks hampers their appreciation of its usefulness. We note that although the Regional East African Community Health (REACH)-Policy initiative was put in place by ministries of health of the three East African Countries (including Uganda) in 2005 to support use of evidence in policy development, no respondent made mention of this initiative. A possible reason could be the high turnover of government officials in that, the team that committed to the initiative may no longer be in office. Indeed the Ministry of health has had important changes in ministers and other personnel in the previous years. Stability in researchers' personal and organizational contacts has been noted to be critical and the high turnover of national health authorities cited as one the challenges to uptake of evidence in policy development [32,35]. Another reason could be poor communication within government structures in that a commitment that was made at a ministerial level was inadequately communicated to other policy makers. It could also be that our respondents have not made use of this initiative.

Our study has shown that some policy makers believe that reduced bureaucracy in the policy development process, as pointed out by civil society respondents, is favorable for KT. Indeed evidence has shown that government bureaucracy impacts negatively on uptake of

evidence in policy development. Some of the available frameworks have raised the issue of organizational bureaucracy as an important factor in determining uptake of evidence, the extent to which an organization is open to debate on research findings [11,12,20,21]. Similarly Sevene et al found that communication failure within government bureaucratic processes obstructed delivery of cost effective interventions [36]. Mubyazi and Gonzalez-Block noted the challenges of keeping track of use of evidence in protracted policy development processes [37]. A lengthened and bureaucratic policy development process poses a risk of delays and calling for fresh evidence as issues change.

Under research characteristics, respondents mentioned the need for provision of relevant, high quality, contextualized evidence with feasible recommendations which is also highlighted in several KT frameworks [11-13,16,20]. This study has brought to the forefront that policymakers prefer separation of the roles of research undertaking and policy development. Contrary to this, Sauerborn et al in their stakeholder orientation model for policy making to enhance use of research, raised the need for use of researchers inside MoH as one of the options for creating an appropriate institutional framework [6]. Our findings are however, in line with other studies. For example, Young documented successful experiences in a few African countries, where commissioned research undertaken by independent think tanks within the countries informed policy development [10]. However, such an approach may not work in cases of action research where interventions are piloted in order to learn lessons to guide large-scale implementation or in the case of operational research addressing management problems faced by health managers at the work place. Indeed Varkevisser et al found that researchers within Ministries of health were able to undertake research on management problems they faced in their working environment and successfully implemented recommendations [32]. This implies that, a strict separation of roles as highlighted by our respondents must be assessed on a case by case basis. Policy makers expressed preference for the use of local researchers. This may be beneficial in several ways; they can engage with policy makers for a longer period of time and can contextualize evidence better compared to international researcher. The challenge noted is however the weak capacity among local researchers in low income countries to produce rigorous quality evidence [38,39]. In this case, it may be wise to explore partnerships between local and international researcher teams.

Under the theme of partnerships, several frameworks have similarly highlighted the importance of sustained partnerships in evidence generation, dissemination and implementation [11-13,18,20,21]. In our study, policymakers put a lot of emphasis on community involvement in addition. The role of communities in policy making and enforcing accountability has increased in the recent past more especially in low income countries [30]. Some KT framework have also raised the importance of community collaboration and engagement [12,21] However, Deslie et al noted that communities must be empowered in terms of skills enhancement and information sharing in order to play an effective role [29]. It should be noted that this remains often a discourse, as in Uganda, the communities are little involved in research priority setting.

The use of regional networks and professional bodies, which are stated in the literature as important, were not seen as such by policymakers in this study. Similar experiences regarding weaknesses of professional bodies to ensure uptake of evidence have been reported in other African countries. In Mozambique for example, although obstetricians participated in development of guidelines on management of eclampsia and incorporated available evidence, they later reported that they had no authority to ensure implementation of guidelines [36]. There may be different reasons for this. In Uganda, professional bodies are relatively weakly developed and have not engaged in policy development in a systematic manner. Regional networks only engage with a few policymakers and only occasionally. On the other hand, it may have to do with "power centers" in that; professional bodies and regional networks have no authority in the policy process.

In regards to the political context, policymakers did not raise the issue of political stability and credibility of government officials as important for KT. This however contradicts what has been documented in other African countries where the dialogue between researchers and policymakers was hampered by political circumstances and, un-favorable research results suppressed by political powers [32]. Possible reasons could be that our respondents are used to the high turn-over of government officials, which commonly happens in low income countries and that they may have ceased to see it as a key issue. Alternatively, policymakers may not have a full appreciation of what elements of the political context offer better opportunities for KT, and how they could deal with this. Young highlighted the need to better understand political processes in low income countries in order to improve KT [10].

Not all facilitating factors carry an equal weight in terms of influence and furthermore, their relative weight is likely to vary depending on the type of evidence and policy in question. This study showed that our interviewees ranked elements under institutional strengthening, research characteristics and partnerships as most important. Our findings are reflected by Ssengooba et al, who

showed that institutional mechanisms and use of shared platforms involving all relevant stakeholders, provision of comprehensive evidence and building of coalitions of stakeholders were key for uptake of evidence in PMTCT programmes [40].

The specificity of our MRT is that it is embedded in the local political, systems and policy making context and prioritizes areas deemed important by policymakers and researchers in the country. It raises preference for use of mainstreamed structures within MoH which were thought important for sustained dialogue, ownership and institutional memory and; separation of roles between researchers and policymakers. These are less emphasized in previous frameworks. Although our MRT is developed in the context of Uganda, we believe it can serve as reference for studies in other low-income countries with contexts similar to that of Uganda. The refined facilitating factors presented in this paper were collected from respondents without a specific reference to a given research project and policy outcome. The extent to which they are valid will need to be tested on specific case studies. This withstanding, our refined MRT has proposed activities under 3 elements namely institutional strengthening for KT, research characteristics and partnerships that are within the capacity of ministries of health to undertake.

Strengths and weaknesses of the study

The main strength of this study is the two step process that we have used to build the MRT. The refining of the preliminary MRT based on a literature review, through KI interviews with policymakers, takes into consideration the contextual issues that have been raised as a concern for KT. Among the limitation though is that factors presented in this paper were collected from respondents without a specific reference to a given research project and policy outcome. People's views may differ given the level of interest they may have in a given policy. In this study, we did not use the Delphi method to distil KI judgments and reach theoretical saturation. While that may be beneficial, we note that this approach was not appropriate given the fact that we did not refer to a specific piece of evidence and policy with relevant stakeholders mapped. The Ugandan political context may have influenced views of respondents given the fact that the country is in a multiparty system and the current government has been in power for over 23 years. The views of respondents in opposition may differ from those in the ruling party. We however did not look at the political affiliation of respondents. Although this search was not systematic, we searched the major databases and believe the reviewed papers are a representative sample on which a plausible MRT could be based.

Conclusions

This study developed an initial MRT on knowledge transfer in policymaking in the health sector on the basis of a literature review and further refined this initial theory through in-depth interviews with Ugandan policymakers and researchers. We found that policymakers and researchers perceived a strong institutional capacity for KT, the existence of research partnerships and the characteristics of the actual research as the most important facilitating factors for improving KT. These empirical findings allowed us to refine and enrich the initial MRT accordingly. Our theory is not intended to be prescriptive, but to provide a systematic account of facilitating factors that increase chances of KT in Uganda, which can serve as a starting point for similar studies in other low-income countries.

Additional material

Additional file 1: Table S1. details of publications reviewed.
Additional file 2: Interview guide.

Abbreviations

HSS: Health systems; IT: Information Technology; KI: Key informants; KT: Knowledge Translation; MoH: Ministry of Health; MRT: Middle Range Theory; PNFP: Private not for profit; WHO: World Health Organisation.

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Authors' contributions

JNO contributed to the conception and design of the study, data collection, analysis, interpretation and led the drafting of the manuscript. DKM participated in data analysis, interpretation and drafting of the manuscript. BM contributed to interpretation of data and drafting of the manuscript. FS participated in conception and design of the study, data analysis, interpretation and drafting of the manuscript. JM participated in the conception and design of the study, data analysis and interpretation and drafting of the manuscript. BC contributed to the conception and design of the study, data analysis, interpretation and drafting of the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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Perspectives on the role of stakeholders in knowledge translation in health policy development in Uganda

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Abstract

Background: Stakeholder roles in the application of evidence are influenced by context, the nature of the evidence, the policy development process, and stakeholder interactions. Past research has highlighted the role of stakeholders in knowledge translation (KT) without paying adequate attention to the peculiarities of low-income countries. Here we identify the roles, relations, and interactions among the key stakeholders involved in KT in Uganda and the challenges that they face.

Methods: This study employed qualitative approaches to examine the roles of and links among various stakeholders in KT. In-depth interviews were conducted with 21 key informants and focused on the key actors in KT, their perceived roles, and challenges.

Results: Major stakeholders included civil society organizations with perceived roles of advocacy, community mobilization, and implementation. These stakeholders may ignore unconvincing evidence. The community's role was perceived as advocacy and participation in setting research priorities. The key role of the media was perceived as knowledge dissemination, but respondents noted that the media may misrepresent evidence if it is received in a poorly packaged form. The perceived roles of policy makers were evidence uptake, establishing platforms for KT and stewardship; negative roles included ignoring or even misrepresenting evidence that is not in their favor. The roles of parliamentarians were perceived as advocacy and community mobilization, but they were noted to pursue objectives that may not be supported by the evidence. The researchers' main role was defined as evidence generation, but focusing disproportionately on academic interests was cited as a concern. The donors' main role was defined as funding research and KT, but respondents were concerned about the local relevance of donor-supported research. Respondents reported that links among stakeholders were weak due to the absence of institutionalized, inclusive platforms. Challenges facing the stakeholders in the process of KT were identified.

Conclusions: Our investigation revealed the need to consider the roles that various stakeholders are best placed to play. Links and necessary platforms must be put in place to achieve synergy in KT. Relevant capacities need to be built to overcome the challenges faced by the various stakeholders.

Keywords: Research, Uptake, Policy, Practice, Roles, Stakeholders, Uganda, Low-income countries

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Background

Although efforts have been made to improve uptake of evidence in the development of public health policy, much remains to be done, especially in low-income countries (LICs) [1-3]. Several terms have been used for the notion of uptake of evidence in health policy development, including knowledge translation (KT), research utilization, evidence-based decision making, and getting research into policy and practice. In this article, we use KT as an all-encompassing term defined as "*a dynamic and iterative process that includes synthesis, dissemination, exchange, and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system*" [4].

There is an extensive body of literature on the factors that facilitate or hinder the uptake of evidence and; several models for KT have been proposed [5-9]. Sauerborn *et al.* highlighted the role of stakeholders in KT, stating that evidence can only be relevant if it is known and used by stakeholders [10]. The current study builds upon an earlier study on KT in Uganda in which we developed a middle range theory (MRT) of how the uptake of evidence in health policy development can be improved [11]. MRTs should be understood here as defined by Merton in 1968 as "*theories that lie between the minor but necessary working hypotheses (…) and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behavior, social organization, and social change*" [12]. The themes in our MRT that were previously identified by policy actors as most important were: (1) institutional strengthening for KT to enhance ownership and better application of evidence; (2) timely provision of high-quality, relevant evidence produced by credible researchers; and (3) partnerships involving all relevant stakeholders, including communities, throughout the process of knowledge generation up to its application [11]. In this article, we focus on the partnerships, roles, relations, and interactions of key stakeholders involved in KT. We define partnership as a complementary relationship that enhances attainment of a given objective and in which the roles of the various stakeholders are well identified [6].

Potential stakeholders in KT encompass both the public and private sectors and have been identified as government policy makers, politicians, service providers, health managers, professional bodies and networks, knowledge brokers, donors, communities, civil society organizations (CSOs)/non-governmental organizations, and the media. The literature highlights a multiplicity of potential roles that can be played by the various stakeholders in KT. For example, CSOs have the capacity to mobilize communities to demand policy change, to contribute to all stages of research, to mobilize resources, and to disseminate and utilize evidence in implementing their own programs [13-15]. CSOs are here defined as organized groups concerned with public interests, including non-governmental organizations and less formally organized groups based in local communities [14]. However, the challenges faced by CSOs include inadequate capacity to navigate the political terrain and to influence policy, the service-delivery focus of their operations, financial constraints, limited capacity to undertake research beyond evaluation of their programs and pilot programs, weak links with the research community and dependence on donors [7,16,17]. Communities have also been identified as stakeholders because their involvement facilitates the generation of research results that are more responsive to local needs [6,18]. However, communities are challenged by a lack of relevant institutional structures, the weak capacity of communities, and the costs associated with enabling their participation [19]. Although Armstrong *et al.* maintain that the roles of CSOs, the media, and pressure groups in KT remain poorly understood and unexplored [20], the media have been shown to enjoy major influencing power; their roles in KT have been stated to be dissemination of information and social mobilization [10,21,22].

Policy makers influence the degree to which research informs policy development, shape the research prioritization process, and impact the actual generation of knowledge [7,21]. In addition, policy makers play a key role in establishing the required platforms for engagement in KT and in building partnerships between researchers and other stakeholders [23]. The roles of politicians have been identified as mobilization of communities, dissemination of evidence, and advocacy. However, politicians may face several challenges, including the pressure to respond to their constituencies and political ideological agendas that may influence how they deal with the available evidence [3,10].

Although researchers intervene as major stakeholders in the process of KT [10,21,24], they have been criticized for failing to address policy-relevant questions, for lacking knowledge of the policy process, for poor packaging of results, and for possessing limited dissemination skills [18,21,25,26].

The donors' main role is funding research, KT activities, and implementation of research findings [3,21]. However, Young pointed out that the role of donors in KT can be both supportive and disruptive [27]. Failure to address local research priorities and taking control of the research and policy agendas are among the criticisms leveled against donors [28,29].

Knowledge brokers are defined as people who link the various stakeholders through their capacity to disseminate research in user-friendly packages. However, researchers have raised concerns regarding the need to evaluate their effectiveness [7,30,31]. Formal networks can bring together people with a common interest into tightly organized

platforms; informal networks of stakeholders are also common. If information flows freely within these networks, it is more easily taken up in policy development [28,32,33], but some researchers have pointed out the complexity of the interactions in such networks [5,20]. Table 1 summarizes the roles played by various stakeholders according to the literature.

Tomlinson *et al.* stated that the exact composition and configuration of the stakeholder groups is country-specific [34], and stakeholder roles in KT are influenced by the context in which the evidence, the policy development process, and the stakeholders interact. Past research has highlighted the role of stakeholders and the importance of sustained partnerships, but did not pay adequate attention to the peculiarities of LICs [10]. This investigation aims to fill this gap by developing a better understanding of the perceived roles of the key stakeholders in KT in Uganda.

We hypothesized that stakeholder interactions and relations influence the uptake of evidence in public health policy development. Effective partnerships often do not emerge spontaneously; links need to be established, a common vision built, capacities strengthened, and challenges/barriers addressed. By using a qualitative approach and involving key informants, we addressed the question of partnerships in KT and explored the perceived roles of the various stakeholders in KT in Uganda. We also evaluated whether and how these stakeholders engage in partnerships.

Table 1 A summary of the roles played by various stakeholders in KT

Stakeholder	Roles
CSOs	Representing and advocating for the communities they serve, mobilizing resources for undertaking research, undertaking research, disseminating and facilitating the implementation of decisions based on evidence
Communities	Involvement in setting the research agenda, demanding the application of evidence
Media	Dissemination of information and social mobilization
Policy makers	Identifying knowledge gaps, commissioning and guiding research processes, applying evidence in decision-making, establishing institutional platforms for KT
Politicians	Advocacy, setting research priorities, disseminating evidence, mobilizing communities
Researchers	Generating evidence
Donors	Providing funding for research, KT activities, and implementation of research findings
Knowledge brokers	Disseminating evidence
Formal and informal networks and professional bodies	Generating and disseminating evidence

Methods

This qualitative study utilized document review and in-depth interviews conducted between November 2010 and January 2011 to examine the roles and links among various stakeholders in KT, as related to public health policy[a]. A sampling frame of participants was developed by the research team, in part based on the initial findings of our document review, which identified various types of stakeholders. Study participants were then purposively selected who were deemed to possess relevant characteristics, experience, and/or knowledge about the research question [36]. Candidate respondents were chosen on the basis of their institutional affiliations, their seniority in their current roles, and/or their responsibilities as health policymakers. Overall, 15 members of the Health Policy Advisory Committee (HPAC) were interviewed. HPAC is the policy advisory organ of the health sector; its membership and number of representatives from each stakeholder group have been agreed on by all stakeholders in the health sector. Selected HPAC members included government officials at the central level (n = 4), service providers at the district level (n = 1), and representatives of CSOs including coordinators (n = 2) and service providers (n = 2). Additionally, representatives from private for-profit (n = 1) organizations, multilateral donors (n = 3), bilateral donors (n = 2), researchers (n = 2), journalists/media (n = 2), and parliamentarians (n = 2) were interviewed. Professional bodies, policy networks, and knowledge brokers were not selected because an earlier study on KT in Uganda indicated that these potential stakeholders did not have a significant role in KT in Uganda [11].

Officials in the HPAC are the most senior officers in their institutions/agencies. In the case of private not-for-profit and private for-profit organizations, HPAC members are delegated representatives of faith-based medical bureaus and private health providers, respectively. Districts and service providers are represented by officers from local government health services. Researchers were selected on the basis of their previous work on KT and their focus on health system development. Journalists were selected based on their focus on reporting on health issues; they were the most senior reporters on health issues. The politicians were members of the social service committee, which deals with health issues. Detailed information regarding the selected key informant stakeholders appears in Table 2.

JNO developed the interview guide, which consisted of open-ended questions intended to examine perceptions about the roles of various stakeholders in KT, the challenges faced by these stakeholders, and the availability of platforms for stakeholder engagement. The research team reviewed and refined the guide prior to pretesting it

Table 2 Key informant respondents

	Stakeholder group	HPAC (n)	Selected (n)	Duration in post
Policy makers (n = 15)	**Central level MoH**	9	4	three for more than 7 years and one for 3 years
	Service providers and health managers at the service-provision level			
	District level	1	1	for over 7 years
	Facility-based CSOs	2	2	at least 6 years
	Non-facility-based CSOs	2	2	6 years and 3 years
	Private for-profit providers	1	1	2 years
	Donors			
	Bilateral	4	2	Four for 6 years, one for 6 months, and one for 2 years
	Multilateral	3	3	For at least 7 years
	Researchers			
	Public (from the School of Public Health)	0	1	over 14 years
	Private (from a private research group)	0	1	2 years
	Journalists (specialized health reporters)	0	2	at least 10 years
	Parliamentarians/politicians	0	2	2 years, but previously worked with the health sector for over 15 years
	Total		**21**	

Researchers, journalists and parliamentarians are not members of HPAC.

with volunteer colleagues in the Uganda office of the World Health Organization (WHO; n = 2), technical officers in the Ministry of Health (MoH; n = 2), and one researcher from the School of Public Health. Key informants were contacted and invited by email or telephone to participate in the study. All identified respondents agreed to participate and were interviewed.

All interviews were conducted by JNO, in English and face-to-face. Interviews were recorded, transcribed verbatim, and entered into Microsoft Word for editing as the first step in "formal" analysis. During the interviews, JNO made additional notes to record the initial findings and impressions that were used to augment the transcribed interviews. The interviews lasted 45 minutes on average. Deductive content analysis techniques were used to identify emerging categories linked to the research issues [37]. As a first step to analysis, JNO and DKM read all transcribed interviews and developed categories of emerging issues. The study team collaboratively analyzed the transcripts to identify categories according to the type of key informant, the emerging issues organized by the research areas defined in the interview guide, and by the various stakeholders in KT. Deductive content analysis was undertaken by JNO, BM, and DKM to assess how respondents perceived the role of the various stakeholders in KT and the challenges they face. Patterns in responses were compared with results from the literature regarding the roles for and challenges facing the various stakeholders to identify convergent and other emerging issues. JNO, BM, and DKM initially identified categories and emerging issues independently, after which JNO and DKM reviewed and interpreted the findings. Relying on manifest analytical approach, converging issues were again reviewed by the rest of the research team and where interpretation differed, consensus was achieved through revisiting the raw data and discussions. Where necessary, quotations that best represented emerging issues were edited slightly for flow, but the meaning of the text was preserved.

Informed consent was obtained from all respondents prior to the interviews. Study participants were informed about the purpose of the study and the scope of the issues in the in-depth interview guide. Confidentiality was ensured in data management, and only aggregate information without subject identifiers is reported. All data were secured in a safe location accessible only to the study team. Ethical approval was obtained from the Institutional Review Board of the Institute of Tropical Medicine, Antwerp, Belgium (IRB/AC/ac/197) and the Uganda National Council for Science and Technology (SS 2920).

Results

The respondents were asked to identify the stakeholders in KT in Uganda and to report what they felt were the positive and negative roles played by these stakeholders (Table 3). Below we present specific issues that were identified for each group of stakeholders.

Table 3 Identified positive and negative roles for various stakeholders

	Positive roles (no. of respondents)	Negative roles (no. of respondents)	Challenges faced in playing their role in KT
CSOs	Using research results (10)	May de-campaign evidence if they are not convinced (2)	Lack of capacity, weak internal organization, lack of independence
	Advocating with policy makers to implement evidence (8)	If not given proper information, may cause confusion (1)	
	Mobilizing communities (7)		
	Disseminating research (2)		
	Undertaking research (2)		
	Liaising with the media (1)		
	Generating research topics (1)		
Communities	Can demand that evidence be implemented or demand that a policy be developed (6)	Can be disruptive if results do consider community-contextual issues (1)	Currently not able to engage in research policy processes
	Contributing to development of the research agenda (6)		
	Can participate in research (1)		
Media	Disseminating research results (15)	Misrepresenting evidence (5)	Not well organized and are communicating to a public that is not strong enough to respond
	Putting forward community views (4)	De-campaigning implementation of evidence if they are not convinced (3)	
	Advocating for implementing evidence (1)		
Policy makers	Using evidence in developing policies and implementation (12)	If evidence is not in their favor, can de-campaign it or misrepresent results (2)	Inclined to serve political interests
		May remain unconcerned about available evidence and play a passive role (1)	
	Establishing structures that can improve uptake of research (*e.g.* knowledge brokers), developing a communication strategy and a community research advisory network (5)		
	Providing stewardship (5)		
	Participating in research (1)		
Parliamentarians/politicians	Demanding implementation of evidence (8)	Focus may differ; if they see that the available evidence does not favor their objectives and may lead to the loss of votes, they will not support the evidence. If they stand to benefit, they will support the evidence (4)	Difference in objectives; technical objectives may differ from political objectives
	Advocating for funding to implement recommendations (4)		
	Mobilizing and disseminating evidence to their communities (4)		
Researchers	Undertaking research (14)	Corruption affects the research community to the extent that they may even provide misleading results (1)	Balancing satisfying academic interest and community needs
	Research users (1)		
Donors	Providing funding for research (16)	May carry out research that does not focus on local needs (3)	Availability of institutionalized platforms for setting research agendas and engaging in KT under strong MoH leadership
	Providing funding for implementation (9)		
	Undertaking research activities (5)	At times they work toward fulfilling agency agendas (2)	
	Encouraging the development of evidence-based polices (2)	May refuse to fund implementation of certain recommendations, for whatever reasons (1)	
	WHO provides global evidence that guides policy development in countries (2)		

Table 3 Identified positive and negative roles for various stakeholders *(Continued)*

	Implementing research recommendations (1)	Can make financial commitments to support implementation of evidence but fail to meet them (1)	
	Influencing the research agenda (1)		
	May bring in global knowledge (1)	Failure to contextualize global knowledge (1)	
Private health providers	Using evidence to make investment decisions (1)		Weak internal organization

CSOs

Almost half of the respondents (n = 10) mentioned the use of research results as a role that CSOs can play in KT. A MoH official remarked that "*civil society, most especially those concerned with health issues, have the capacity to implement research recommendations.*" A donor official stated that "*civil society can mobilize dedicated funding and can actually help to implement research findings*."

Eight respondents also included advocating with policy makers to implement evidence, developing policies that incorporate evidence, and community mobilization among the roles of CSOs in KT.

> A civil society respondent remarked that "*civil society is very key; they can disseminate research, advocate with policy makers, mobilize communities, and liaise with the media*."

> A MoH respondent also emphasized this role, stating that "*civil society, most especially those concerned with health issues, should be involved in most decisions because they have the capacity to mobilize communities to support policy development and implementation*."

Regarding CSOs undertaking research, one respondent stated that CSOs are limited by their weak position; the MoH does not believe that they have the capacity to undertake high-quality research. A CSO respondent stated, "*Sometimes we have failed to commission studies because if these studies are done by us, the attitude in the MoH is such that they may not believe in them, but if they are performed by WHO or UNICEF, then the big name carries the day. So, many times, we have been discouraged at the pre-research stage*."

Negative roles that CSOs may play in KT were also mentioned. These roles included undermining evidence that they are not convinced about and causing confusion in the community if they are not given proper information.

One respondent, who is a researcher, articulated challenges facing CSOs in KT, with the exception of religion-affiliated bureaus. This respondent was concerned about their lack of capacity, weak internal organization, and lack of independence. Most CSOs are funded by donors, and some receive funding from government and that compromises their independence. The respondent said, "*Civil society is not a big voice; they are currently just being imposed on us by donors. They lack funding independent of the government and lack technical capacity. They are not organized well enough to engage in policy development, can't harness their power to influence policy processes, and may not even be educated enough*."

Communities

Six respondents expressed the opinion that the communities' main roles were to demand implementation of evidence and to contribute to the development of the research agenda.

> A donor respondent stated that "*communities can advocate for their needs, speaking up when the policy that should be in place is not being implemented.* [They] *can help researchers to better define their questions, and can also demand to know what research is being done and whether it will benefit them*."

> A civil society respondent said that "*communities are the beneficiary of the research; they can demand that evidence is implemented through political leaders like members of parliament, through demonstrations, but they can also contribute to development of the research agenda*."

One respondent mentioned that this role requires that researchers and policy makers understand how to engage communities. In addition, there must be organized community structures that enable communities to participate in research processes.

However, one researcher raised concerns regarding whether the community was able to play any role in KT, stating that "*the community is dislocated from the main machinery, both in terms of undertaking research but also in policy development. Their contribution is very small, they are not key stakeholders. Power and decision making is very centralized, and even decentralization that was meant to enhance community participation has yet to be achieved. Communities have no political voice, partly because of poverty and lack of education*."

The media

A majority of respondents expressed the idea that the role of the media is to disseminate evidence, and also to bring the views of the community to policymakers.

> A MoH respondent said that "*the media definitely play a key role in dissemination, informing people about new research findings. They put forward the views of the community*."

> A private for-profit respondent highlighted the dissemination role of the media as "*the media have a positive influence; they are the means of transfer of information, they are a communication channel to the public*."

> A journalist remarked that "*the media act as a public watchdog; they can make something a national issue. They are also a pressure group; they can mobilize for action and also sensitize the public about the research findings. In about ten minutes, knowledge can be transferred instantaneously and simultaneously to the whole world*."

Respondents identified several negative roles of the media, such as misrepresenting data when evidence is passed on to the media in a poorly packaged form.

> A private for-profit respondent said that "*the way you engage in dialogue with the media and the way information is packaged will determine the impact of the media. If information is poorly packaged and poorly passed on, they will misrepresent the evidence. If you don't want them to provide wrong information, give the correct information*."

> A donor stated that "*the media can have a negative influence if they misrepresent your results or the ideas of your research, e.g. telling the public that they have come to us as guinea pigs in reference to a new research project like a drug trial*."

> A civil society respondent indicated that "*the media can play a negative role by misrepresenting information for their own interests, so you need to bring them on board. We should work hard as professionals to have the media on board; we need to create time for them*."

In order to minimize misrepresentation, one respondent mentioned the need to carefully select messages and to provide written messages as opposed to verbal communication.

The challenges hampering the effectiveness of the media in KT included not being well organized and communicating with a public that is not strong enough to respond. One researcher stated, "*The media are not very strong. They should be the civil watchdog reporting to the public (…) the public is not organized enough to follow up on what is reported. In this case, it weakens the role of the media. The media should work hand-in-hand with the public, but the public is weak and this also weakens the media. An example is drug thefts that have been reported in papers, but the public has never come up to demand accountability*."

Government policymakers

Many respondents (n = 12) stated that the role of government policy makers in KT is to make use of evidence and to identify knowledge gaps. One respondent said that "*government policy makers and technical ministries play a role in policy formulation, but they are also the implementers. They should use evidence to formulate policies*."

Five respondents mentioned that government policy makers should put in place structures and platforms that can improve the uptake of research and play a stewardship role in the generation and uptake of evidence. A donor respondent stated that "*they should ensure that dialogue takes place, they should take a stewardship role, ensure that research results are discussed and use them for policy development*."

Some negative roles identified by respondents included ignoring or even misrepresenting evidence that is not in their favor, as illustrated in the following quote by a civil society respondent, "t*hey can play a negative role if the research result is not in their favor. If it is not in their favor they can actually ignore it. The other negative role is they can misinterpret it to suit whatever side they want to lean against*."

Another negative role indicated by respondents was the inclination to serve political interests irrespective of available evidence. A journalist said that "*they tend to operate in the political domain, which limits them depending on the regime. They are sometimes insensitive to some societal needs, and they become negative on things that should really be supported*."

Politicians/parliamentarians

Respondents perceived that the main role of parliamentarians is to ensure implementation by demanding that evidence is implemented (n = 8) and by advocating for funding for its implementation and dissemination (n = 4). A civil society respondent stated that "*parliamentarians can mobilize communities; each parliamentarian comes from a constituency, and can mobilize his/her people to demand the implementation of evidence. But they also play a role in dissemination; they can disseminate evidence*

to their communities. They also push senior officers within the MoH to implement evidence."

Differences in the objectives being pursued underpinned a negative role attributed to politicians. Four respondents mentioned that the priority of politicians is to secure the electorate's vote; these respondents felt that if the evidence is contrary to this objective, the politicians will not support it.

> For example, a MoH respondent said "*People fear to carry out research that is against politicians' interests, they fear annoying them. If findings are in their favor, they can help you push the implementation of recommendations. However, politicians will stop research implementation if it is against their interests.*"

> A private for-profit respondent stated, "*Politicians tend to have inclinations. Policies are twisted towards political interests and in that sense, they can have a negative influence. Political peddling has an impact on how that policy is going to be. If they are open towards evidence and understand the value of research, they can play a positive role.*"

Researchers

Although the main role of researchers was identified as undertaking research, respondents pointed out that researchers need to perform research in collaboration with beneficiaries like the MoH. Respondents were also concerned about the focus of the research community on satisfying academic interests rather than community needs. In addition, respondents highlighted the issue of corruption affecting the research community, which is understood to occur when funds are provided and inferior-quality research or misleading evidence is produced.

Donors

Respondents described the role of donors in KT as providing funding for undertaking research (n = 13) and providing funding for implementing research findings (n = 16), as illustrated in the following quotes. First, a donor respondent said,

> "*Donors should fund research, although it must be in line with the priorities identified in the research agenda. They should fund dissemination activities. They should also contribute to funding the implementation of recommendations.*"

> Second, an MoH respondent stated that "*donors are key for funding, and can provide funds for the implementation of research recommendations.*"

> Third, a journalist said, "*When it comes to the generation and use of evidence, donors can comfortably perform in funding.*"

Although undertaking research was identified as a donor role by five respondents, respondents also were concerned about the local relevance of donor-supported research.

> A civil society respondent remarked, "*They should not just bring research of their interest. The north-to-south collaboration in research should be fine-tuned to make research more responsive to knowledge gaps as perceived at the local level*,"

> A MoH respondent stated that "*donors may impose a research agenda on us that is not our priority.*"

A private for-profit respondent raised the issue of the donor agency agenda overtaking local interests in the research process, stating, "*Donors are sometimes bent towards fulfilling agency agendas. If our priorities are not clear, support may be wasted through duplication and confusion.*"

Almost all respondents (n = 18) stated that stakeholders need to work together in a partnership right from setting the research agenda, through the research or knowledge generation process, dissemination and applying the knowledge. Seventeen respondents indicated that institutionalized platforms bringing together all relevant stakeholders are necessary to ensure that partnerships are effective; they reported that these platforms were lacking, and that the leadership of the MoH in guiding research processes and applying evidence was weak.

> A MoH respondent said, "*There is no systematic dialogue between policy makers and researchers. Other stakeholders must be involved as well. The Uganda National Health Research Organization that should coordinate this exercise is still weak.*"

> A civil society respondent declared that *"there must be a continuous rapport between researchers and the government. I think when researchers give evidence, that's where it stops, there must be continuous networking and linkage.*"

> Another civil society respondent stated, "*Partnership is very much necessary, the community is not involved, the community puts in little yet all should be included in policy development.*"

These platforms would ensure systematic dialogue. One civil society respondent emphasized that "*we need to have a research advisory network in place.*

This should bring together researchers, civil society, knowledge brokers, and policy makers. In this way, it would be easy to have a research agenda agreed on by all stakeholders that will be followed and results well disseminated and implemented."

Discussion

Our study has yielded useful insights into the roles of the various stakeholders in KT in Uganda. The literature emphasizes that the roles assigned to stakeholders should correspond to their skills and expertise [38]. The need for systematic and meaningful involvement of stakeholders in partnerships, working in a complimentary manner to achieve a common objective, has also been raised [34]. This goal calls for establishing inclusive platforms with appropriate leadership to bring all stakeholders together. In addition, there must be mechanisms for addressing conflicts of interest and guarding against undue influence. Deslie *et al.* noted that the weaknesses facing various stakeholders must be addressed, their skills must be enhanced, and information must be shared in understandable formats if stakeholders are to play their roles effectively [13].

Respondents noted that the uptake of evidence in public health policy development and implementation can be performed by government policy makers and CSOs. In the case of CSOs, these findings are similar to what has been identified in literature [13,16]. Their ability to mobilize funding and implement health programs can enhance their contribution to implementing evidence. However, other researchers caution that their capacity to engage in policy development is limited, especially in LICs, and questions about the legitimacy of their policy positions and accountability have been raised [39]. Policy makers serve a leadership role in policy development and are definitely central to the uptake of evidence in policy development. However, literature has shown that they often work under severe time constraints and political pressure, which may not allow enough time for the application of evidence [40]. This issue requires the balancing of time pressures, timely provision of evidence, and implementing decisions. The potentially superficial understanding of the subject matter by policy makers, who are often responsible for several areas, is also a documented challenge [40]; researchers can minimize the effect of this superficial understanding by summarizing evidence in brief, digestible formats.

The dissemination of evidence was identified as a role that can be played by the media, CSOs, and parliamentarians. In the case of the media, our respondents highlighted the risk of misrepresenting evidence and a weak public as compromising the media's effectiveness. The role of the media in disseminating evidence has been documented, and researchers have noted that more contact with the media will help strengthen the media's capacity for science reporting [41]. Indeed, an earlier study in Uganda noted the poorly coordinated efforts of researchers and communities to reach the media, concluding that the media is a powerful ally that is under-utilized by public health professionals [42]. The literature emphasizes the importance of presenting evidence to CSOs in a clear and simplified format if they are to effectively disseminate evidence; in addition, regular updates need to be provided throughout the research process [16,43]. These actions will safeguard against the negative roles identified in this study, especially misrepresentation of evidence and the creation of confusion in the community. Although the literature indicates that researchers can engage in dissemination, our respondents did not identify this role. Researchers may instead focus on the generation of user-friendly research products and improving the engagement with the media and with CSOs. This focus reflects the results of studies of the process of translating research on male medical circumcision and prevention of mother-to-child transmission into policy; Ssengooba *et al.* reported that researchers were found to be media "shy" [26]. Some studies have reported that researchers can also act as policy entrepreneurs by organizing themselves into networks that can engage policy makers. In instances in which this strategy was successful, some of the policy makers had research backgrounds [33]. This strategy was not mentioned by our respondents.

Advocating for the implementation of evidence, exerting pressure on policy makers, and mobilizing communities were identified as roles for politicians/parliamentarians and CSOs. These roles are similar to those previously identified in the literature [13,15,16]. CSOs and parliamentarians are nearer to communities and are supposed to represent community interests. CSOs have been shown to be effective advocates once empowered with evidence; they have been able to mobilize communities to demand government accountability and to encourage donors to focus on country priorities [13]. Respondents in our study noted the need for CSOs to be funded outside of the government to ensure independence. However, the dependency of CSOs on donors to finance their operations, especially in LICs, will remain a constraint in that CSOs may be hesitant to take a position that is against the position of their funders [17]. Regarding politicians/parliamentarians, effective realization of their roles continues to be challenging given the nature of political systems in LICs. Political ideology and the tendency to respond to the demands of constituencies or electorates, irrespective of the evidence, are among the challenges that must be overcome [27]. Young previously highlighted the need to better understand the political processes of LICs in order to understand the role of evidence in policy making [27]. The community has been noted to be able to exert pressure on policy makers to respond to evidence [44], which can be

enhanced through effective dissemination of research to communities.

Although previous research revealed that undertaking research is a role that could be played by CSOs [13,16], it was not identified as a major role of CSOs in our study. This result reflects the often weak linkage between CSOs and the research community and the limited scope of their research, which is mainly limited to evaluation of their programs [13]. The capacity of CSOs to engage in research can only be encouraged if investments can be made with respect to training, mentorship programs, or through formal partnerships between communities and universities that link CSOs with academic researchers. Community participation in setting the research agenda, which was highlighted in this study, has also been identified by other researchers [45,46], who noted that this participation may improve the responsiveness of research to community priorities. Several challenges confronting researchers were identified by our respondents, including the risk of disproportionate focus on academic interests and failing to address community priorities; these challenges were also pointed out by other researchers [43,44]. In addition, the tradeoff between producing high-quality research and the time-constrained nature of the policy-making process is often difficult to achieve.

In our study, funding research and implementing evidence were identified as roles played by donors, a finding similar to other studies [3,21]. The funding role of donors in KT has long been seen as potentially supportive and disruptive at the same time. In some instances, funding has been used to influence research agendas and policy development in LICs [42]. For example, Burris *et al.* reported that the funding requirements of donors in Ghana were the strongest impetus for the uptake of evidence in guideline formulation for HIV care [44]. Similarly, the decision to change Uganda's malaria treatment policy was heavily influenced by the availability of funding from the Global Fund against AIDS, Tuberculosis, and Malaria [47]. Many LICs depend heavily on foreign aid to fund health services, allowing donors to exert undue influence on research processes and programming decisions. Some researchers have highlighted the need to better understand the interface between development agencies and national processes in LICs [3]. Donor funding can definitely contribute positively to research and policy development in LICs, but governments must be able to effectively fulfill their stewardship role [48]. This undue influence of donors has been controlled to some extent when governments have established structures to develop research agendas through inclusive partnerships [34]. We were surprised to note that no respondent mentioned funding of research and implementation of evidence as a role for governments.

In our study, there was also no mention of professional bodies and informal policy networks as stakeholders in KT. Reasons for this omission may include the relative weakness of professional bodies in Uganda and the fact that they are not much known outside the MoH. In addition, professional bodies are not very active in public-health policy making, which was the focus of this study, as has been reported for several African countries [49]. Their role is more pronounced in the development of clinical practice guidelines, and positive contributions have been documented [33]. Knowledge brokers were not identified as stakeholders by the respondents of the present study, perhaps because this is a relatively new concept; there are currently no knowledge brokers active in Uganda.

In this study, government policy makers, CSOs, the media, parliamentarians/politicians, communities, researchers, and donors were identified as stakeholders in KT for public health policy in Uganda. The roles played by these stakeholders and the challenges that remain to be overcome are summarized below.

Role: Uptake of evidence in public health policy development and implementation

For CSOs to effectively engage in policy development, their skills must encompass navigating the political terrain, engaging policy makers, and networking, which call for high levels of internal organization and independence [16,39]. Uptake of evidence by policy makers could be improved by recruiting advisors and/or establishing think tanks to synthesize evidence in simple, digestible formats, as already attempted in some LICs [27]. The links among policy makers, researchers, and CSOs have long been known to be potentially beneficial, and should be strengthened [5,24] to enable systematic information-sharing and synergy in evidence implementation [39]. Policy makers need to put in place the institutional frameworks and platforms for engagement that will enhance greater ownership and application of evidence by policy makers and politicians [11].

Role: Dissemination

The risk of misrepresentation of evidence by the media must be minimized through improved dissemination of evidence, preferably in written formats rather than verbal communication alone. The literature underscores the critical impact of communicating evidence in a clear, conclusive, and accessible way [16,43]. Further, platforms need to be established for systematic engagement and information-sharing among researchers, policy makers, and the media. In order to improve the impact of the media, there must be parallel efforts to strengthen the public's response to media messages.

For CSOs to strengthen their contributions as disseminators of evidence, evidence must be presented to CSOs in clear and adapted formats, and regular updates should be

provided. Similarly, parliamentarians need to be armed with accurate information through targeted dissemination and regular updates.

Role: Advocating for the implementation of evidence, exerting pressure on policy makers, and mobilizing communities

To achieve this role, CSOs need to be independent and funded independently of government channels. The links between parliamentarians and community structures on the one hand and between parliamentarians and researchers on the other must be strengthened to ensure that politicians are provided with accurate information. Further, there is a need for mechanisms of targeted dissemination of evidence to communities in simplified and appropriate formats. Platforms for researchers, policy makers, and communities to effectively engage with communities and for organizing communities to be able to engage in policy processes must be put in place [45].

Role: Undertaking research

Structures must be established to enable communities to participate in research processes; these structures should include links between communities and researchers. Communities must be organized, and consultative mechanisms need to be established for them to engage in setting research priorities. For researchers, institutional platforms should be established between researchers and policy makers so that researchers appreciate both the policy-making process and the pressure under which policy makers work. At the same time, these platforms could help policy makers to better appreciate the research process and the constraints faced by researchers. Such platforms provide learning opportunities for all actors [26]. The failure to focus on community needs and local priorities can be addressed through mechanisms for inclusion in the setting of research priorities.

Role: Funding research and implementation of evidence

In order to focus donor support on the priorities of the country, governments need to establish structures to develop research agendas through inclusive and participatory partnerships. The advocacy and community-mobilization roles of CSOs could also be employed to ensure that donor funding supports locally identified priorities.

Study limitations

In the interviews, no references were made to either a specific research study or to actual policy, which may have influenced the respondents' reflections on the KT process in Uganda by keeping the discussion at a more abstract level. However, it could also be argued that mentioning a specific policy could have induced the respondents to be more anecdotal in their responses. We also note that some respondents may have dual roles in KT. For instance, a researcher may be working for civil society, and therefore represent two stakeholder groups at the same time. The influence of these dual roles was not explored in this study; it could be considered a strength as much as a weakness of this investigation, in that this influence may have enriched the reflection more than it limited it. We did not use the Delphi method to identify the shared views of the various stakeholders and to reach theoretical saturation. While such a process may have its benefits, we believe that in-depth interviews allowed more efficient exploration of the views of the various groups, which in a second phase can still be presented to a wider group through a Delphi process. Finally, this study focused on KT in reference to public health policies and may not be representative of other fields such as clinical interventions.

Conclusions

Previously, Sauerborn *et al.* emphasized the importance of considering the needs of various stakeholders [10]. We argue that there is a need to take into consideration the roles that the various stakeholders are best positioned to play in KT. Linkages must be built and necessary platforms put in place to achieve synergy among stakeholders in KT. At the same time, the challenges faced by the various stakeholders need to be overcome, and relevant capacities must be built if they are to play their roles effectively.

Endnotes

[a] In the health sector in Uganda, policy development and implementation of health programs have been undertaken within a partnership under the sector-wide approach since 2000 [35]. The process of policy development usually begins with discussions within technical working groups comprised of government officials, donors, civil society representatives, and private for-profit health providers. Technical working groups propose options that are discussed further in the HPAC, the policy advisory body of the health sector. The HPAC consists of senior government officials from the central and district levels and representatives from donor agencies and the private not-for-profit and private for-profit sectors. The HPAC makes final decisions regarding the adoption of policy options.

Abbreviations

CSO: Civil society organization; HPAC: Health policy advisory committee; KT: Knowledge translation; LICs: Low-income countries; MoH: Ministry of health; MRT: Middle range theory; WHO: World health organization.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

JNO contributed to the conception and design of the study, to data collection, analysis, and interpretation, and led the drafting of the

manuscript. BM contributed to data interpretation and to drafting of the manuscript. DKM participated in data analysis, interpretation, and drafting of the manuscript. FS participated in study conception and design, data analysis and interpretation, and drafting of the manuscript. JM participated in study conception and design, data analysis and interpretation, and drafting of the manuscript. VCS participated in interpretation of the results and drafting of the manuscript. BC contributed to study conception and design, data analysis and interpretation, and drafting of the manuscript. All authors read and approved the final manuscript.

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Chapter 3: The case of malaria treatment policy change in Uganda

The malaria treatment policy change case was selected based on the likelihood of predicting similar results as the MRT1. Being a biomedical policy, more emphasis is likely to be attached to evidence on the effectiveness of selected drug options. This implies that the uptake of evidence in the malaria treatment policy change, if at all this occurred, is likely to be explained by the facilitatory factors as detailed in our MRT 1. We reviewed the malaria treatment policy change process and post implementation period. This review highlighted the importance of managing the policy change process, generating evidence for policy decisions and availability of adequate and predictable funding for effective policy roll-out.

Published article

Nanyunja M, Nabyonga Orem J, Kato F, Kaggwa M, Katureebe C, Saweka J: "**Malaria treatment policy change and implementation: the case of Uganda**" Malar Res Treat 2011, 2011:683167.

We further explored if evidence was available, the type of evidence that was available and the extent to which evidence guided decision making. We specifically explored the place of evidence, barriers and facilitatory factors to uptake of evidence in the malaria treatment policy change in Uganda. In addition, the respondents` rating of the degree of consistency between the policy decision and available evidence was assessed. Results showed that evidence was used to change the malaria treatment policy, though the consistency between evidence and policy decisions varied along the policy development cycle. The results agreed with facilitatory factors identified in MRT 1 though additional factors emerged as well. The availability of high-quality and contextualized evidence, including effective dissemination; Ministry of Health institutional capacity to lead the KT process; intervention of the WHO and a regional professional network; the existence of partnerships for KT with mutual trust and the availability of funding, tools, and inputs to implement evidence, were the most important facilitatory factors that enhanced the uptake of evidence. Among the barriers that had to be overcome were resistance from implementers, the health system capacity to implement evidence, and financial sustainability.

Published article

Nabyonga-Orem, Juliet, Freddie Ssengooba, Jean Macq, and Bart Criel. "**Malaria treatment policy change in Uganda: what role did evidence play?**" *Malaria journal* 13, no. 1 (2014): 345.

We further explored how stakeholders impacted the uptake of evidence in the malaria treatment policy change in Uganda. We noted a diverse group of stakeholders who played multiple roles. Donors, the MoH, service providers, and researchers engaged in the role of evidence generation. The MoH, parliamentarians, and opinion leaders at the national and local levels engaged in dissemination of evidence. The donors, MoH, researchers, and service providers engaged in the uptake of evidence in policy development and implementation. Stakeholders exerted varying levels of support and influence for different reasons. We noted

that all of the influential stakeholders were divided regarding the best antimalarial alternative to adopt. We concluded that for a given KT process, mapping of stakeholders, devising mechanisms for their engagement and how to resolve conflicts of interest and disagreements a priori, will enhance uptake of evidence in policy development.

Published article

Nabyonga-Orem, Juliet, Miriam Nanyunja, Bruno Marchal, Bart Criel, and Freddie Ssengooba. "**The roles and influence of actors in the uptake of evidence: the case of malaria treatment policy change in Uganda**" *Implementation Science* 9, no. 1 (2014): 150.

We thus refined the MRT 1 into MRT 2a stating that "High quality and contextualized evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process, there are partnerships for KT in place, WHO and regional professional bodies play a role and implementation is feasible in that tools and inputs required to implement evidence are available"

Details of MRT 2a are as follows with additions underlined:

> Evidence must be of high quality, contextualised, providing economically feasible recommendations and, produced in a timely manner by credible researchers. Use of local researchers is helpful but there is need for separation of roles between researchers and policymakers. There is need for effective dissemination of evidence to communities and tailored dissemination to influential stakeholders.
> KT requires strengthened MoH institutional capacity to lead the KT process. Institutionalized platforms for engagement between researchers and policymakers, including civil society need to be in place. Mechanisms to coordinate evidence generation and synthesis need to be mainstreamed within the MoH although regional professional bodies also play a role and WHO's intervention is helpful. The capacity of policy makers in knowledge management needs to be strengthened and the policy making process must not be too bureaucratic.
>
> Partnerships for KT need to be in place, and all relevant stakeholders must be involved throughout the process to improve trust and build interest. Building a culture of partnerships in health development over time enhances trust. Stakeholders play different roles and there is need to devise mechanisms for their objective engagement and resolving conflicts of interest.
>
> Feasibility of implementation needs to be taken into consideration. Funding must be available, operational tools must be provided and implementers must receive required training to implement evidence.
>
> These contribute to higher ownership, adoption and better application of evidence.

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Review Article

Malaria Treatment Policy Change and Implementation: The Case of Uganda

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Malaria due to *P. falciparum* is the number one cause of morbidity and mortality in Uganda where it is highly endemic in 95% of the country. The use of efficacious and effective antimalarial medicines is one of the key strategies for malaria control. Until 2000, Chloroquine (CQ) was the first-line drug for treatment of uncomplicated malaria in Uganda. Due to progressive resistance to CQ and to a combination of CQ with Sulfadoxine-Pyrimethamine, Uganda in 2004 adopted the use of ACTs as first-line drug for treating uncomplicated malaria. A review of the drug policy change process and postimplementation reports highlight the importance of managing the policy change process, generating evidence for policy decisions and availability of adequate and predictable funding for effective policy roll-out. These and other lessons learnt can be used to guide countries that are considering anti-malarial drug change in future.

1. Introduction

Malaria is the number one cause of morbidity and mortality in Uganda. It is highly endemic in 95% of the country, and the remaining 5% of the country is prone to malaria epidemics [1]. Over 95% of the malaria cases are due to *plasmodium falciparum*. Effective malaria case management, using efficacious and effective antimalarial medicines, is one of the recommended strategies for malaria control [2]. Until 2000, Chloroquine (CQ) was the first-line medicine for treatment of uncomplicated malaria in Uganda, and Sulfadoxine/Pyrimethamine (SP) or Amodiaquine (AQ) was the 2nd-line medicine while Quinine (Qn) was the reserve medicine. For severe malaria, Qn was the recommended medicine initially given intravenously until the patient is conscious and able to take medicines orally [3]. However, in the late 1990s, parasite resistance to CQ, at varying levels in the 8 East African Network for Monitoring Antimalarial Treatment (EANMAT) sentinel sites located in different parts of the country, was documented. By 2000, the parasitological resistance to CQ had increased significantly, ranging from <5% to >50% in different sites, and clinical failure following CQ treatment in Uganda had increased to about 38% [4], exceeding the WHO recommended threshold of clinical failure of 25%, beyond which policy change is recommended in the shortest time possible [5]. Uganda embarked on a malaria treatment policy change process as shown in Figure 1. After several technical discussions and considerations, the first-line antimalarial medicine for uncomplicated malaria was changed from CQ only, and a new interim policy with a combination of CQ and Sulfadoxine-Pyrimethamine (CQ/SP) as first-line treatment was adopted. The selection of CQ/SP was based on assumption that the combination would be more efficacious than CQ monotherapy [5]. In addition, the government could ensure availability of the CQ/SP combination to all public health facilities using available resources. However, between 2001 and 2004, the efficacy of CQ/SP reduced significantly, with treatment failure ranging

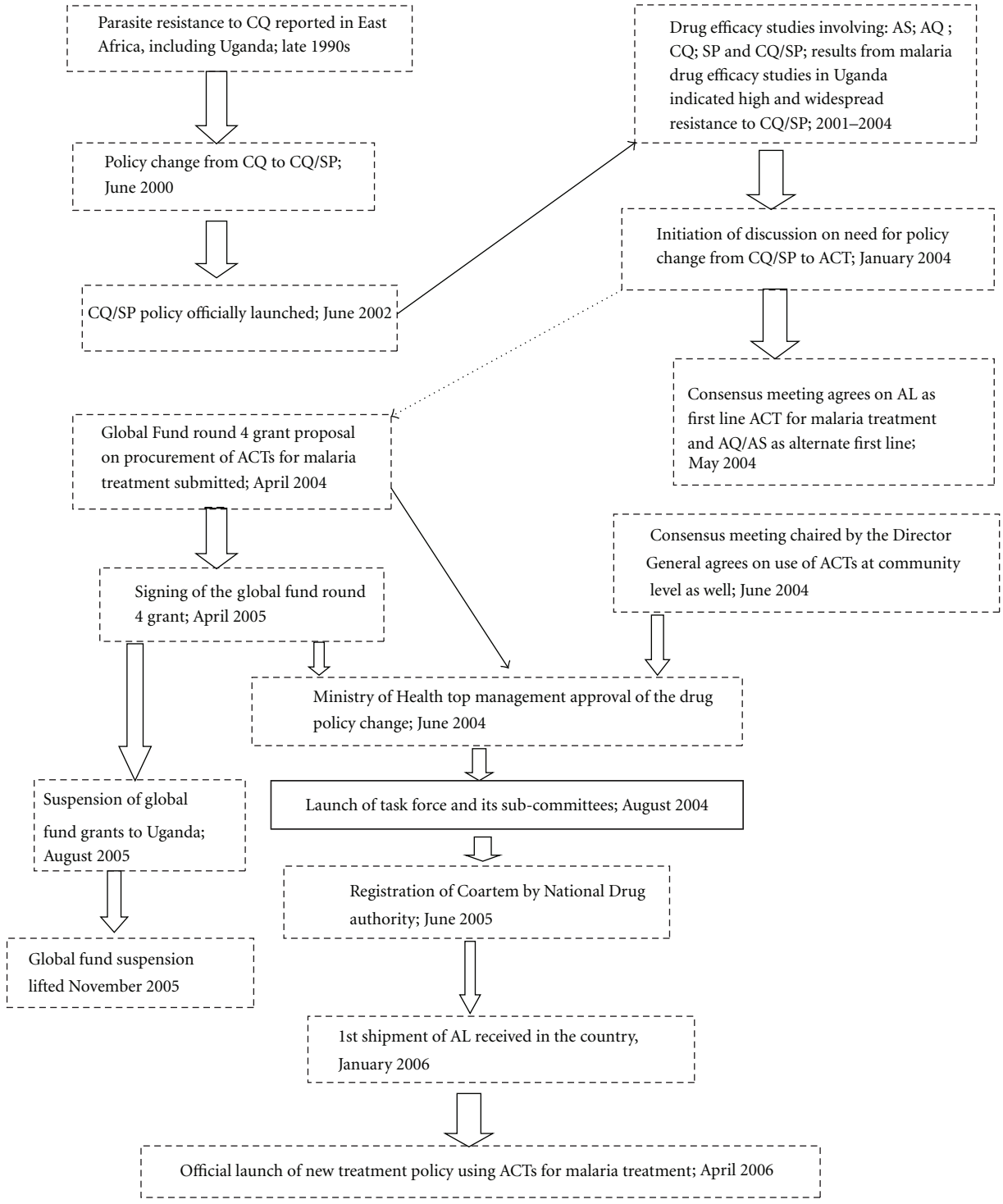

Figure 1: A timeline of key events during the malaria drug policy change in Uganda.

from 22% to 77% (median 41%) [6–9]. In line with the WHO recommended threshold for antimalarial drug policy change (clinical failure rate of ≥25%), Uganda embarked on yet another policy change process that culminated in the adoption of artimesinin combination therapies (ACTs) as the first-line treatment for uncomplicated malaria. Quinine was selected as the second-line treatment for uncomplicated malaria and first-line treatment for severe malaria and for malaria in pregnancy. Specifically, Artemether-Lumefantrine (AL) was adopted as the first-line treatment for uncomplicated malaria, with Artesunate-Amodiaquine (AS/AQ) as an alternative first-line [10]. This paper describes this last policy change process, factors put into consideration prior to adoption of this policy, the roll-out of the policy, 5-year

experience of implementation of the new policy, and the lessons learnt, to guide other countries that consider malaria treatment policy change.

2. Methods

We reviewed unpublished reports and scientific publications on several drug efficacy studies conducted in Uganda between 2000 and 2004 to document the evidence used in selection of the first-line antimalarial drug. We also reviewed unpublished reports and minutes of several meetings that were held to gain consensus on the medicine to adopt as first-line for treatment of uncomplicated malaria, the reports of the task force that was constituted to guide the implementation of the new policy and its subcommittees, the minutes of the different meetings held by the subcommittees and the task force, as well as the documentation of the malaria treatment policy change process that summarized the whole process step by step and included some of the key reports as attachments. For experiences on the implementation of the policy, and challenges faced, we reviewed several reports and publications by different groups of people that conducted studies to assess the level of implementation of the new policy. The studies were done at different periods after the introduction of the policy. We also used information from National Medical Stores (NMS) and National Malaria Control Programme (NMCP) reports, the Malaria Indicator Survey report, and Annual Health Sector Reports for the details on policy implementation and drug availability. However, and most important, the first and third authors participated in the whole policy change process, compiled the documentation of the drug policy change process, and thus also input personal experiences into the paper.

2.1. Malaria Treatment Policy Change Process

2.1.1. Decision-Making Process. In 2004, results of malaria drug efficacy studies in Uganda showing high and widespread resistance to CQ/SP (Table 1) caught the Ministry of Health (MoH) by surprise as it had not been adequately updated on the growing resistance by the researchers. This happened around the same time that WHO released the WHO statement on ACTs as the most effective antimalarials that should be considered as first-line treatment for malaria in highly endemic countries with CQ resistance [11]. At the same time there was international pressure and advocacy from malaria experts about the need to change malaria treatment policy to ACTs as first-line treatment in several countries including Uganda [12]. Several technical meetings were held by partners including WHO, Malaria Consortium, and the researchers with MoH, until the need to change malaria treatment policy was appreciated, accepted, and commissioned by the MoH. Policy change discussions were then initiated, with support from WHO and other partners.

Whereas in principle policy change to ACTs was inevitable, the cost of ACTs was prohibitive and unaffordable by the Government of Uganda. However, there were prospects of funding for ACTs by the Global Fund for AIDS, Tuberculosis, and Malaria (GFATM). Uganda responded to a call for round 4 proposals by the GFATM and submitted a 5-year grant proposal to support the procurement and introduction of ACTs for malaria treatment in Uganda. The success of the round 4 GFATM proposal and hence assurance of funds for ACTs for 5 years paved way for discussions to consider adoption of ACTs in Uganda.

A one-day technical meeting was jointly convened by WHO and MoH to review the evidence available and make a decision on which ACT to adopt. The meeting was attended by technical experts in malaria case management in Uganda, Malaria researchers from Makerere University and University of California, San Francisco collaboration, technical advisors from WHO headquarters, Regional Office for Africa, and Country office, Malaria consortium, USAID, DFID, and MSF. Results of the various studies on efficacy of CQ/SP, other non-ACT medicines, and ACTs (Table 1) and one study on effectiveness of Artemether-Lumefantrine (AL) [13] were presented and discussed. WHO technical experts also made a presentation on WHO guidance and its basis as well as the recommended ACTs [11]. Discussions held on which ACTs to adopt covered efficacy and effectiveness, drug formulation with a preference for coformulated tablets to copackaged ones, availability of a pediatric formulation, ease of administration, possible adverse effects, cost, and ease of use by both qualified health workers and community health workers during home-based management of fever (Table 2). Though ACTs were expensive, with Artemether/Lumefantrine (AL) being more expensive than Amodiaquine and Artesunate (AQ/AS), it was anticipated that, in the future, prices would come down due to economies of scale. Besides, funding had already been secured from the GFATM for procuring adequate quantities of ACTs for the foreseeable future. Discussions were tough, with different groups having different ACT preferences due to personal and possible external influences, but consensus was achieved; AL was selected as the first-line antimalarial. After further review by the MoH technical team, AQ/AS was selected as an alternative first-line drug (Table 2). Agreement on what drug to adopt for home-based management of fever was harder, and consensus was not achieved at this meeting, with some experts suggesting a combination of Amodiaquine and SP (AQ/SP) that was still fairly efficacious instead of taking ACTs to community level. The Director General of Health Services convened another technical meeting to discuss this further, and finally it was agreed that first-line ACTs should be accessed by all people with uncomplicated malaria at both health facility and community level.

Parasite resistance to CQ/SP was above the WHO treatment failure threshold in some regions and was reported to be below the threshold in other regions. This raised questions on whether the policy change should be applied to some parts of the country and leave the others using CQ/SP until the treatment failure rate reaches the threshold for drug policy change. After review of the logistical challenges of implementing a dual first-line policy, it was agreed that the policy would be changed for the whole country. A brief about the proposed change in malaria treatment policy was written and presented to the MoH top management for approval by

Table 1: Antimalarial drug efficacy studies in Uganda from 2000 to 2001: results for children less than 5 years.

Period of study	Site, transmission intensity	Researchers/authors and/or publication	Protocol used	Drug or drug combination	Treatment failure rates (%)		Parasitological failure rate (%)
					After 14 days	After 28 days	
2000	Kampala, Medium	[14]	WHO 1996	SP	10	—	—
				AQ	7	—	—
				AQ/SP	3	—	—
July 2000 to August 2001	Kampala, Medium	[15]	Longitudinal study	SP	17	—	32
				AQ/SP	1	—	2
				AS/SP	1	—	5
July to Sept 2001	Kaberamaido, high	[16]	WHO 1996	CQ	—	45	—
				SP	—	16	—
				CQ/SP	—	12	—
October 2001	Kabale, low	[17]*	WHO 1996b	CQ	7.5	—	—
				SP	0	—	—
				CQ/SP	0	—	—
March 2001 to Jan 2002	Kampala, Medium	[18]*	WHO 1996	SP	—	15	30
				CQ/SP	—	7	17
				AQ/SP	—	0	1
Dec 2001 to March 2002	Tororo, high	[7]	WHO 1996	CQ/SP	8	—	40
				AQ/SP	0	—	15
				SP	9	—	42
Jan to Nov 2002	Bundibugyo, high	[19]	WHO 2002	SP	23.4	37	—
				AQ	8.8	20.6	—
				CQ/SP	6.0	22.8	—
Aug 2002 to July 2003	Mulago Hospital, Kampala Medium	[9]	WHO 1996	CQ/SP	—	35	—
				AQ/SP	—	9	—
				AQ/AS	—	2	—
Dec 2002 to June 2003	Kanungu, low	[8]	WHO 1996	CQ/SP	—	67	73
				AQ/SP	—	35	38
	Kyenjojo, high	[8]	WHO 1996	CQ/SP	—	37	58
				AQ/SP	—	14	24
	Mubende, medium	[8]	WHO 1996	CQ/SP	—	34	43
				AQ/SP	—	13	14
	All sites combined	[8]	WHO 1996	CQ/SP	22	Range 34–67	Range 43–73
				AQ/SP	8	Range 13–35	Range 14–38
Nov 2002 to May 2004	Jinja, low to medium	[20]	WHO 2003	CQ/SP	—	40	—
				AQ/SP	—	13	—
				AQ/AS	—	4	—
	Arua, medium to high	[20]	WHO 2003	CQ/SP	—	46	—
				AQ/SP	—	14	—
				AQ/AS	—	9	—
	Tororo, high	[20]	WHO 2003	CQ/SP	—	34	—
				AQ/SP	—	18	—
				AQ/AS	—	12	—
	Apac, high	[20]	WHO 2003	CQ/SP	—	22	—
				AQ/SP	—	7	—
				AQ/AS	—	10	—
	All sites combined	[20]	WHO 2003	CQ/SP	—	22–46	—
				AQ/SP	—	7–18	—
				AQ/AS	—	4–10	

*Study participants included both children and adults; results reported for both children and adults together. AS: Artesunate; AQ: Amodiaquine, CQ: Chloroquine, SP: Sulfadoxine-Pyrimethamine.

Table 2: How the decision to select the first-line treatment was reached.

Combination	Decision	Comments
Artemether/Lumefantrine (3 days-course)	Possible	Shown good efficacy in Uganda, Kenya, Tanzania and other African countries; good effectiveness in Uganda; coformulated tablets, prepacked in treatment courses for specific age groups
Artesunate (3 days) + Amodiaquine (3 days)	Possible	Shown good efficacy in Uganda; co-packaged; provider and consumer acceptance of Amodiaquine was low hence co-packaging instead of coformulation could encourage administering Artesunate and leaving Amodiaquine, some resistance to the combination already documented in Uganda
Artesunate (3 days) + Sulfadoxine/Pyrimethamine (1 day)	Rejected	There was already high resistance of *P. falciparum* to SP in Uganda and in the sub-region; and already some resistance to Artesunate—SP combination in Uganda
Amodiaquine (3 days) + Sulfadoxine/Pyrimethamine (1 day)	Rejected	According to WHO recommendations this combination should be an interim policy recommended where ACTs cannot be immediately deployed and where parasite resistance to both AQ and SP is still low. Already in Uganda there was high resistance of *P. falciparum* to SP. There was also high probability of cross-resistance between AQ and CQ, reducing further the efficacy of AQ+SP combination. Already one site (Tororo) showed parasitological resistance to AQ+SP combination of 32.5%
Artesunate (3 days) + Mefloquine (MQ) AS/MQ	Rejected	Not recommended by WHO for high transmission areas.

the NMCP. After a long discussion on financial, logistical, mortality reduction and other implications of the policy change, the top MoH managers accepted the proposed policy change in June 2004. This paved the way for the planning for the launch and implementation of the policy change. The new policy was officially launched by the Rt. Honourable Prime Minister of Uganda, on behalf of His Excellency the President of Uganda, on the 25th of April 2006 during the commemoration of Africa Malaria Day.

2.1.2. Planning for Policy Change. A task force was established by Ministry of Health to guide the planning for the rolling out of the policy change. Four subcommittees of the task force, commissioned in August 2004, were tasked with development of different aspects of the roll-out plan. The treatment guidelines and training approaches subcommittee updated the malaria treatment guidelines and job aids to include the new policy details and also developed other training materials and the training plan for health workers and community medicine distributors; the Information, Education, and Communication (IEC), advocacy and social mobilization subcommittee updated the IEC materials, developed a training module for health workers and a handbook for parliamentarians as well as the overall communication strategy to support the policy change; the supply management subcommittee quantified the ACTs needed annually using the morbidity method, proposed mechanisms for incorporating AL into the Essential Medicines List for Uganda and for phasing out CQ/SP and phasing in ACTs while the monitoring and evaluation subcommittee worked on monitoring framework for the policy roll-out, covering process, output, and impact monitoring, incorporating AL into the existing antimalarial medicines efficacy studies as well as establishment of pharmacovigilance and postmarketing surveillance. A meeting was held at central level in September 2004, where the products of the different subcommittees were discussed, agreed upon and a team tasked to compile these into one-policy implementation plan. Relevant IEC and training materials were ready for mass production for the policy implementation. Introduction of ACTs was planned for in phased manner, starting with the health facilities in 2005/2006 and to extend to communities for home-based management of fever at beginning of 2007.

2.1.3. Registration of ACTs. AL (Coartem) was officially registered as an antimalarial medicine by the Uganda National Drug Authority (NDA) in June 2005. It was initially classified as a prescription-only medicine although steps were taken later to reclassify it to an over-the-counter medicine to enable its use at community level for the home-based management of fever. The public-sector Coartem was in form of 4 colour-coded packs: yellow with 6 tablets per pack for the treatment of people with weight ranging from 5 to 14 kg, blue with 12 tablets per pack, for the 15–24 kg group, brown with 18 tablets per pack, for the 25–34 kg group, and green with 24 tablets per pack, for the $\geq$35 kg weight group. In Uganda, to ease prescription, case management experts translated the weights into matching age groups with yellow Coartem for treatment of people from 4 months to 3 years, blue for 4 to 7 years, brown for 8 to 12 years, and green for those above 12 years. Coartem for private-sector use was packaged differently. Several other brands of AL besides Coartem that were subsequently registered by the NDA include Lumartem and Lumet Forte of CIPLA LTD. and Artefan of AJANTA

Pharmaceuticals. Other ACTs that were also later registered in their various brands included Artesunate + Amodiaquine, Artesunate + SP, and Dihydroartemisinin + Piperaquine [21]. Availability of several ACTs ensured a variety of ACTs in the private sector. Ensuring use of high-quality ACTs in the private sector is however still a challenge; a study done in 2010 in 3 African countries including Uganda found substandard ACTs on the market. In the case of Uganda, they were only in the private sector [22].

To avoid use of artimesinin monotherapies that could result in quick development of parasite resistance to artimesinin and ACTs in general, the government (NDA) banned importation of oral artimesinin monotherapies in 2007, although implementation may not be 100% enforced. This resulted in significant decline of oral artimesinin monotherapies in the private sector.

2.2. Artimesinin Combination Therapy Introduction Process

2.2.1. Funding for ACT Introduction Process. GFATM round 4 that was the source of funding for the policy change was signed in April 2005, and first fund disbursement was in December 2005. Following the disbursement from GFATM, orders for ACTs were made by the country, through an arrangement with WHO; WHO had an agreement with Novartis, the manufacturer to AL (Coartem) that ensured that countries got the drug at a very subsidized cost for the public sector. Funds for preparatory activities including mass production of training materials, job aides, malaria treatment guidelines, and different IEC materials were also disbursed and activities initiated in January 2006. Whereas the policy change was accepted in June 2004, it was not until April 2006 that actual implementation started. This time lag was mainly due to delays in GFATM grant signing and release of funds to the country and from the government treasury to the MoH.

2.2.2. Training. Cascade training was implemented, starting with training of national-level trainers who trained district trainers. Training at both levels was in form of facilitated workshops. Samples of the prepackaged and color-coded AL were available at these trainings for trainees to familiarize with. The district trainers conducted on-job training of the health workers and familiarized health workers with the samples of the drug packs. Training was followed immediately by deployment of the medicines, to ensure that health workers immediately initiate ACT prescription as trained, prior to knowledge decay. The health workers in the private sector were also trained; however private practitioners had to procure ACTs on the open market, where it was about 10 times the cost of the public-sector ACTs. This eventually encouraged pilferage of the public sector ACTs to some private facilities, a practice that was actively investigated and condemned by the government authorities.

2.2.3. Social Mobilization. A national launch of the new treatment policy was done by the Rt. Hon. Prime Minister, on the 25th of April 2006, on behalf of His Excellency the President of Uganda. IEC campaign about the new and more effective antimalarial drug was conducted using radios, television, posters, among others. Interpersonal communication was also used in sensitization meetings with district leaders, health workers, parliamentarians, and different groups at community levels. The message reached most communities and increased the demand for the new drug by patients at the health facilities. One of the key IEC materials for health workers in public and private sector was a one-page chart with the summarized new drug policy in tabular form, which they hang in all out-patient consultation rooms and in-patient wards for continuous reference. The campaign was generally successful and informative.

2.2.4. Logistics Management. ACTs were procured through WHO arrangement with Novartis for the first 3 years of implementation, in line with the procurement plan developed in planning phase. In quantification and ordering for the medicines, data from a sample of health facilities were used to ascertain the proportions of AL of the different colors needed. The first shipment of AL was received on the 31st of January 2006. Handling and distribution of ACTs were from the onset mainstreamed into the existing government process of clearing, storage, and distribution of medicines by the National Medical Stores (NMS) for public sector and Joint Medical Stores (JMS) for private not-for-profit (PNFP) sector. The NMS had to hire additional storage space to store the AL prior to distribution as the drug was more bulky than CQ/SP. JMS would receive from NMS supplies for the PNFP health facilities (about 20% of the medicines) and was in position to handle storage and distribution. The first distribution of AL was a "push" to all health facilities based on morbidity estimates made at national level based on Health Management and Information System (HMIS) data; subsequently orders were made by the health facilities based on estimated needs, also using the morbidity method. As this was a new drug and health facilities were not very clear as to the proportion of people in the different age-groups attending the health facility, there were overestimates and underestimates of required AL of different colors by different districts and health facilities. Due to this, often the total orders received from the districts were exceeding the procured monthly AL. Hence, some rationing was done at the NMS to ensure that all health facilities received some ACTs. Maintaining adequate stocks of the different color codes was a challenge at both national and health facility levels. Adherence to the NMS delivery schedules was also a challenge due to the bulkiness of the drug, the old transport fleet then, and management challenges within the institution. Delayed delivery of AL to the district and health facilities contributed to stock-out at these levels.

2.2.5. Monitoring. To monitor the implementation of the new malaria treatment policy, troubleshoot where problems are being faced and ensure use of CQ/SP and monotherapies is phased out, quarterly support supervision was planned for in the first year. However, the planned frequency of support supervision was not achieved due to late release of funds and

other competing activities that were being undertaken by the national and district trainers. Support supervision was hence done in samples of districts after 6 to 9 months after the introduction of the new policy. The concept of pharmacovigilance and the forms for reporting any adverse effects of the drug were introduced to the health workers during the training and the reporting channel to the NDA clarified. HMIS tools were revised to capture ACTs stock-outs instead of CQ/SP, malaria cases and deaths, and malaria in pregnancy as a separate variable during the HMIS review of 2005. The updated forms were disseminated to all districts for use in reporting with effect from 2006. HMIS data was received monthly from all districts by the National Resource Center at the Ministry of Health and entered in the National Data Bank. The malaria specific information was retrieved from the data bank and reviewed periodically by the NMCP.

2.2.6. Technical Assistance. To support the introduction of the new policy, technical assistance was provided to the Ministry of Health by the WHO Country Office, the MSH, and Malaria Consortium. In addition to technical experts within these organizations, a full-time technical consultant attached to the NMCP was supported by WHO to assist the programme for 6 months in coordination of the different planned activities during policy change introduction process. In addition, a technical assistant was hired by MSH to support NMS in ACT-policy-related logistics management. All these technical experts assisted the Ministry of Health to ensure that all necessary steps as per WHO guidelines for policy change were undertaken and also timely troubleshooting about obstacles done.

2.3. Implementation of the New Policy

2.3.1. Review of Implementation of the New Policy. Details of evaluation studies undertaken to assess implementation of the new malaria treatment policy are summarized in Table 3. Three 3 months following the introduction of the new medicines/malaria treatment policy, as part of the documentation of the malaria treatment policy change, a survey was done in 5 districts (15 health facilities). The study found that guidelines on the new policy were available in study districts except the malaria treatment brochure which was not available in any of the districts. Overall, in all the 5 districts, AL was prescribed for 32% of uncomplicated malaria cases (range 5–72%), even when AL was available at the health facility. AL stock-outs were reported as rampant in most of the districts [23]. Another study was done 11 months following introduction of the new malaria treatment policy covering 7 districts (119 health facilities), and stock-outs of AL were again registered. The study further showed that even the second-line drug, Qn, was out of stock in a significant number of health facilities. Seven (7) facilities lacked both AL and Qn for the three months prior to the survey with a danger of health workers prescribing other ineffective non-ACT antimalarials [24]. Another follow-up study done 11 months following the malaria treatment policy change showed that only 56% of uncomplicated malaria cases were prescribed AL, even when the drug was available, again with significant stock-outs. Guidelines on malaria treatment policy change were only available in 50% of health facilities [25]. Another study undertaken 16 months following the malaria treatment policy change indicated that AL was prescribed for 64% of uncomplicated malaria, the rest were given CQ/SP or any other non-ACT antimalarial. In some facilities that still had a lot of stock of CQ/SP, ACTs were being used alongside the CQ/SP with the clinician left to make the judgment on whom to give ACTs or CQ/SP. The tendency was for ACTs to be prescribed for more ill-looking patients and those who had failed to improve on CQ/SP. Stock-outs of AL were still reported; there were still significant amounts of CQ and SP available on the contrary, and availability of the alternate first-line drug AQ/AS was very low, below 5%. Stocks of non recommended antimalarials available on the day of the survey were much higher than what had been reported 6 months earlier. Supervision on proper use of AL was also noted to be weak with only 34% of health facilities reporting having been supervised prior to the survey [26]. Malaria wall charts, displaying the new treatment policy (1st line, alternate first line, 2nd line, and medicines for malaria in pregnancy) and their dosages in tabular and pictorial form, that were provided to health facilities to serve as a quick guide for health workers were only available in 48% of sampled facilities despite having been disseminated at the time of launching the new policy [26].

2.4. Funding Mechanisms and Their Effects on Policy Implementation.

In August 2005, about a year after the approval of the new malaria treatment policy by the Ministry of Health, 4 months after the signing of GFATM grant round 4 phase 1 agreement, and before the procurement of the first year's ACTs, all GFATM grants to Uganda were suspended following claims of mismanagement [27]. As GFATM was the main source of funds for procurement of ACTs, implementation of the new policy had to be postponed pending lifting of the suspension. After some negotiations, funding of life-saving commodities like ACTs and ARVs was approved even during the suspension, hence the procurement of the first year's ACTs in 2006. Introduction of ACTs had been planned for in a phased manner, starting with the health facilities and to extend to communities for home-based management of fever by early 2007. The production of the prepacked CQ/SP for home-based management of fever, branded Homapak, had been stopped in anticipation for the community roll-out of ACTs at the beginning of 2007. Due to the delays in signing the GFATM round 4 grant, its suspension shortly after the signing, and the delays in release of necessary funding, the community roll-out was postponed to 2008, yet no more Homapak was being produced. Hence, this channel of antimalarial access (through home-based management of fever at community level) was rendered nonfunctional hampering the efforts to increase accessibility to ACTs within 24 hours of fever onset. The suspension was lifted in November 2005. The procurement of the life-saving commodities including ACTs, through WHO, during the suspension enabled the Ministry of Health to plan for the

Table 3: Details of evaluation studies undertaken to assess implementation of the new malaria treatment policy.

	Timing	Study details	% uncomplicated malaria patients for whom AL was prescribed	Availability of AL	Stock-out days	CQ/SP availability on the survey day	AQ/AS availability on the survey day	Quinine availability on the survey day	Recommend-ations
(1)	3 months later	Covered 5 districts, 15 health facilities [23]	Overall 32% (range 5–72%) when AL was in stock In 3 districts many patients were still being treated with CQ+SP even when AL was available. In some health units, health workers were prescribing AL only for those patients who had failed to improve on CQ+SP.	Stock-outs reported in the different health facilities in 4 out of 5 districts visited	4 districts reported stock-outs				Improve AL availability Strengthen supply chain management
(2)	11 months later; March 2007	Covered 7 districts and 119 health facilities were sampled [24]			49% of health facilities had AL stock-outs lasting 4 weeks and above 7 facilities had neither AL or QNN for 3 months			71% reported disruption of stock of more than one week in a period of 3 months 7 facilities had no QNN for 3 months	Improve the supply chain. Regular on job supervision

Table 3: Continued.

	Timing	Study details	% uncomplicated malaria patients for whom AL was prescribed	Availability of AL	Stock-out days	CQ/SP availability on the survey day	AQ/AS availability on the survey day	Quinine availability on the survey day	Recommend-ations
(3)	11 months later	80 health facilities surveyed representing all levels of care [25]	56% of uncomplicated malaria cases were prescribed AL		Stock-outs ranges from 50% for the green pack to 81% for the brown pack				Improve quantification of required AL. Improve diagnostic capacity
(4)	16 months later Aug. 2007	Cross sectional, cluster samples, health facility survey in 4 districts—195 facilities assessed [26].	64% overall and for <5 years was 69%	AL availability varied by color. Availability of any pack of AL was 87% on the day of the survey and 72% in the past 6 months. Availability of all AL packs on the day on the survey and in the past 6 months was only 34%.	Ranged from 58% for the 18-tablet pack to 44% for the 24-tablet pack and for ALL tablet packs it was 33%	Oral CQ 69% Inj. CQ 62%	SP 88% AQ 2%	AS 4% Oral 30% Inj. 41%	Increase % of AL prescriptions. Immediate increase of quantities of AL for all age groups Regular monitoring of malaria case management activities RDT deployment

launch of the new malaria treatment policy in April 2006. After lifting the suspension, the disbursements were still not timely due to different reasons, thus resulting in stock-outs. The signing of GFATM round 4 grant phase 2 was delayed by almost 18 months during which there was again rampant stock-out of ACTs in the whole country.

2.5. Country Efforts to Address Drug Stock-Out Challenges. To increase local availability of ACTs and address the challenges of stock-outs, a local manufacturing plant, Quality Chemicals Industries Ltd., was established through collaboration between CIPLA and a Ugandan business group and commissioned in 2008. Soon after passing Good Manufacturing Practice (GMP), the factory started producing ACTs that were bought locally to try and fill in the gaps created by the delayed GFATM funds. However, this could not close the big gap and the demand from the community, especially during the 18 months of delay in signing of the GFATM round 4 grant phase 2. Reasons for this were twofold; the production capacity of the local firm was low given the fact that it was in its infancy stage, and government expenditure on medicines was low yet it was supposed to purchase ACTs using own resources from the local firm. Per capita expenditure on medicines was only US$ 1.7 in 2006/07 far below an estimated requirement of US$ 7.5 [28]. During GFATM round 4 grant phase 2 period, Uganda was selected to pilot the Affordable Medicines Facility for malaria (AMFm) that would enable countries to access ACTs at a subsidized price, even for the private sector. There was a protracted negotiation between Government and AMFm as this seemingly good facility could potentially interfere with the prospects of the local manufacturing plant and country efforts to increase local availability of ACTs. However, as soon as a workable agreement was reached, Uganda accepted to be a pilot country for AMFm. Affordable Medicines Facility for malaria agreement was signed and launched on April 25 2011 (World Malaria Day). To date some of the first-line buyers in the private sector have already received about 2 million ACTs doses. This will hopefully contribute to more availability of ACTs and pave way for the eventual removal of CQ and SP for malaria treatment, leaving SP for only intermittent presumptive treatment of malaria in pregnancy.

3. Discussion

The experience of changing malaria treatment policy from CQ/SP to ACTs brings out several issues that are critical for consideration in policy change that constitute lessons learnt in the process. Several countries have gone through this process, and it is well appreciated that the malaria treatment policy change process is a complex endeavor and its successful implementation is influenced by several factors [29].

4. Decision-Making

Policy change for malaria treatment must be based on evidence of growing parasite resistance [29, 30]. Although it is agreed that evidence to change policy should be of high quality and rigorous, the nature and amount of evidence required to change a drug policy can lead to protracted discussions [31]. In many countries evidence from efficacy studies has been used to justify malaria treatment policy changes [32] but it is now recognised that this alone is not sufficient [33]. Others have argued that given the complexities of changing drug polices the picture should be more comprehensive; evidence on cost effectiveness, cost of changing the drug policy, provider, and community acceptability and operational feasibility should be considered alongside efficacy data [4, 33]. Indeed in Tanzania, after presentation of results from clinical trials showing parasite resistance to CQ, further research was commissioned to generate evidence on cost effectiveness of alternative antimalarials and cost of changing the drug policy [34]. Other favorable factors include consistency of findings from several sites within the country, evidence drawn from a wide range of the study population, availability of local research with results similar to those in other countries, and credible partners like WHO being in agreement with presented evidence [30, 34]. In the case of Uganda, evidence presented was generated from several studies undertaken in different parts of the country, representing different levels of malaria endemicity. Results were consistent with those from Kenya, Tanzania, and Malawi. At around the same time, WHO released the position on ACTs as the most effective antimalarials [11], and international pressure from malaria experts about the need for a change in drug policy to ACTs as first-line treatment of malaria was also ongoing [12]. These factors were favorable to the dialogue on policy change in Uganda.

Several studies have emphasized the importance of institutionalizing malaria drug policy reviews based on systematically collected data, early and continuous engagement of all key stakeholders in the process, and improved communication [34, 35]. In the case of Uganda, presentation of the data to the policy makers when resistance had already surpassed thresholds without having primed them of the growing resistance over time resulted in conspiracy suspicion. A multicountry analysis of the process of changing national malaria treatment policy showed that lack of standardized data, initial lack of understanding of how to use research findings to influence policy, and poor communication between key stakeholders were among the challenges faced [35].

In consideration of the data on efficacy of the different drug combinations, there is need to look at the current efficacy, the rate of deterioration of efficacy recorded in the country or in similar countries, the resistance mechanisms and possibility of cross-resistance and project how long the combination is likely to be of acceptable efficacy in the country if used well. If a fairly efficacious combination that has been deteriorating at a relatively fast rate is adopted, it is likely to exceed the policy change threshold and lead to another policy change process in a few years. This was the case with the policy change from CQ to CQ/SP. Whereas AQ/SP had been proposed as an option for consideration for use in home-based management of fever, instead of taking ACTs to the community, the efficacy of the drug combination AQ/SP had fallen significantly within a year [8] that it was not regrettable it had not been adopted as an option.

What it costs to change and implement a policy has also been a challenge to taking optimal decisions especially in instances where the policy being adopted is more costly than the one in use [36–38]. In Uganda, the change from CQ to CQ/SP was partly driven by the fact that this option was affordable to the government and patients seeking care in the private sector. Similarly in Tanzania, the change from CQ as a first-line drug to SP was driven by affordability despite the fact that research had shown a rising parasite resistance trend to SP [34]. Availability of the GFATM funds was a major influence on the adoption of the ACT treatment policy in Uganda. Although donor aid plays a key role in financing health services, the extent to which developing countries should make policy decisions based on funding from donors continues to be hotly debated. The lack of predictability, sustainability, and alignment has been documented in Uganda and other developing countries, hampering implementation of programmes [39–41]. Similarly this could hamper policy implementation. In the case of Uganda, the suspension of GFATM due to alleged mismanagement resulted in delayed implementation of the new policy, and the delay in signing the GFATM round 4 grant phase 2 resulted in rampant ACT stock-outs.

External influences on drug policy change can be several; donors through availing funds can influence drug policy change. Influence of donors in policy change processes in developing countries, largely tied on receiving donor aid, has been documented. In instances where this has been in conflict with local contexts, resistance from recipient countries has not always been successful [42]. Other external influences on policy change could be manufacturers and technical officers-leaning towards some manufacturers. In Uganda decision-making process, there was a lot of push for adoption of AS/AQ versus AL, with 2 different groups of people in the meeting pushing for the 2 medicines, which raised suspicion of the possibility of indirect influence by the manufacturers of the 2 drug combinations. The eventual adoption of AL as first-line and AS/AQ as alternative first-line was partly as a form of compromise. These influences were also documented in Tanzania where the change from CQ to SP was decampaigned by pharmaceuticals manufacturers and traders who had large stocks of CQ and had even made more investments to continue with CQ production and marketing [34]. As much as possible, manufacturers' influence should be avoided in the discussion on drug policy change and focus be put on efficacy, cost-effectiveness, acceptability, and feasibility of use of the different medicines. Provider and consumer confidence in the recommended drug policy is also critical for effective implementation. In Tanzania, a belief by the public that CQ was still effective despite results of efficacy studies that showed high parasite led to protracted discussions and loss of time in the policy change process [34]. The low provider and consumer acceptability of Amodiaquine due to the perceived severe side effects was an important factor in decision-making in Uganda. In addition, there were also concerns about co-packaging of AS/AQ against the background of low provider and consumer acceptability as this could result in situations where patients consume only Artesunate and not Amodiaquine and lack of pediatric formulation for AS/AQ at the time. However, the manufacturer has now started producing coformulated AS/AQ as well as the pediatric formulations.

5. Social Mobilization

Involvement of the public needs to be harnessed right from the time of undertaking the research, dissemination of results, to launching and implementing the policy. The public should know and understand why a new policy is being developed. Public suspicions, personal experiences, and lack of trust have often derailed policy change processes. In Tanzania, parliamentarians' public pronouncements that they were continuing to use CQ raised questions among the general public about the need to change the drug policy to SP. In addition, isolated incidences from patients who had had side effects from other antimalarials further detracted the debate [43]. Public pronouncements by high ranking official facilitates uptake of new polices. In Uganda, launch of the new treatment policy by the Rt. Hon. Prime Minister during the commemoration of Africa Malaria Day energized the policy implementation and reinforced government's commitment to fight malaria. In Tanzania, launch by the honorable minister of health also greatly enhanced public confidence [34]. However, caution also needs to be taken on what message is given and the potential effects of the message. They should be pretested well to ensure that they communicate the intended message. In Uganda, the message sent out that ACTs were the most effective drug had far reach but in some cases resulted in some unperceived actions. Some health workers would keep this very effective drug for the patients that were very sick looking or those who did not respond initially to CQ/SP. In the latter case, it was being used as a second line instead of first-line treatment.

The policy of clinical diagnosis and presumptive treatment of all fever, especially in children less than 5 years, as malaria [10], resulted in several non-malaria cases being treated as malaria. Whereas CQ had antipyretic effects and hence patients would initially feel a bit better on CQ even if they did not have malaria, AL lacked this quality. Hence febrile patients, misdiagnosed and treated as malaria, would in most cases not feel better while on AL, and this was quite disappointing to the public given the IEC messages passed. After some time, the public started discrediting AL, indicating that it is not as effective as had been portrayed. However, efficacy studies at the time still indicated that AL was quite efficacious. Subsequently, the Ministry of health adopted a malaria diagnostic policy that requires each febrile case to be subjected to parasitological diagnosis of malaria by microscopy or rapid diagnostic tests, and only parasitologically positive cases should be treated with antimalarials.

5.1. Cost. Treatment policy change is quite costly and should be well planned for. Although the highest cost falls on acquiring the drug, training, preparation of guidelines, communication, supervision, and monitoring of policy implementation, continued therapeutic efficacy testing of the drug and informing the policy makers when changes are needed

are costly activities which are often underrated. In Tanzania, estimations showed that the cost of changing the malaria drug policy amounted to 1% of overall public expenditure and 3% of annual drug budget [44]. Key activities are often not undertaken compromising successful implementation of the policy. In Uganda, support supervision was not implemented as planned, and this possibly had a negative effect on the policy implementation.

Many of the malaria patients are attended to in the private sector. Hence, malaria treatment policy should be implemented by both the public and the private sectors. In Uganda, whereas the private sector was trained on the new malaria treatment policy, the subsidized medicines procured with GFATM funds and later from the local manufacturer were distributed to the public and private not for profit sectors only. The private-for-profit facilities and pharmacies had to procure the medicines from the open market at a cost almost 10 times the cost of the one in the public sector. This resulted to limited access to ACTs in the private sector due to cost, yet, use of the private health sector in Uganda is significant with 59% of first consultations taking place in the private sector [45]. The Affordable Medicines Facility for malaria aims at providing more subsidized ACTs to both public and private sectors and will potentially assist to address this gap. Private-public partnerships should be put into consideration in designing policy changes.

6. Implementation

Changing a policy based on evidence does not automatically guarantee its implementation. There are operational issues which may relate to the health system in general but also to health workers' attitudes that need to be addressed. In the case of Uganda, evaluation studies showed variations in the new drug policy uptake by the health workers, ranging from 34% to 64%. Evidence shows that reasons for this are several; the lack adequate supplies of AL, concern about AL costs, and the availability of non-recommended antimalarials like Amodiaquine caused prescription confusion [46]. Health-system-related challenges faced in Uganda included weak stock management and the resultant stockouts; health workers also had difficulties quantifying needs for the different packs when making orders. Supervision was not undertaken regularly, and diagnostic capacity was weak even when the new guidance on parasitological diagnosis before prescription of ACTs was issued. Available stocks of nonrecommended antimalarials were significant. Whereas this may have been due to the high level of stock-outs of AL in most sites, this to some extent undermined implementation of the new policy where AL was available. Kangwana et al. noted that the key benchmark of successful drug policy implementation is ensuring availability of recommended medicines at service delivery levels [47].

Although there was good progress in implementation of the policy, more supervision needed to be done to assure health workers of the availability of ACTs and ensure they prescribe ACTs for all uncomplicated malaria, especially when ACTs were available at the health facilities. The need to review the importance of color coding was also flagged as an issue requiring further scrutiny. Improving availability of AL, strengthening the supply chain, and diagnostic capacity were also noted as key to successful implementation of the new drug policy.

Among the remedial efforts to counter rampant stock-outs in Uganda was starting local manufacturing of ACTs. Similarly, in Sudan, a year into implementation of the drug policy change 4 local manufacturing companies had registered their ACT products in Sudan. The extent to which this can address ACT shortages depends on several factors. In the case of Uganda improvements were modest given the low production capacity of the local firm in its infancy stage and low government expenditure on medicines; it was supposed to purchase ACTs using own resources. Per capita expenditure on medicines was only US$ 1.7 in 2006/07 far below an estimated requirement of US$ 7.5 [28]. In the case of Sudan, the cost of the drug was prohibitive to an ordinary Sudanese given the fact that services in public facilities were not free and, indeed, a household survey showed that treatment with ACTs was only 10.5% on average and cost was a major hindrance [30].

7. Conclusion and Lessons Learnt

Uganda adopted ACT treatment policy for malaria in 2005 at a time when the CQ/SP combination was evidently not the best treatment option for malaria cases in Uganda. Policy change was facilitated by the availability of funds from GFATM. The planning for policy change was meticulously done; however the implementation has been plagued by rampant stock-outs of the ACTs. Until the ACTs are available at the service delivery centres at health facility and community levels, the full impact of the new policy change may not be achieved, and the use of non-recommended antimalarials will remain a problem. The advent of AMFm and the local manufacturing of ACTs provide opportunities for ensuring unlimited access to ACTs by all but factors that may hinder realization of this objective need to be addressed.

In malaria endemic countries, drug policy change is something to be expected at one point in time. Countries should consider institutionalizing necessary processes, engagement of all stakeholders, constant dialogue using systematically collected data but must also agree on what kind of data is crucial. Comprehensive cost estimates should be computed to undertake all key activities and funding mobilized for successful policy change processes and implementation. The private sector remains a significant source of health care for the population, and improving access to new drug polices will involve strong partnerships, regulation and addressing impediments to accessing care in the private sector as much as feasible.

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MALARIA JOURNAL

RESEARCH Open Access

Malaria treatment policy change in Uganda: what role did evidence play?

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Abstract

Background: Although increasing attention is being paid to knowledge translation (KT), research findings are not being utilized to the desired extent. The present study explores the role of evidence, barriers, and factors facilitating the uptake of evidence in the change in malaria treatment policy in Uganda, building on previous work in Uganda that led to the development of a middle range theory (MRT) outlining the main facilitatory factors for KT. Application of the MRT to a health policy case will contribute to refining it.

Methods: Using a case study approach and mixed methods, perceptions of respondents on whether evidence was available, had been considered and barriers and facilitatory factors to the uptake of evidence were explored. In addition, the respondents' rating of the degree of consistency between the policy decision and available evidence was assessed. Data collection methods included key informant interviews and document review. Qualitative data were analysed using content thematic analysis, whereas quantitative data were analysed using Excel spreadsheets. The two data sets were eventually triangulated.

Results: Evidence was used to change the malaria treatment policy, though the consistency between evidence and policy decisions varied along the policy development cycle. The availability of high-quality and contextualized evidence, including effective dissemination, Ministry of Health institutional capacity to lead the KT process, intervention of the WHO and a regional professional network, the existence of partnerships for KT with mutual trust and availability of funding, tools, and inputs to implement evidence, were the most important facilitatory factors that enhanced the uptake of evidence. Among the barriers that had to be overcome were resistance from implementers, the health system capacity to implement evidence, and financial sustainability.

Conclusion: The results agree with facilitatory factors identified in the earlier developed MRT, though additional factors emerged. These results refine the earlier MRT stating that high-quality and contextualized evidence will be taken up in policies, leading to evidence-informed policies when the MoH leads the KT process, partnerships are in place for KT, the WHO and regional professional bodies play a role, and funding, tools, and required inputs for implementing evidence are available.

Keywords: Malaria treatment policy change, Evidence, Knowledge translation

Background

Although commitment to knowledge translation (KT) has been an issue of interest to funders of research, researchers, and policymakers, there is a concern that research findings are not being utilized to the extent that they should [1-4]. Several studies have documented the barriers and facilitatory factors for the uptake of evidence in policy development and many lessons have been learned [5-9]. Delays in using evidence to change treatment protocols, which in some instances have been longer than seven years [7], have led to wasting resources due to the continued use of ineffective care, with suboptimal health outcomes. Among the documented reasons for such delays is the poor quality of available evidence, political processes lacking inclusive dialogue, donor influences, a lack of openness to using evidence by policy makers, lack of required inputs to implement the evidence, limited alternatives, and concerns regarding the duration over

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which the new drugs will remain efficacious [5,6,10]. Available models on improving the uptake of evidence in policy development only marginally address these factors, some of which specifically pertain to low-income countries (LIC) [5,10-12]. Scholars have pointed out the specificity of KT processes, stating that they are influenced by the nature of the policy, context, and stakeholders involved [12,13].

In the present study, evidence is broadly defined to include research study results (both published and unpublished), findings from monitoring and evaluation (M&E) studies and population-based surveys, Ministry of Health (MoH) reports, community complaints, and clinician observations [14,15]. The term KT is defined as a dynamic and iterative process including the synthesis, dissemination, exchange, and ethically sound application of knowledge to improve health, strengthen the healthcare system, and provide more effective health services and products [16]. In the present study, the terms "uptake of evidence in policy" and "knowledge translation" are used interchangeably.

This study, which looks at the uptake of evidence in policy development, specifically in reference to changes in the malaria treatment policy and its implementation, is part of a larger study exploring ways to improve KT in Uganda. Previous work in Uganda led to the development of a middle range theory (MRT) outlining the main facilitating factors for translating evidence into policymaking [17]. MRTs are defined here as "theories that lie between the minor but necessary working hypotheses (…) and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behaviour" [18].

The MRT detailing facilitating factors to the uptake of evidence as identified by policy actors in Uganda states the following:

> "*High-quality and contextualized evidence will be taken up in policies so as to lead to evidence-informed policies in instances where the MoH leads the KT process and there are partnerships for KT in place.*

Evidence must be of high quality, contextualized, providing economically feasible recommendations, and produced in a timely manner by credible researchers. Use of local researchers is helpful but there is need for separation of roles between researchers and policymakers.

KT requires strengthened MoH institutional capacity to lead the KT process. Institutionalized platforms for engagement between researchers and policymakers including civil society need to be in place, and mechanisms to coordinate evidence generation and synthesis need to be mainstreamed within the MoH. The capacity of policy makers in knowledge management needs to be strengthened and the policy making process need not be very bureaucratic.

Partnerships for KT need to be in place and all relevant stakeholders must be involved throughout the process to improve trust and build interest. Communities need to be involvement in evidence generation and KT as well.

> *These contribute to higher ownership, adoption, and better application of evidence* [17]*".*

The MRT was developed on the basis of a literature review and then validated with policy actors in Uganda. The facilitating factors were collected from respondents without a specific reference to a given research project and policy outcome; the extent to which they are valid in other settings needs to be tested in specific policy case studies. This study explores the place of evidence in the design and implementation of the change in malaria treatment policy in Uganda using a case study approach. Specifically, the study seeks to assess the extent to which the previously developed MRT explains the uptake of evidence in policy development from a policymaking perspective and explore the barriers and facilitatory factors to the uptake of evidence in the malaria treatment policy change. Eventually, the application of this MRT to concrete, selected health policy cases will contribute to refining and enriching the previously developed MRT.

Background to the case study

The background to this case study was published by Nanyunja *et al.* [19]. The increasing resistance against chloroquine (CQ) in the late 1990s in several African countries, as reported by the East African Network on Monitoring Antimalarial Treatment (EANMAT), caused concern [20]. EANMAT was established as a platform to bring together malaria researchers and policy-makers from the Ministries of Health of the three East African countries: Kenya, Uganda, and Tanzania. In Uganda, the MoH set up several sentinel sites in 1997 with support from EANMAT and the World Health Organization (WHO) to monitor the efficacy of anti-malarials. The sentinel sites represented all geographic, epidemiological, and ecological strata of malaria in Uganda. Evidence from these sentinel sites showed that resistance to CQ exceeded the WHO-recommended threshold beyond which a policy change is recommended [21,22]. Thus, several countries, including Uganda, embarked on changing their malaria treatment policies [7,10,19,23,24]. A review of this process in Uganda highlighted the importance of managing the policy change process, generating and using evidence for policy decisions, and the availability of adequate and predictable funding for effective policy roll-out [19]. The malaria treatment policy initially

changed from CQ only to a combination of CQ/sulphadoxine/pyrimethamine (SP) in June 2000. Due to increasing resistance to CQ/SP, the treatment policy was changed again to artemisinin combination therapy (ACT), specifically artemether-lumefantrine (AL) (trade name Coartem®), as the first-line treatment for uncomplicated malaria, with artesunate-amodiaquine (AS/AQ) as an alternative [25]. The process occurred over a period of 25 months, from March 2004 to April 2006.

Methods

Study design

The case study approach was used based on the need to understand complex contextual issues [26]. The case is the malaria treatment policy change from CQ/SP to AL with AS/AQ as an alternative first-line treatment, which occurred in Uganda within a time span of 25 months between March 2004 and April 2006. Case study research has been shown to offer an opportunity for detailed contextual analysis of real life situations when the boundaries between the phenomenon under investigation and context are not clearly evident [26]. Furthermore, several researchers have used case studies to test theories in real life situations [27,28]. The validity of the results was enhanced through the use of multiple data collection methods and member checking [29]. Prior to finalization, the preliminary results were reviewed by stakeholders who were central to the policy case: two from the WHO and two from the MoH. Recall bias was ameliorated by interviewing a wide range of knowledgeable stakeholders and by using multiple data sources [29]. The case study was performed between June 2012 and August 2013.

In a quest to improve the comprehensiveness and validity of the findings, the present study employed both qualitative and quantitative methods (QUAL + quant) which are increasingly being applied to the investigation of complex issues in health systems research [30,31]. A timeline of key events was developed based on a review of documents in consultation with two persons from the WHO and two persons from the MoH who held malaria-focused positions for over 10 years. This timeline guided the identification of key milestones, involved processes, the key documents to be reviewed, and the institutions involved, which subsequently informed the selection of respondents (Figure 1).

Selection of respondents

The selection of respondents was guided by the study design. Using the timeline of key events, institutions were identified that were involved in the policy process. Key informants (KIs) were selected using purposive sampling, with the main criterion being their involvement in the research, design, or implementation of the malaria treatment policy change [32]. From each of the key institutions, the focal persons involved in the policy change process were selected and employed the snowballing technique to identify other key respondents until saturation. Some of the identified respondents had since moved on to other employment or retired and were categorized under the institutions they worked for at the

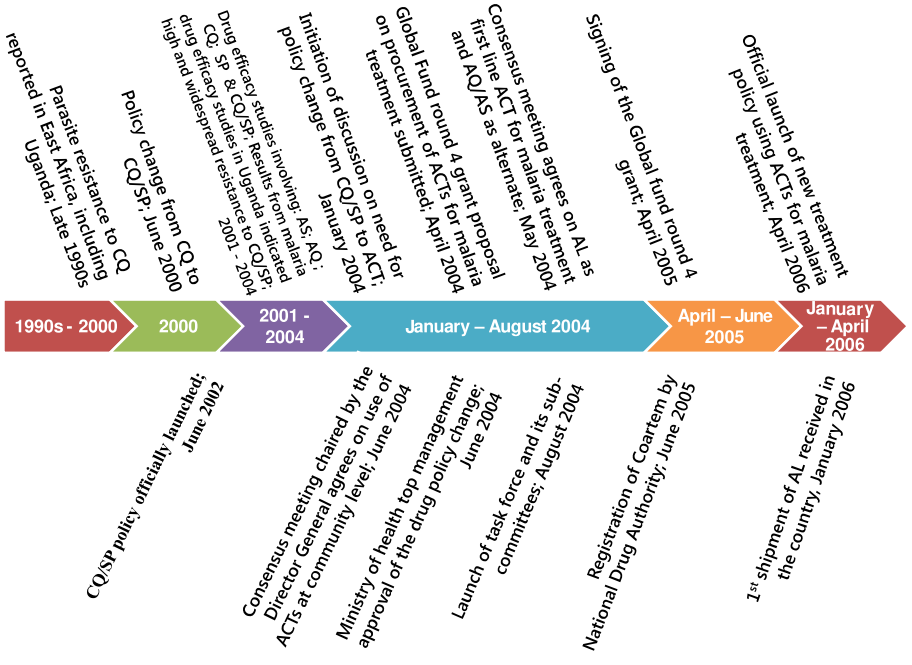

Figure 1 Timeline of key events in changing the malaria treatment policy.

time of the policy change. The identified focal researchers were selected for interviews if they had been involved in malaria research and provided evidence that was considered in the policy change process. Emphasis was placed on collecting their perceptions in line with the study questions, beyond what they may have published in scientific papers and research reports.

To obtain perceptions from across the spectrum of the healthcare delivery system, two districts with high malaria endemicity [33] were purposively selected based on proximity and the presence of a regional referral hospital (Jinja district) or general hospital (Mpigi). Within these districts, two hospitals and two lower level facilities (one public and one private not-for-profit in both districts) were purposively selected based on proximity and the desire to include different levels of the healthcare system. At the district level, the district health officer and a member of the district health team in charge of supervising health facilities within the district were purposively selected. Finally, the medical superintendent, or health centre employee in charge, and one clinical staff member responsible for the outpatient department at each health facility, were purposively selected as these employees interface with patients on a daily basis and are more likely to know the malaria burden, community health-seeking behaviours, and to have interfaced often with the supervising teams.

The selected respondents included donor representatives, public policy makers, civil society organizations (CSOs), researchers, the media, and representatives of the pharmaceutical sector. Managers of health services at the district level, health care providers from the public and private not-for-profit health facilities, senior officials from the national medical stores (NMS) in charge of medicine procurement and distribution, and managers from the national drug authority (NDA) in charge of medicine regulation were also interviewed. Details of the selected respondents are shown in Table 1.

Table 1 Key informant respondents

	Institution	Number of respondents	Average number of years in post
	Donors	**3**	**8**
Public sectors	National level MoH	10	11
	National medical stores (NMS)	1	3
	National drug authority (NDA)	1	6
	Service providers	4	7
	Managers at district level	2	9
	Researchers in universities	1	8
Private sectors	Civil society organizations	3	9
	Researchers from private research institutions	1	7
	Media	1	8
	Private pharmaceutical sector	1	5
	Service providers&	3	6
Total number of respondents		31	

&One of the selected districts did not have a private not-for-profit hospital.

Selection of relevant documents

The timeline of key events guided the identification of relevant documents to be reviewed. A broad range of documents relevant to the case were included in order to ascertain the processes and stakeholders involved and assess the use of evidence.

Qualitative research methods

The qualitative part of the study assessed whether evidence was available to guide policy decision-making, the nature of the evidence that was available, the extent to which evidence was disseminated and discussed in relevant forums, whether and why evidence had or had not been considered in policy development and implementation, and whether policy decisions were in line with the available evidence. The barriers and facilitatory factors to the uptake of evidence in the malaria treatment policy change and implementation process were explored.

Data collection

Data collection methods included a review of documents and interviews with KIs. Interviews were conducted with KIs using an in-depth interview guide consisting of open-ended questions. The interview guide was developed by the first author and was reviewed and refined by the research team prior to pretesting it with volunteer colleagues in the WHO Uganda office (n = 2), technical officers in the MoH (n = 2), and one researcher from the Makerere University School of Public Health in Uganda. KIs were contacted and invited by email or telephone to participate in the study. All identified respondents accepted to participate and were interviewed. All interviews were conducted by the first author face-to-face in English (see Additional file 1).

Relevant documents were reviewed using a review guideline and included MoH position papers, concept papers, minutes of meetings, malaria policies and guidelines, research reports, malaria proposals to the Global Fund, reports of working groups, and supervision and research reports as identified over the timeline of key events (see Additional files 2 and 3).

Data analysis

Interviews were recorded, transcribed verbatim, and entered into MS Word software for editing as the first step in the "formal" analysis. The interviews lasted 45 minutes on average. During the interviews, the first author made additional notes of initial findings and impressions, which were used to enrich the transcribed interviews. Next, the first author read all of the transcribed interviews to identify emerging issues, and then the first two authors analysed the interviews together to identify emerging issues. Deductive content thematic analysis [34] was used to organize the emerging issues under themes in line with the initial MRT. An example of how the deductive content thematic analysis was conducted is provided in Table 2. The research team then reviewed and interpreted the findings. Converging issues were reviewed again by the research team and, when interpretations differed, consensus was achieved by revisiting the raw data and discussions. Identified regularities were compared with the previously developed MRT to identify convergent and other emerging issues. Similarities and contrasts between respondent perceptions were reviewed by the research team and possible explanations for the contrasting views discussed. When necessary, quotations that best represent the emerging issues were edited slightly for flow while preserving the meaning of the text.

Table 2 An example of content thematic analysis

	Category 1 (manifest)	Category 2	Subtheme	Theme
Evidence used was mainly on the efficacy of the drugs being used (CQ/SP) and there was good quality evidence from different sites in the country showing that the efficacy of the drugs was declining.	Evidence used was mainly on the efficacy of the drugs Good evidence from different sites in the country	Efficacy studies of high quality from multiple sites showing consistent results	High-quality evidence of drug efficacy (CQ/SP)	
Though few studies has been done in Uganda, there were studies in other countries in the region- Ghana, Zambia- showing high levels of efficacy for the ACTs in a similar environment. The evidence from the clinical studies was quite good- the studies were comparable and had been done with adequate sample sizes. The data were consistently showing increasing resistance.	High-quality evidence showed a high level of efficacy for the ACTs in other similar settings			
A lot of international evidence on efficacy was used, including sentinel surveillance sites set up by EAMAT, who are respected professionals.	Evidence from MoH-owned sentinel studies supported by respected researchers			
There was not overwhelming data in the country to compare the two (CQ/SP & ACTs); but real data was available showing that CQ was failing. Just a few studies compared ACTs, but the particular ACTs being used and that were recommended as the best for the circumstances had only been investigated by one study in Uganda.	Real data showing CQ was failing			**Characteristics of available evidence**
There was also the option of taking amodiaquine artesunate and artemether lumefantrine. A few studies investigated artesunate, but studies with amodiaquine showed that amodiaquine resistance was not yet at the mark where it cannot be used, especially if it is in combination with SP, but the resistance of amodiaquine was increasing rapidly. Then the issue was that, if combination therapy is used and amodiaquine loses efficacy in the next one to two years, the problem of mono therapy will return.	Efficacy data was available on the different options: amodiaquine artesunate and artemether lumefantrine	Locally available evidence on drug efficacy study discussed in a stakeholder forum	Locally available evidence of the efficacy of other potential drugs/ACTs was reviewed and discussed	
As a country, none of the partners involved in implementing malaria control activities disagreed with the results on CQ resistance that came out of the studies.	All partners agreed with research results		Consensus on research results	

Quantitative research methods

Quantitative methods were used to capture the multiple perspectives of the involved stakeholders and enable the identification of regularities and patterns [35]. The quantitative part of the study measured the frequency with which evidence was cited in reviewed documents (including different types of evidence) and the respondents' rating of the degree of consistency between the policy decision and available evidence. A policy development framework including the steps of agenda setting, policy formulation, selection of preferred options, and implementation [36] was used to organize the quantitative part of the case study.

Data collection

The document review entailed quantifying the frequency with which evidence was cited, including the type of evidence (local *versus* international research; operational research, systematic review, basic research, M & E data). Using a semi-structured questionnaire, KIs were asked to rate the consistency between policy decisions and available evidence. The consistency between evidence and policy decisions were rated using scales developed by Hanney *et al.* [3], which rate different parameters on a scale of 1 to 4 (1, considerable level of agreement; 2, moderate level; 3, limited level; 4, no indication of consistency despite availability of evidence). In applying the scales, the factors taken into consideration included the degree to which the policy was consistent with evidence in terms of the definitions of the policy problem and objectives and the description of the strategies and actions, and how far the elements of the policy contradicted the available evidence.

Data analysis

Quantitative data were analysed using Excel spreadsheets. Qualitative and quantitative data sets were eventually triangulated. In addition, findings from the document analysis and the analysis of KI interviews were integrated throughout the analysis. Informed consent was obtained from all respondents prior to the interviews. Study participants were informed about the purpose of the study and the scope of issues in the in-depth interview guide. Confidentiality was ensured in data management and only aggregate information without subject identifiers is reported. All data were secured in a safe location accessible only to the study team. Ethical approval was obtained from the Institutional Review Board of the Institute of Tropical Medicine, Antwerp (Belgium; IRB number IRB/AC/ac/197) and Uganda National Council for Science and Technology (number SS 2920).

Results

Use of evidence in changing the malaria treatment policy

The change in malaria treatment policy was reported to be very technical, and in which the role of evidence was very important. A civil society respondent stated more specifically that, "*This is mainly scientific because we are dealing with technical issues, hence no room for guessing. As civil society, although we reach out mainly to communities, we were at task to explain the need for a policy change using scientific explanations".*

The evidence that was reported to have been available and considered in the policy process was categorized into nine areas (Table 3), namely local and international evidence on drug efficacy, guidance from the WHO, "cries" from the community, evidence on cost, implementation feasibility, routine monitoring data, local and international experiences, observational evidence, and evidence on behavioural change.

Evidence on the efficacy of CQ/SP and ACT was reviewed, discussed, and guided decision-making, as highlighted by a donor respondent: "*We used evidence to change the malaria treatment policy. We mainly used evidence on the efficacy of the drugs that we were using (CQ/SP). There was good evidence from different sites in the country showing that the efficacy of the drugs was really declining*". This evidence was deemed to be of high quality because multiple study sites were using a WHO-approved protocol. Technical support was provided by EANMAT and the WHO when setting up the sites and for the development of research protocols, data analysis, and interpretation. Results from the different sites were consistent, and the results were consistent with those of other countries with similar malaria endemicity:

> "*The methodology to undertake studies on the efficacy of medicines was thorough, so when we presented the evidence, there were no loopholes. We made sure that results were not from only one study area. Otherwise, with the challenges we had with this malaria treatment policy shift, if there were loopholes in the data we would have been shot down, especially at the point when people started thinking that maybe some drug companies were the ones pushing it on Uganda and that the country was not going to afford the new policy*". (Researcher respondent)

The WHO provided evidence from global and regional levels, as well as standards with regards to drug resistance cut-off levels at which a country should embark on changing their malaria treatment policy. This was important in guiding decision-making, as emphasized in the following quotes:

> "*WHO is seen as the authority on clinical matters; when the WHO takes a stance and says that this drug is better for patients than the old drug, the country will often take that recommendation very seriously*". (Donor respondent)

Table 3 Type of evidence used to change the malaria treatment policy as reported by respondents

		High-quality evidence on drug efficacy (CQ/SP and ACTs)	Guidance provided by WHO	Cries from the community	Evidence on cost	Implementation feasibility	Routine monitoring data	Local and international experiences	Observational evidence from clinicians	Evidence on behavioural change
Public sector	Donors	3	3	1	2	1	0	2	1	1
	Central level MoH	7	6		4	1	1			
	NMS									
	NDA	1	1						1	
	Service providers	1	2	2		1	1			
	Managers at district level	2	1				1			
	Researchers	1	1							
Private sector	CSO	1		1						
	Pharmaceutical company	1								
	Media	1		1				1		
	Service providers	1				2				
	Researchers	1	1	1		1			1	
	Total	**20**	**15**	**6**	**6**	**5**	**3**	**3**	**3**	**1**

"*Uganda is a member of the WHO - so we tend to take advice and guidance from the WHO. Whenever WHO updates guidelines or sends out new information, we take that advice. One of the reasons why a country, like for example Uganda, should change the policy is because they are being guided by an international body like the WHO, which is our technical arm in policy around malaria and other diseases*". (MoH respondent)

Cries from the community further created impetus to take action, as one donor respondent stated, "*There was a public outcry, and the public outcry comes in many forms, either through newspaper articles or, particularly if you are the health worker, people will tell you 'doctor you gave me this drug for a fever last week and it is not getting better!' That is how they communicate to you their concerns, and that is strong enough. So to me, I think that is strong enough evidence and we used it*".

At the implementation stage, community complaints, which referred to perceptions of the effectiveness of Coartem®/AL, were used to address operational challenges:

"*When we came in with Coartem, three months later we started getting complaints from the community that the new drug was not as effective as CQ; when you take it you still feel weak and the temperature does not go down. The problem was not that the new drug was not working, but it did not have the property of reducing temperature. So we had to go on radio to make the announcements nationally saying 'when you are taking Coartem®, take an antipyretic like Aspirin or Panadol together with Coartem,' and it worked*". (MoH respondent)

Routine M & E and evidence from supervision reports were also used at the implementation stage. However, reservations were expressed by service providers regarding the quality of routine data stating that "*we submit our monthly reports to the District Health office, and these reports are used in assessing delivery of services, including malaria, but I have never seen any change. No feedback to improve the quality of data*".

Facilitatory factors for the uptake of evidence

Respondents identified factors that facilitated the uptake of evidence, and these were categorized into five themes: 1) characteristics of the available evidence, 2) MoH institutional capacity to lead the KT process, 3) partnerships for KT, 4) availability of tools and inputs to implement evidence, and 5) intervention of the WHO. These themes are summarized in Table 4 and the details of each theme are provided in Additional file 4.

Characteristics of the available evidence

The characteristics of available evidence encompassed several dimensions, including the availability of high-quality local evidence, the availability of competent in-country researchers, consistent results from multiple studies performed by different researchers, evidence generated by credible international researchers/regional network, and consensus on research results.

High-quality local evidence on the efficacy of CQ/SP was available from sentinel sites set up in Uganda by the MoH with support from EANMAT and the WHO. A private pharmaceutical representative noted that "*the study design also influenced the uptake of evidence. For example, they used the WHO tools; people will easily accept such evidence other than coming up with individually designed tools. The WHO tools are already tested methods*".

Some research studies were performed by competent in-country researchers who were deemed credible, and this helped the acceptance of results, as highlighted in the following quote from a donor respondent:

"*Uganda is fortunate that it has a lot of leading thinkers in malaria who know a lot about malaria. They were part of the process and were leading in all the studies. The availability of local data made it easier for running this case through the different levels of policy formulation, which would be different I*

Table 4 Factors that facilitated the uptake of evidence as reported by respondents

	Donors	MoH	NMS	NDA	Service providers	CSO	Pharmaceutical company	Media	Researchers	Total
Characteristics of available evidence	10	20	2		14	4	4		3	57
MoH institutional capacity to lead the KT process	1	8		2	2	3			4	20
Partnerships for KT	3	7		1	3	2	1		1	18
Availability of tools and inputs to implement evidence	2	5			9	1				17
WHO intervention	3	4				1			1	9

suppose if you were in a country where there are no systems for research".

International researchers who had generated evidence from outside the country were also credible, as the MoH respondent stated, "*The regional network EARMAT is highly respected as a body of senior malaria experts, their support to sentinel sites in the regions gave a lot of credibility to the data, and they have been very supportive in terms of helping us to understand what is in the background*".

Consistency in the research results of different study sites in the country and studies from other East African countries was a key factor, as stated by a donor respondent, "*Evidence sometimes is not easily accepted, but there was consistency in results from different sites. If you have several studies from different settings undertaken by different researchers showing the same results, it is easily accepted".*

Evidence was disseminated through the media, as a MoH respondent stated, "*I remember we had a report coming out every Monday in the newspapers publicising the malaria burden*". However, some felt that the extent to which evidence influenced decision-making could not be ascertained. A journalist remarked, "*We certainly published a number of stories on drug resistance in the newspapers although I am not sure to what extent those publications influenced decisions*".

Similarly, the review of documents pointed to the availability of contextualized evidence on the efficacy of anti-malarials from studies performed in the country. Other sources of high-quality evidence included Demographic Health Survey (DHS) data supported by Macro International, the census and national household survey employing internationally agreed upon methodologies, and malaria economic studies, which were carried out in several countries following the WHO protocol.

There was separation of roles, the researchers conducted the studies and policy makers played a leadership role, receiving and discussing results. Research findings were discussed in several partnership forums. Evidence was discussed in the Malaria Case Management Technical Working Group (MCMWG)[a], the Interagency Coordination Committee for Malaria[b], and the national stakeholder forum. A research committee was put in place and included Malaria programme staff, researchers, and representatives of technical partners (WHO, Malaria Consortium, UNICEF). Research priorities were identified in a meeting that brought together all relevant stakeholders.

MoH institutional capacity to lead the KT process

The MoH institutional capacity to lead the KT process encompassed several dimensions, including leadership role, the willingness of MoH to use evidence, MoH involvement in research studies, and a culture of the MoH using evidence to change treatment policies.

The strong leadership of the MoH and a culture of using evidence in policy development, facilitated partly by previous experiences, were echoed by several respondents. A researcher remarked, "*I recall that around the time that we transitioned from CQ/SP to ACT, the NMCP was in the hands of two people; both of them believed in evidence*".

There was close collaboration between researchers and MoH policy makers, as reported by a researcher:

> "*Our research programme has been working closely with the MoH and that helps; although were not always on the same page we had a good relationship. The sentinel sites were established by the malaria control programme a long time ago and we are using them. We have continued that relationship and, when we do studies, we often discuss with them what we are going to do and get a go ahead from the ministry. We have also had funding coming through the Ministry*".

However, one donor respondent expressed reservations about the quality of MoH participation:

> "*We have people in the ministry that are not well versed with the evidence they are using to decide whether this policy makes sense or not, and therefore you have people that think they know the evidence but really they do not*".

The reviewed documents further confirmed that an institutionalized and systematic data collection system on drug efficacy was in place through the MoH-established sentinel sites (established in 1997). In addition, the Health Management Information System (HMIS), which collects data on service utilization and malaria cases, was also in place and managed by the MoH. These sources provided data that were referenced in the majority of the reviewed documents.

Furthermore, the MoH commissioned several studies, including a review of all available data, and closely followed up with researchers through the implementation of the research studies. Broad institutionalized platforms were in place for engaging all stakeholders. The MoH took leadership of the knowledge synthesis and application process through participation in, and chairing, the working group charged with synthesising all available evidence and making recommendations to the steering committee, which consisted of the decision-makers.

Partnerships for KT

Partnerships for KT encompassed: the availability of platforms and structures within the MoH to discuss

evidence, the interest of stakeholders to see that evidence is adopted into policy, and civil society involvement.

The availability of structures within the MoH to enable systematic dialogue was highlighted as a factor that improved the uptake of evidence:

> "*At that time we had a very good team in the MoH and the opportunity to discuss things. There were systems and we had regular meetings and annual performance reviews. We had quarterly performance evaluations, which were very important and everyone had to be there right from the minister, so the climate for evidence-based decision-making, whether it was accidental or not, was there in the vision of the leadership*". (MoH respondent)

Platforms to enable inclusive participation were also in place for evidence to be discussed, which facilitated consensus building, as highlighted in the following quotes:

> "*The way the policy process worked is that the malaria programme in the ministry called together all its technical stakeholders - all its partners - everyone, government, academia, NGOs, etc. Everyone sat in one room and debated what they thought the best policy option should be. I thought this was an excellent process*". (Donor respondent)

> "*As a malaria programme, we have what we call a Malaria Case Management Technical Working Group, which periodically meets to review how our medicines are working in the country; so that is another arm which facilitated the uptake of evidence because we are able to detect a need for change*". (MoH respondent)

The document review showed that partnerships were put in place at several stages of knowledge generation, synthesis, and application, bringing together relevant stakeholders. Figure 2 shows partnerships that were put in place for decision-making, whereas Figure 3 shows partnerships that were put in place for developing operation tools and implementing details.

The MCMWG [c] was put in place to synthesize available data and make evidence-based recommendations to the steering committee and MoH. The MCMWG concluded that, "After careful consideration of the evidence for CQ/SP treatment failure, the meeting agreed that there was need to change the anti-malarial drug policy (AMDP). In line with June 2000 recommendations to adopt a long-term policy and WHO recommendations, ACT was considered the most viable option to change to." A policy decision that conformed to the available evidence.

Ahead of the national consultative meeting, evidence on drug resistance against the first-line treatment for

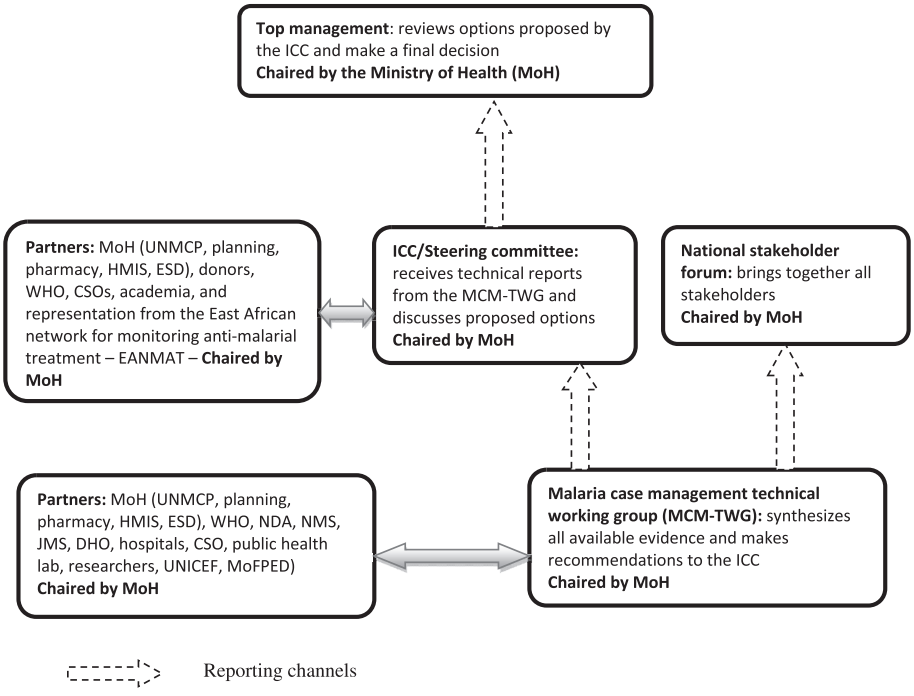

Figure 2 Partnerships for decision-making.

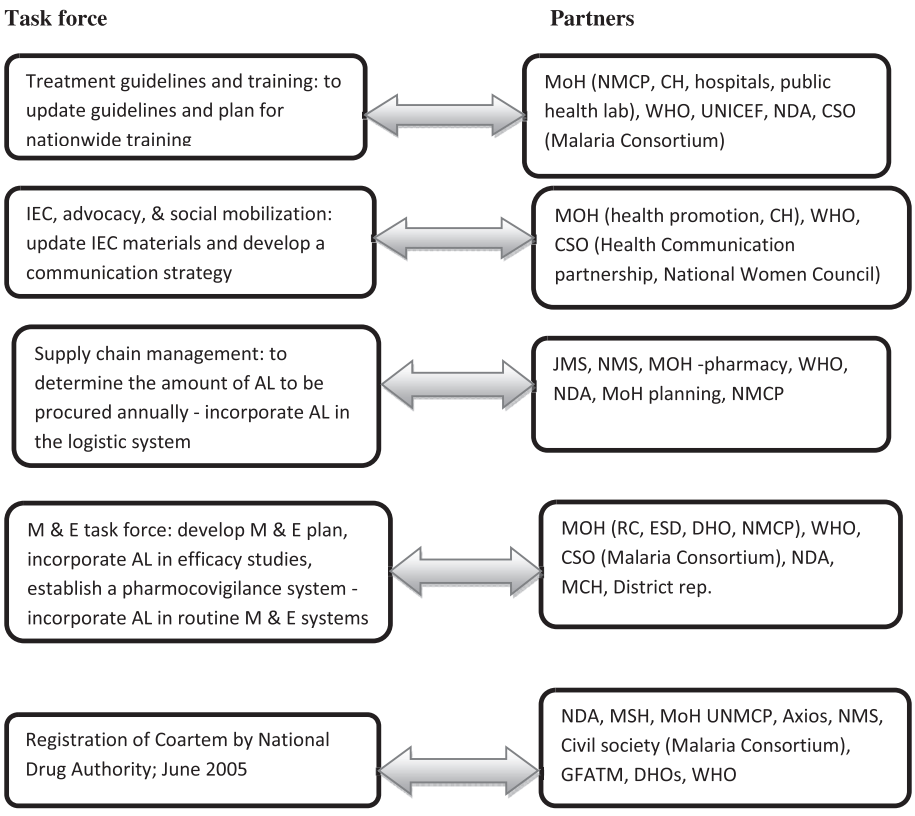

Figure 3 Partnerships for developing operational tools and implementation details.

malaria, as well as its interpretation and implications, was also presented to influential stakeholders in a form that was easy to understand. A national consultative stakeholder forum was then held, bringing together researchers, policy makers, clinicians, donors, CSOs, and district level health managers, and evidence synthesized by the MCMWG guided the dialogue. The national stakeholder forum identified information gaps, enabling all partners to participate in setting the research agenda. The meeting identified several studies covering several aspects to provide comprehensive evidence on cost-effectiveness, acceptability, and the feasibility of implementation. These studies were then commissioned by the MoH.

A series of meetings were held ensuring sustained dialogue throughout the policy change process. The steering committee provided regular briefings to members of MoH top management to apprise them of the situation, including presentations of synthesized evidence.

After a decision was made to change the first-line treatment for uncomplicated malaria to AL, the MoH commissioned task forces that brought together relevant stakeholders to work out the implementation process and mainstream implementation of the new policy in the routine system (Figure 3). In a meeting convened by the National Drug Authority (NDA), a decision was made to ban the importation of CQ and other monotherapies based on available evidence. The meeting agreed to strengthen linkages between the NDA, local researchers, and sentinel sites, to access data in order to prove and monitor drug efficacy, and to enable policy changes from time to time.

All stakeholders were represented in the different working groups and worked together to review the evidence, make policy decisions, and produce operational tools. All of the task forces were chaired by senior MoH officials.

Availability of tools and inputs

The provision of guidelines, medicines, and training for health workers on the new policy are factors that favoured the implementation of evidence.

A MoH official stated that "*some health workers were totally green about the new anti-malarials; so we developed training materials and we trained health workers throughout the country.*" A service provider stated that "*the MoH provided us with guidelines which were very useful when it came to actual implementation of the policy. The civil society helped us to print more copies of these guidelines and provide them to health facilities*".

Affordability issues were also raised, despite the availability of evidence. Some respondents reported that the

decision to move to ACT was influenced by the availability of funding from the Global Fund (GF), as highlighted in the following quotes:

"*Around that time, there were was an opening for the Global Fund, and the possibility of applying for the Global Fund round 2 to support the policy change was raised. That was the only way we could realize the change to the new drug, and when we applied for funding and got it, that drove the decision*". (MoH respondent)

"*There was the Global Fund at that point, otherwise it would have taken us a long time to change the treatment policy if we were to foot it alone. The Global Fund came on board with rounds where we had to make proposals to get funding for the new treatment, and when they gave us funds, we took up the policy*". (MoH respondent)

The document review showed that the MoH put in place a mechanism to enable the implementation of evidence; the four task forces shown in Figure 3 were charged with the responsibility of developing operational instruments to implement the new policy, including mainstreaming the implementation of monitoring into routine systems. The operational tools also incorporated the evidence.

Barriers to the uptake of evidence

Respondents mentioned resistance from implementers as one of the barriers that had to be overcome. One MoH official remarked that "*there is a general tendency of human beings resisting change just by nature, because they have learned the old ways of giving medicine and nobody is willing to adjust. So there was a problem with some of our health workers' attitude".*

Another reported barrier was the influence of drug companies, as stated by a service provider, "*You know as part of market dynamics- you will find that once a product has been in the country for some time, there is a system which promotes its sale; so when a change is proposed, there is resistance because someone has been promoting a product which the company has been selling for some time. That is one arm that can bar you from adopting good evidence*". Health system considerations and sustainability of the new policy were among the additional challenges. Concerns also existed about whether the supply chain system would ensure the availability of ACT and whether the country could sustain the policy from its own resources.

Quantitative results

All 18 of the reviewed documents referenced evidence; the documents cited evidence 57 times. Each type of evidence was counted only once in each reviewed document. The evidence cited most was mainly locally generated evidence, as opposed to international, efficacy studies, M & E, and WHO guidance (Table 5).

Respondents rated the degree of consistency between the available evidence and decisions at the different stages of the policy cycle, namely agenda setting, policy formulation, selection of preferred option, and policy implementation (Table 6). This rating of the consistence between evidence and decisions taken was intended to assess whether evidence played a bigger role at a particular stage of policy development than at other stages.

The consistency between evidence and decisions was strongest at the agenda setting stage. Consistency was moderate in the analytical and decision-making stage and weak at the implementation stage.

Discussion

Evidence played a key role in changing the malaria treatment policy; however, the level of consistency between available evidence and decisions varied along the policy development cycle. The characteristics of the available evidence, strengthened MoH capacity to lead the KT process, existence of partnerships for KT, and availability of tools to implement evidence were the most important facilitatory factors. Among the barriers to be overcome

Table 5 Nature and frequency of evidence cited

Nature of evidence	Local evidence&	International
Efficacy studies[d]	20	10
Monitoring and evaluation[e]	12	
Guidance from WHO[f]		11
Surveys (NHS, DHS, census)[g]	7	
Operational research[h]	5	
Social science[i]	5	
Epidemiology	4	
Clinical observation[j]	3	
Entomology	1	
Total	**57**	**21**

&Refers to evidence from Uganda.
[d]Data on the efficacy of used antimalarials (CQ, SP, amodiaquine). Results from the Tanzania study and three sentinel sites in Uganda. The Uganda sentinel sites were put in place and supported by the MoH.
[e]Mainly the Health Management Information System showing malaria burden.
[f]Recommendation on when to consider changing the first line treatment; resistance cut-off levels. ACTs are the most effective medicines available to treat uncomplicated malaria.
[g]National household survey data, Uganda poverty participatory assessment surveys, DHS, census. Citing population-based data on self-reported malaria cases, use of ITNs, health-seeking behaviour, and access to malaria treatment.
[h]Evidence of the areas requiring strengthening in the logistic system, health system weaknesses affecting delivery of malaria interventions, and implementation experiences on home-based management of fever.
[i]Evidence of economic burden of malaria, evidence of other malaria control strategies such as behavioural change issues, and acceptability of the different anti-malarials.
[j]Clinicians' observations in Uganda national referral hospitals.

Table 6 Respondents' rating of the consistency between available evidence and policy decisions

		Public sector				Private sector			
		Donors (n = 3)	MoH (n = 8)	NDA (n = 1)	Service providers (n = 12)	Pharmacist (n = 1)	CSOs (n = 2)	Researchers (n = 2)	Total
Agenda setting	Strong (1)	3	7	1		1	1	2	**15**
	Moderate (2)		1						**1**
	Weak (3)								
	No influence (4)								
Analytical stage	Strong (1)	2	3	1				1	**7**
	Moderate (2)	1	4			1	1		**7**
	Weak (3)							1	**1**
	No influence (4)		1						**1**
Decision-making	Strong (1)	2	2					1	**5**
	Moderate (2)	1	4	1			1		**7**
	Weak (3)		1			1		1	**3**
	No influence (4)		1						**1**
Implementation	Strong (1)	2	1						**3**
	Moderate (2)			1	5			1	**7**
	Weak (3)	1	6		5	1	1	1	**15**
	No influence (4)		1		1				**2**

was resistance from implementers, the health system capacity to implement the new policy, and financial sustainability.

The characteristics of the available evidence, as reported in this study, have been shown to enhance ownership and the application of evidence [37,38]. In addition, the separation of roles between researchers and policy makers, which is an identified factor that can safeguard scientific rigour and the objectivity of research, was respected [12,17]. This partly explains the fact that, evidence guided decision-making. Outcomes have been different in cases where evidence was deemed to be of poor quality, contradictory, and inconclusive [39]. Mubyazi *et al.* reported delays in changing the malaria treatment policy because policy makers casted doubt on the available evidence [7]. Ssengooba *et al.* reported similar findings for the uptake of evidence on medical male circumcision as a preventive measure for HIV; the policy was delayed due to the president of the country discrediting research results [9].

The credibility of researchers, receiving support from the WHO, and utilising regional approaches as opposed to focusing solely on country efforts are also crucial facilitatory factors [40] realized in this study. Similarly, Woelk *et al.* documented the intervention of international researchers and involvement of local researchers in regional and international research networks as a facilitatory factor to the uptake of evidence in the magnesium sulphate trial for the treatment of pre-eclampsia [41]. These networks expose local researchers and clinicians to a culture of evidence-based decision-making.

Several types of evidence were employed, but the emphasis was on the efficacy of medicines. Although the use of evidence on the efficacy of medicines has been a common practice in most countries when changing malaria treatment policies, evidence is needed from several aspects for policy decision-making [10,42]. In some instances, cost considerations and the feasibility of implementation have driven decision-making despite the availability of high-quality efficacy data [7]. In addition, community acceptability has affected the uptake of evidence in some cases. Malik *et al.* documented a community preference for drugs that they knew how to use and were cheap and affordable [24]. In the case of Uganda, the use of different ACT packs for different age groups was an identified challenge that affected the implementation of evidence [19]. This finding highlights the need for comprehensive evidence to guide decision-making and, in this study, evidence was available on health seeking behaviour, access to anti-malarials, the capacity of the supply chain system, community acceptability of anti-malarial interventions, the affordability of the new policy by the government, and the capacity of the health system to implement the changes.

The tailored dissemination to influential stakeholders, which occurred at the beginning of the policy process, could have influenced decision-making, as evidenced by the strong rating of the influence of evidence on decisions

made at the agenda setting stage. Effective dissemination of evidence has been documented as a facilitatory factor to the uptake of evidence [43,44]. However, the reduced consistency noted when moving from the analytical stage to implementation may not solely be the result of the dissemination modalities used; it may imply that other factors played a more central role than evidence. These are stages where issues such as affordability, health system issues, political will, and donor interest have influenced debates [45].

KT has been realized in instances where the MoH has the capacity to take a leadership role in coordinating the generation, synthesis, and application of evidence [46,47], which was the case in this study. In their study of six countries in Southern Africa, Varkevisser *et al.* documented the successful uptake of evidence into policy where ministries of health led the process of evidence synthesis and dissemination [46]. In contrast, Lavis *et al.* documented successful KT when structures outside the ministries of health led the evidence synthesis and dissemination process, but these were in areas of clinical care and technology assessment [48]. In this case study, a two pronged approach was employed with mainstream structures, which have been shown to be beneficial given the opportunity to engage with stakeholders more effectively [47], and regional professional bodies, which have been shown to be very effective, especially for getting evidence into clinical practice [14,48]. Some scholars have argued that mainstream structures are more relevant for getting evidence into public health policies [47], but these may also play a role in getting evidence into clinical practice, more so in low income countries where clinical decisions have far reaching health system implications. The presence of institutionalized platforms for KT, as existed in this case study, have been shown to be beneficial [3]. Ssengooba *et al.* also documented successful KT in Uganda where the uptake of evidence on the prevention of mother to child transmission was facilitated by the presence of KT platforms [9]. A long history of partnerships, as seen in this case study, helped build trust over the years and created a platform from which evidence could be discussed and decisions made. The involvement of relevant stakeholders in partnerships throughout the process, from knowledge generation to applications, was shown to enhance the uptake of evidence in policy development [17,24]. Colon *et al.* documented a case in which the application of evidence was frustrated by weak partnerships engulfed in suspicions and protection of personal interests [49]. Although partnerships are beneficial, the realization of positive results in not always obvious, and among documented challenges is the varied capacity of stakeholders [40], effective leadership to encourage open dialogue and ensure respect [50], and time constraints on the part of decision-makers to allow the mobilization and participation of stakeholders. In this case study, these issues could have been ameliorated two ways. First, partnerships in policy making regarding malaria issues was a long-standing tradition. Second, partnerships in health policy development in general were already ingrained in the vision of the leadership, with participation at the highest level of the MoH.

Communities have been shown to be key stakeholders and, in this study, "community cries" created an impetus for policy change. Although effective community engagement remains a challenge in several low-income settings due to a lack of structures and resources [51], they are stakeholders in KT whose role could be maximized. The need for targeted dissemination to communities has been raised following the argument that, if they are armed with the right information, they can demand that certain policies be put in place [1,52]. In this case study, the media played a role in disseminating evidence through newspapers, and this could have facilitated community involvement.

In this study, the provision of guidelines and medicines, training health workers on the new policy, and mainstreaming the implementation in routine processes favoured the implementation of evidence. Scholars have documented failed KT in several low income settings due to a lack of medicines, drug licensing, inadequate human resources, and lack of training [6,7,51,53]. Kangwana *et al.* also documented challenges to implementing the revised malaria treatment policy due to a lack of ACTs [54], whereas Bergstrom *et al*. documented the failure of health workers to implement new knowledge due to a lack of required medicines and equipment [55]. Instances exist in which the affordability was the major factor guiding decision-making despite the availability of efficacy data, such as the case of changing the antimalarial treatment policy in Tanzania [7]. This was also a key consideration in this case study as highlighted that … *there was the Global Fund at that point otherwise it would have taken us a long time to change the treatment policy*. Donor funding requirements have also influenced decision-making in other settings, such as the development of HIV care guidelines in Ghana [45].

The present results agree with the facilitatory factors identified in the earlier developed MRT on KT in Uganda, although additional factors and themes also emerged. The MRT was refined as follows:

> *High-quality and contextualized evidence will be taken up in policies so as to lead to evidence-informed policies in instances where the MoH leads the KT process, the WHO and regional professional bodies play a role, partnerships for KT, and tools and*

required inputs are available to implement the evidence.

Evidence must be of high quality, contextualized, provide economically feasible recommendations, and produced in a timely manner by credible researchers. Use of local researchers is helpful but there is a need for the separation of roles between researchers and policymakers. Effective dissemination of evidence to communities and tailored dissemination to influential stakeholders is also needed.

KT requires strengthened MoH institutional capacity to lead the KT process. Institutionalized platforms for engagement between researchers and policymakers, including civil society, need to be in place. Mechanisms to coordinate evidence generation and synthesis need to be mainstreamed within the MoH, although regional professional bodies also play a role and the WHO's intervention is helpful. The capacity of policy makers in knowledge management needs to be strengthened and the policy making process must not be very bureaucratic.

Partnerships for KT need to be in place, and all relevant stakeholders must be involved throughout the process to improve trust and build interest. Building a culture of partnerships in health development over time enhances trust. Communities need to be involved in evidence generation and translation.

The availability of funding, tools, and inputs to implement evidence is crucial. Funding must be available, operational tools must be provided, and implementers must receive required training to implement the evidence.

These contribute to higher ownership, adoption, and better application of evidence.

Strengths and weakness

The strengths of this study are the use of multiple data sources and interviews with a wide range of respondents, which generated a rich data set from which to assess the use of evidence. Among the weaknesses of this study is potential recall bias; interviews were conducted long after the policy development process occurred. However, the recall bias was ameliorated by the use of multiple sources of data. Rating has been attempted for the degree of consistency between available evidence and the decisions made at the different stages of policy development, but in reality the stages are not that distinct. The policy process is iterative.

Conclusion

Different types of evidence were used in changing the malaria treatment policy in Uganda, though the level of consistency between evidence and policy decisions varied along the policy development cycle. Respondents perceived the availability of high-quality and contextualized evidence, including targeted dissemination of evidence to communities and influential stakeholders; MoH institutional capacity to lead the KT process; the intervention of the WHO and a regional professional network in evidence generation and policy development; existence of partnerships for KT with mutual trust; and the availability of funding, tools, and inputs to implement evidence as the most important facilitatory factors that enhanced the uptake of evidence in the malaria treatment policy change. Context is very important in KT, and the refined MRT may not hold in all contexts, but it can serve as a starting point for other countries planning to embark on changing their malaria treatment policies and seeking to maximize the use of evidence.

Endnotes

[a]This was charged with spearheading all technical aspects of the change in the malaria treatment policy.

[b]This committee provided oversight over the work of the Malaria Case Management Technical Working Group.

[c]Technical committee - Malaria Case Management Technical Working Group (MCMWG) put in place to synthesize available data (technical committee) and make evidence-based recommendations to the steering committee and MoH. Malaria Case Management Group comprised the MoH (UNMCP, planning, pharmacy, HMIS, ESD), WHO, NDA, NMS, JMS, DHO, hospitals, CSO, public health lab, researchers, UNICEF, and MoF.

Additional files

Additional file 1: In-depth interview guide for policy makers and researchers. Open-ended question to elicit responses from respondents.

Additional file 2: Guideline for document review. Guide used in reviewing documents.

Additional file 3: Documents reviewed. Details of milestones and list of documents reviewed.

Additional file 4: Factors that facilitated the uptake of evidence in the malaria treatment policy change. Details of facilitatory factors under the different themes.

Abbreviations

ACT: Artemisinin combination therapy; AL: Artemether/lumefantrine; AQ: Amodiaquine; CSOs: Civil society organizations; CQ: Chloroquine; EANMAT: East African Network on Monitoring Antimalarial Treatment; KT: Knowledge translation; MoH: Ministry of Health; MRT: Middle range theory; NDA: National Drug Authority; NMS: National Medical Store; SP: Sulphadoxine/pyrimethamine; WHO: World Health Organization.

Competing interests

The first author works for the World Health Organization in the Africa Regional office and is responsible for monitoring and evaluation. The authors declare that they have no competing interests.

Authors' contributions

JNO contributed to the study design, data collection, and data analysis and led the drafting of the manuscript. FS contributed to the study design,

interpreting the results, and drafting the manuscript. JM contributed to interpreting the results and drafting the manuscript. BC contributed to the study design and drafting the manuscript. All authors read and approved the final manuscript.

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The roles and influence of actors in the uptake of evidence: the case of malaria treatment policy change in Uganda

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Abstract

Background: Uganda changed its malaria treatment policy in response to evidence of resistance to commonly used antimalarials. The use of evidence in policy development—also referred to as knowledge translation (KT)—is crucial, especially in resource-limited settings. However, KT processes occur amidst a complex web of stakeholder interactions. Stakeholder involvement in evidence generation and in KT activities is essential. In the present study, we explored how stakeholders impacted the uptake of evidence in the malaria treatment policy change in Uganda.

Methods: We employed a qualitative case study methodology involving interviews with key informants and review of documents. A timeline of events was developed, which guided the purposive sampling of respondents and identification of relevant documents. Data were analysed using inductive content analysis techniques.

Results: Stakeholders played multiple roles in evidence uptake in the malaria treatment policy change. Donors, the Ministry of Health (MoH), service providers, and researchers engaged in the role of evidence generation. The MoH, parliamentarians, and opinion leaders at the national and local levels engaged in dissemination of evidence. The donors, MoH, researchers, and service providers engaged in the uptake of evidence in policy development and implementation. Stakeholders exerted varying levels of support and influence for different reasons. It is noteworthy that all of the influential stakeholders were divided regarding the best antimalarial alternative to adopt.

Conclusion: Our results showed a diverse group of stakeholders who played multiple roles, with varying levels of support and influence on the uptake of evidence in the malaria treatment policy change. For a given KT processes, mapping the relevant stakeholders and devising mechanism for their engagement and for how to resolve conflicts of interest and disagreements *a priori* will enhance uptake of evidence in policy development.

Keywords: Knowledge translation, Stakeholders, Malaria, Treatment policy change

Background

Since 2001, Uganda has changed its malaria treatment policy twice, after efficacy studies demonstrated significant resistance against first-line antimalarials [1,2] beyond the thresholds at which the World Health Organisation (WHO) recommends policy change [3]. The use of evidence in policy development is of critical importance, especially in resource-limited settings; however, data suggest that its potential has yet to be fully realised [4,5]. Here, evidence is broadly defined to include research study results (both published and unpublished), findings of monitoring and evaluation (M&E) studies and population-based surveys, Ministry of Health (MoH) reports, community complaints, and clinician observations [6,7]. The application of such evidence in policy development is also referred to as knowledge translation (KT), which the Canadian Institute of Health Research defines as "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically

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sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system" [8]. Efforts to improve KT—including developing KT models and implementing several KT activities—have produced mixed results [9-12].

KT processes occur amidst a complex web of interactions between stakeholders, who are hereby defined as individuals who, or institutions which are affected by the policy change, directly influence it, or have an interest in the outcome even when not directly involved [13]. In this article, we use the words stakeholders and actors interchangeably. Scholars have noted that the roles played by stakeholders and their level of influence, support, and interactions have an important impact on how evidence influences policy [14,15]. Mori et al. documented instances where essential medicines were selected based on the experience and discretionary judgment of experts, despite the availability of hard efficacy data [4]. Cases where stakeholder involvement has delayed the translation of evidence into policy have also been documented [16,17]. For example, delays have been attributed to researchers devoting more time to generating evidence than to disseminating their results [17].

The available literature highlights several potential roles that stakeholders may play in KT. For example, civil society organisations (CSOs)—which here are defined as formally organised non-profit groups concerned with public interests [18]—reportedly advocate for evidence uptake, undertaking research, mobilising communities to demand evidence implementation, and implementing evidence in their own programmes [18-20]. On the other hand, communities can participate in research processes as respondents but also in setting the research agenda [21,22]. The media can be an effective ally in evidence dissemination, community mobilisation, and shaping public opinion [21,23,24], while policymakers are responsible for translating evidence into policies and putting the necessary KT platforms into place for engagement among stakeholders [9,24]. Donors fulfil the main role of funding the research, KT activities, and implementation of research findings [9,25]. Finally, researchers can intervene as stakeholders who generate evidence [7,11,25].

Tomlinson et al. point out that the specific composition, roles, and impact of stakeholders in KT are influenced by the context within which KT processes take place and the nature of the policy [26]. For example, Woelk et al. studied the uptake of evidence on malaria control and treatment of eclampsia in three Southern African countries and documented a wide range of international stakeholders influencing the former, while mainly international academic networks influenced the latter [27]. Indeed, actors have played different KT roles with regard to malaria treatment policy changes. For example, researchers and policymakers were instrumental in synthesising and disseminating evidence on the effectiveness of artemisinin combination therapies (ACTs) in Burkina Faso [28], while policymakers have been weak in evidence synthesis in other KT processes [24]. In Sudan, an NGO took the lead in putting a KT platform into place [29], which has been the role of ministries of health in other instances [9]. In Tanzania, pharmaceutical manufacturers and medicine traders reportedly influenced malaria treatment policy changes through their opposition to the change from chloroquine (CQ) to sulfadoxine/pyrimethamine (SP), as the former had invested in continued CQ production, while the latter still had large CQ stocks [16]. The WHO has been instrumental in providing technical guidance on malaria treatment policies at both the global and national levels [23,29], which is not the case in other policy processes—for example, health financing.

The present study is part of a larger study that seeks to enhance our understanding of how we can improve evidence uptake in health policy development. In our previous work, we explored the roles, relationships, and interactions of key stakeholders involved in KT in Uganda, without specific reference to a piece of evidence or a policy. Nabyonga Orem et al. showed that stakeholders in KT were perceived to play both positive and negative roles, as well as identified the challenges that they had to overcome to effectively play the positive roles (Table 1) [30].

In the present article, we explore how different stakeholders have shaped evidence uptake in relation to malaria treatment policy change in Uganda, with specific assessment of the roles they played and their level of influence and support. Furthermore, we investigated the extent to which the previously identified roles of stakeholders in KT in Uganda [30] differed from their roles specifically in relation to malaria treatment policy change. For this project, we employed a case study approach, using qualitative methods involving interviews with key informants (KIs) and review of documents. The case analysed was the malaria treatment policy change from CQ/SP to ACT—more specifically, artemether-lumefantrine (AL)—which transpired over a period of 25 months between March 2004 and April 2006 in Uganda.

Methods

This case study employed qualitative methods to explore how the involved stakeholders impacted evidence uptake in the malaria treatment policy change process. The case study approach was chosen based on the need to understand complex contextual issues [31]. Data were collected between June 2012 and August 2013. To enhance the validity of our results, we employed multiple data collection methods and member checking [31]. Prior to finalisation, preliminary results were reviewed by stakeholders who were central to the policy case: two

Table 1 Summary of roles of stakeholders in KT related to health policy development in Uganda

Stakeholder	Roles	Challenges to overcome	Links that need to be built
CSOs	-Uptake of evidence in policy development and implementation	-Need skills in navigating the political terrain, networking, and engaging policymakers	-Links among CSOs, researchers, and policymakers
	-Dissemination of evidence	-Must be provided with clear and simplified formats to avoid misrepresenting the evidence	
	-Advocating for evidence implementation	-Must be funded independently of the government	
Policymakers	-Uptake of evidence in policy development	-Capacity to synthesise evidence	-Links between policymakers and researchers
	-Establishing platforms for KT and playing a leadership role		
Media	-Dissemination of evidence	-Need to be provided with evidence in simplified and preferably written formats	-Links between researchers and the media
Parliamentarians	-Dissemination of evidence	-Require targeted dissemination to parliamentarians	-Links among researchers and parliamentarians
	-Community mobilisation		
Communities	-Participation in research processes	-Putting into place community structures to enable their participation in research processes	-Links between communities and researchers
Donors	-Funding research and implementation of evidence	-Governments must establish structures for developing research agendas through inclusive participatory partnerships	
Researchers	-Evidence generation	-Focusing on academic interests	

Source: Nabyonga Orem et al. [30].

from the WHO and two from the MoH. Recall bias was ameliorated by interviewing a wide range of knowledgeable stakeholders and by the use of multiple data sources [31].

A timeline of key events was drawn based on the review of documents, in consultation with two persons from the WHO and two persons from the MoH who had each held malaria-focused positions for over 10 years. This timeline guided the identification of key milestones, the involved processes, the key documents to be reviewed, and the institutions involved, which subsequently informed the selection of respondents (Figure 1).

Stakeholder analysis

A stakeholder analysis was undertaken to assess the roles, level of support, and influence of the actors regarding evidence uptake in the malaria treatment policy change. Stakeholder analysis is a powerful tool that can be retrospectively used to understand the roles, interests, and influences of the different stakeholders in the evolution of policy context and processes [32]. Here, our research team drew upon the work of Eden and Ackermann [33] and Bryson [34] in undertaking the analysis and classifying the stakeholders using the influence/power-support/interest grid.

Selection of respondents

Using the timeline of key events, we identified institutions that were involved in the policy process. We selected KIs using purposive sampling with the main criterion being their involvement in either research, design, or implementation of the malaria treatment policy change [35]. From each of the key institutions, we selected the focal persons involved in the policy change process and employed the snowballing technique to identify other key respondents until reaching descriptive saturation [36,37]. Some of the identified respondents had since moved on to other employment or retired, and these persons were categorised under the institutions that they worked for at the time of the policy change. The identified focal researchers were selected for interviews if they had been involved in malaria research and had provided evidence that was considered in the policy change process. Emphasis was placed on collecting their perceptions in line with the study questions, beyond what they may have published in scientific papers and research reports.

To obtain perceptions from across the spectrum of the health-care delivery system, we purposively selected two districts of high malaria endemicity [38], based on proximity and presence of a regional referral hospital (Jinja district) or general hospital (Mpigi). Within these districts, two hospitals and two lower level facilities (one public and one private not-for-profit in both districts) were purposively selected based on proximity and our desire to include different levels of the health-care system. At the district level, we purposively selected the district health officer and a member of the district health team in charge of supervising health facilities within the district. Finally, we purposively selected the medical superintendent

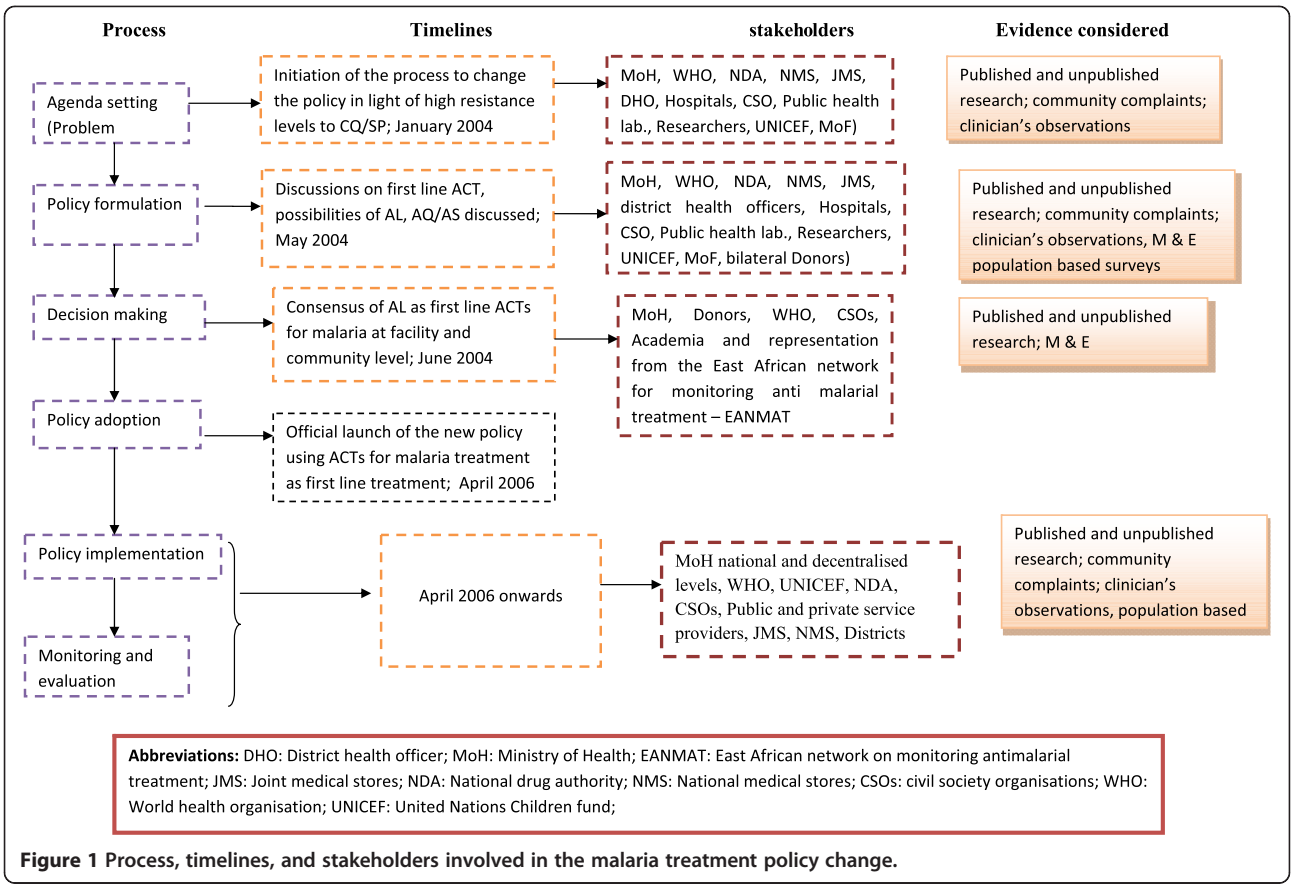

Figure 1 Process, timelines, and stakeholders involved in the malaria treatment policy change.

or health centre employee in-charge and one clinical staff member responsible for the outpatient department at each health facility, as these employees interface with patients on a daily basis and are more likely to know the malaria burden, community health-seeking behaviours, and interfaced often with the supervising teams.

The selected respondents included public policymakers, donor representatives, media, CSOs, researchers, and representatives of the pharmaceutical sector. We also interviewed managers of health services at the district level, health-care providers from the public and private not-for-profit health facilities, the National Medical Stores (NMS) in charge of medicine procurement and distribution and the National Drug Authority (NDA) in charge of medicine regulation (Table 2).

KIs were interviewed using an in-depth interview guide that comprised open-ended questions designed to elicit the respondents' perceptions on whether evidence had been used and who the stakeholders were, the roles they played, and their level of interest in and support for evidence uptake in the policy change process. The interview guide was developed by the first author, was reviewed and refined by the research team, and was pretested with two volunteer colleagues in the WHO Uganda office, two technical officers in the MoH, and

Table 2 Key informants

	Institution	Number of respondents	Average number of years in post
Public sectors	Donors	3	8
	National level MoH	10	11
	National Medical Stores (NMS)	1	3
	National Drug Authority (NDA)	1	6
	Service providers	4	7
	Managers at district level	4	9
	Researchers at universities	1	8
Private sectors	Civil society organisations	3	9
	Researchers from private research institutions	1	7
	Media	1	8
	Private pharmaceutical sector	1	5
	Service providers[a]	3	6
Total number of respondents		31	

[a]One of the selected districts did not have a private not-for-profit hospital.

one researcher from the Makerere University School of Public Health. KIs were contacted by email or telephone and invited to participate in the study. All identified respondents agreed to participate and were interviewed. All interviews were conducted by the first author, in English and face-to-face. The interviews lasted an average of 45 min. During the interviews, the first author made additional notes to record initial findings and impressions that were used to augment the transcribed interviews.

Selection of relevant documents

The timeline of key events guided the identification of relevant documents to be reviewed. We included a broad range of documents relevant to the case to ascertain the processes involved, the stakeholders, and their roles. All identified documents were retrieved and reviewed. Additional file 1 presents details of the reviewed documents.

Data analysis

Interviews were recorded, transcribed verbatim, and entered into MS Word software for editing as the first step towards a "formal" analysis. All interviews and reviewed documents were coded using QRS Nvivo Software Version 10. Content analysis techniques were used to construct emerging categories linked to the research issues [39]. In the first step, the first author read all of the transcribed interviews and relevant documents to identify categories of emerging issues with regard to the involved stakeholders, the roles they played, whether they were supportive, and their possible influence on evidence uptake in the policy process. Next, the study team together analysed the transcripts in order to identify categories of emerging issues according to type of stakeholder, which were organised based on research areas. Inductive manifest content analysis was undertaken to assess how respondents perceived and how documents reflected the role(s) played by the different stakeholders, while inductive thematic content analysis was undertaken to assess the level of support and influence of the different stakeholders. Examples are shown in Additional file 2a and b.

Converging issues were again reviewed by the rest of the research team. Where interpretation differed, consensus was achieved through revisiting the raw data and discussions. Where necessary, quotations that best represented emerging issues were slightly edited for flow, while preserving the meaning of the text. The findings from document analysis and from the analysis of KI interviews were integrated throughout the analysis.

Informed consent was obtained from all respondents prior to the interviews. Study participants were informed about the purpose of the study and the scope of issues in the in-depth interview guide. Confidentiality was ensured in data management, and only aggregate information without subject identifiers is reported. All data were secured in a safe location accessible only to the study team. Ethical approval was obtained from the Institutional Review Board of the Institute of Tropical Medicine, Antwerp (Belgium) (IRB number IRB/AC/ac/197) and the Uganda National Council for Science and Technology (number SS 2920).

Results

We integrated the results from the review of relevant documents and from the interviews with KIs. These findings are presented in three sections, namely, the roles played by the different stakeholders, the stakeholders' level of support and influence, and other external influences on the uptake of evidence. The respondents reported that evidence informed the malaria treatment policy change, which was supported by the review of documents. For example, documentation of the malaria treatment policy change process in Uganda (MoH 2006) states that "*the decision to change the malaria treatment policy was based mainly on evidence from efficacy studies, which showed high resistance of plasmodium falciparum to CQ*". Other types of evidence were also used. For example, one research remarked that "*communities complained first 'I have been taking this medicine for malaria with no improvement'. This was then picked up by the health workers and then by the scientists*". Additional different types of evidence were cited in all 18 documents that were reviewed.

Roles played by the different stakeholders in the uptake of evidence

Throughout the process of policy formulation, decision making, policy adoption, and implementation, stakeholders participated in various task forces charged with the responsibilities of developing the new policy and mainstreaming its implementation in routine processes. The review of documents supported this. Documentation of the malaria treatment policy change process in Uganda (MoH 2006) stated that "*having reached a consensus that the malaria treatment policy needs to change in light of high resistance to the first line anti-malarials, task forces including experts in malaria from the different institutions/agencies were commissioned to work out the policy change and implementation process*". The available documentation further indicated that the different task forces were expected to use available evidence in their deliberation. For example, the report of the supply chain management task force (MoH 2004) stated that "*the task force calculated the amount of AL required based on the malaria prevalence, health seeking behaviour, and population growth rate*" [40]. Similarly, a report of the task force on treatment guidelines and training approaches (MoH 2004) indicated that their goal was to "*update the*

current guidelines for treating malaria in line with evidence".

The majority of stakeholders played multiple roles in the uptake of evidence in policy development and implementation (Table 3). For example, the donors' roles encompassed providing funding for evidence generation, participating in research processes through regular updates and discussions of preliminary results, drafting the new policy through their membership in working groups that discussed policy options given the available evidence, and supporting evidence implementation through provision of funds and free medicines.

The top management and technical programmes in the MoH reportedly led the policy development process, including discussions on the best options given the available evidence on drug efficacy and health expenditures trends. This was further supported by the review of documents. For example, the concept paper for implementing the ACT policy (MoH 2004) stated that "*the MoH is responsible for overall coordination of the policy change process*". Technical programmes within the MoH, specifically the national malaria control programme (NMCP), also engaged in research processes. In particular, one researcher remarked that "*At the time of doing the studies, the NMCP was part of this, so they approved the studies. Then at the level of the studies getting approved by the review committees, they were always inquisitive to see whether the NMCP was on board*". On the other hand, the NDA reportedly played the role of medicine registration and regulation. Again, this was supported by the review of documents, as the report of the workshop on strategies for implementation of the new antimalarial policy (MoH 2006) stated that "*COARTEM was officially registered as an antimalarial medicine by the NDA in June 2006*".

CSOs played roles spanning from involvement in research by participating in regular updates to incorporating evidence into the new policy via participation in discussions regarding policy options and implementation of evidence through their programmes. Members of parliament

Table 3 Roles played by the different stakeholders

	Stakeholders	Roles
Donors	Global Fund	Funding the policy change
	WHO	Providing evidence and technical assistance (TA), participating in the policy process, funding research
	UNICEF	Providing evidence, participating in the policy process
	Presidential Malaria Initiative/USAID	Funding research and participating in the policy process
	Department for International Development (DFID) from the UK	Funding research and participating in the policy process
	China	Providing free medicines (AL)
Pharmaceutical companies	NOVARTIS	Manufacturing the drug
	Private pharmaceutical companies	Importing drugs
Public sector	Top management of MoH	Decision making
	Technical programmes within MoH	Adapting and implementing the policy, participating in research processes, and disseminating evidence
	Ministry of Finance	Providing funding
	Parliamentarians	Disseminating evidence and information on the policy change
	Service providers at national referral institutions	Providing evidence, participating in the policy process
	Service providers at lower levels	Implementing the new policy
	NDA	Regulating medicines
	National Medical Store and Joint Medical Store	Supplying drugs
	Researchers in universities	Providing evidence and participating in the policy process
Community	The community	Beneficiaries of the policy change
Local leaders	Opinion leaders at national level	Disseminating information on the policy change
	Leaders at the local level	Disseminating information on the policy change
Private sectors	CSOs	Participating in policy discussions, research, advocacy, and implementation and monitoring of the new policy
	Private practitioners	Implementing the new policy
	Researchers from private research institutions	Providing evidence and participating in the policy process
	Private sector—companies	Advocacy, publicity, donations

were reportedly engaged in dissemination of evidence. Supporting this, the malaria prevention and control handbook for parliamentarians (MoH 2005) stated that "*the development of this handbook is yet another opportunity to provide information to Members of Parliament to enhance their ability to communicate and disseminate information on malaria prevention and control from an informed position*" [41].

Respondents reported that researchers also engaged in policy discussions—particularly when evidence was discussed—to guide selection of the best option, as well as reviewed drafts of the new policy. Opinion leaders at the national and district levels reportedly disseminated information on the policy change, along with reasons necessitating the policy change with reference to evidence on drug resistance, and mobilised communities to take up the new policy. The communication strategy for treatment of uncomplicated malaria using AL (MoH 2004) states that "*Influential persons and leaders at the national and district levels were armed with information on the new treatment and were requested to share information with the community and advocate for compliance*".

Notably, the role of Novartis—the pharmaceutical company that was manufacturing ACTs—was not reflected in the reviewed documents. It was also striking that communities were not reflected as stakeholders in the reviewed documents, and private practitioners were only involved as trainees in preparation for rolling out the new policy.

Stakeholders' levels of support and influence in evidence uptake in the policy process

Figure 2 shows the levels of support and influence of the different stakeholders in the evidence uptake in the policy process. Some stakeholders were reportedly very influential because they had significant resources, were highly respected, exercised a strong influence on the MoH,

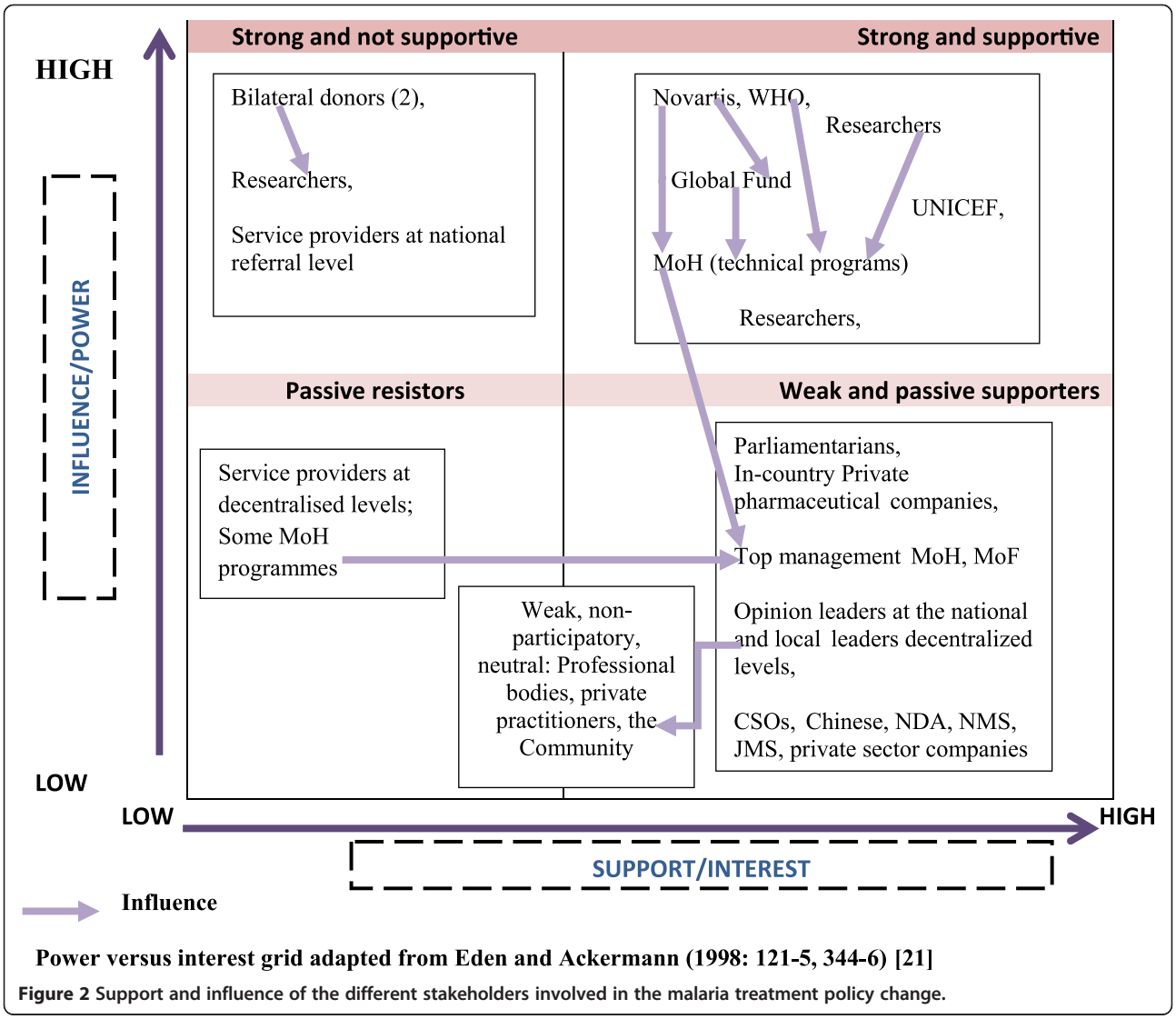

Figure 2 Support and influence of the different stakeholders involved in the malaria treatment policy change.

and strongly believed in the evidence, as well as because the decision regarding which options were adopted and the subsequent policy implementation heavily depended on their opinion.

Although the majority of respondents believed that the evidence demonstrated a need to change the malaria treatment policy, there was no consensus regarding the best alternative. Some research groups presented evidence showing that AL was effective, while others had evidence showing the effectiveness of amodiaquine (AQ) and artesunate (AS). A donor respondent reported that "*there was a lot of influence pushing everyone for ACTs but some stakeholders were pushing for amodiaquine (AQ) and artesunate (AS). When AL was selected, the push for AQ and AS continued and the team had to go back and decided to have these as an alternative*".

Novartis, the pharmaceutical company that manufactures AL, was reportedly supportive of the change to AL. Some respondents reported a possible influence of Novartis on the MoH, on the Global Fund (GF), and in the decision-making process regarding which alternative antimalarial to adopt, as shown in the following quotes:

> "*There were some experiences of people being taken to workshops to discuss the malaria treatment policy change and subsequently visiting the factories—the AL manufacturers. This may have influenced the decision to adopt AL.*" MoH respondent

> "*The pharmaceutical company Novartis could have been talking to the GF, who were saying that the GF grants should only be used for buying ACTs. This was at a time the MoH was applying for GF round 4. So I think, there could possibly have been some external influence to change to AL.*" Researcher respondent

The MoH was not unified in the process. Some MoH officers were reportedly influential and supportive of the change to AL, while others acted more as passive resistors and were less influential. The NMCP was reportedly very supportive and influential, because the adoption of AL as the first-line antimalarial and its subsequent implementation heavily depended on them. Additionally, the NMCP officers strongly believed in evidence. They closely followed the research results from the sentinel sites and regularly met with the researchers. One researcher remarked that "*at the time that the malaria treatment policy changed from CQ/SP to ACTs, the NMCP was in the hands of two people who both believed in evidence and the researchers worked very closely with malaria control programme leadership.*"

The passive resistors were not convinced of the need to change to ACTs (specifically AL), despite the evidence showing their effectiveness. They thought the decision to change was influenced by donors, as shown in the following quotes:

> "*Regarding anti-malaria drugs, we had our own sentinel sites around the country and we were gathering sensitivity data on existing and alternative anti-malarials. So, yes, there was CQ resistance but, we were looking at, I think, AQ as an alternative.*" MoH respondent

> "*Although efficacy data showed resistance to CQ, we were not yet ready for a treatment change. We would have moved at the right time, but when the GF insisted that GF grants should only be used to buy ACTs, it became difficult to opt for another alternative.*" MoH respondent

Top management staff of the MoH were noted to be weak and passive supporters. One respondent reported that the top management cadre could have been influenced by the divided opinions at the technical level, stating the following:

> "*the technical programmes in the MoH were divided. We had a very strong personality like [X] in the NMCP who was very clear. Then there were people who were doubtful despite availability of evidence. If the technical programmes were very clear maybe even top management would have been convinced and rallied behind the decision. The technical programmes wavered in their positions and that could have had an influence on top management.*" MoH respondent

Researchers were reportedly very influential because they were highly respected even if they were divided. In terms of the research results, there was a consensus regarding the high levels of resistance to CQ/SP; however, there were arguments among researchers as to what alternative drug was most suitable, given the evidence showing effectiveness of both ACT specifically (AL) and, AQ and AS. A donor respondent remarked that "*some researchers did not think we needed to change to ACTs (AL). They were saying this was commercially driven and that other options like AQ and AS would have been more appropriate*". Some respondents felt that some researchers used evidence to exert pressure, as one journalist made the following remark: "*there was a man called [Y] who wrote an article in the Lancet criticizing the MoH and WHO for sticking with CQ/SP as the first-line treatment. He was saying 'look, you are having CQ/SP and both of them were having high resistance rates; so by combining the two you are not making matters any better'*".

Others questioned the neutrality of the research community, noting that some of the research teams had been funded by donors who did not support choosing AL as an alternative first-line drug. There were suspicions that the researchers were perhaps being influenced, as shown in the following quote:

> "*These researchers were funded by donors, and those particular donors had different views on possible alternative anti-malarials. When these researchers presented their results, there was a lot of disbelief initially. People made statements like 'Anyway, if you look for the resistance you will find it'. We were using CQ/SP properly and no one was complaining until efficacy studies started reviewing the data. Then we started saying we have resistance to CQ/SP.*" Donor respondent

Donors were also divided. While they were reportedly very influential, they seemed to rally behind the evidence generated from the studies that they supported, as shown in the following quote:

> "*I remember some donors were in for AQ and AS, while others were in for AL. So the MoH, as the chair at that time, listened to both sides as they debated. We listened to the pros and cons of the evidence they were giving and at the end we decided to opt for AL, based on the evidence we had and other considerations. Although AQ/AS was more affordable and its efficacy was more than 90%; artemether had an efficacy of 99% and in most areas 100%. We did not want to go through another costly policy change process in the near future so we opted for AL.*" MoH respondent

The WHO reportedly had a strong influence on the MoH, as shown in the following quotes:

> "*The WHO has the greatest influence on health policy in the world with relation to disease areas like HIV, malaria,* etc. *So Uganda as a country will often look at the WHO for the decisions that it makes. The WHO has some of the best doctors in the world and they are looking at all of the evidence that is published, and weighing the different evidence to try and make decisions on what makes sense. So countries rely on the decision making ability of the WHO and use that in their own decision making.*" Donor respondent

> "*I remember our guidance was that any research that was conducted and funded by the WHO was most credible, because we rely on the WHO's advice and take the WHO recommendations seriously.*" MoH respondent.

The review of documents further supported this, as the documentation of the malaria treatment policy change process in Uganda (MoH 2006) stated that "*the WHO provided technical assistance and each of the five combinations treatments recommended by WHO for the African Region at that time was considered as a possible alternative*" [42]. Although the WHO was seen as a neutral body, there were some suspicions that perhaps the WHO was being influenced by the manufacturers of AL. One donor respondent said that "the *WHO had a fair share of that suspicion because, in the interest of promoting ACTs as the most effective, the WHO went into an arrangement with the manufacturers of AL. They believed that this was one of the best ACTs, and negotiated with the manufacturer so that countries will get a reduced price. Fortunately, ACTs happened to come out as the best option for most of the countries*". The review of documents supported this view, as the documentation of the malaria treatment policy change process in Uganda (MoH 2006) stated that "the *Project Management Unit (PMU) of GF in the MoH was mandated to procure COARTEM® (AL) through the WHO, taking into consideration the agreements between WHO and Novartis Pharmaceutical Company, which provides for subsidized COARTEM® (AL) for the public sector*".

Communities were weak and largely non-participatory. One donor remarked that "*We don't involve the community in policy discussions. We do not even disseminate evidence to them. We assume and choose what we think is good for them and we just take it to them*". Indeed, among the reported roles played by the community, respondents only mentioned "beneficiaries of the policy change".

Service providers at the national referral hospital and at the district levels were both reported as resistors, but for different reasons. At the national level, the service providers were not convinced that the change was needed. For example, one donor remarked that "*some senior consultants from Mulago hospital (national referral hospital) didn't think that we needed to change to ACTs. They were saying that this was commercially driven*". The service providers at the district level were apparently rather passive resistors, with one service providers stating that "*the case of non-compliant health workers was a small barrier that was eventually beaten. Some health workers resisted but eventually they had to follow*". This may have stemmed from their lack of effective involvement in the part of the decision-making process where evidence justifying a policy change was discussed. One donor remarked that "*I can tell you that we only got views of district level service providers indirectly from the studies, but not directly. We got a few district health workers into the policy discussions but not so much beyond that*". Service providers at the district level were not even aware

of the evidence that had been discussed at the national level. One of them stated that "*we have a problem of poor dissemination of evidence. A lot of evidence is generated but is poorly presented and does not reach clinicians*". Another service provider stated that "*there was no local evidence,* e.g. *the local laboratory network was not consulted, (…). Clinical trials must be carried out, but this was not done*", indicating a lack of awareness of the evidence that had been discussed extensively at the national level.

Parliamentarians were weak and passive supporters, although some of them disseminated evidence to their constituents and sensitised communities about the new policy. The review of documents revealed targeted dissemination of evidence to parliamentarians. In fact, a special handbook was developed for them, which was intended to raise awareness among parliamentarians as well as to empower them with the information that they required to effectively mobilise their constituents.

Other external influences impacting evidence uptake

Respondents raised concerns regarding the extent to which evidence can guide decision making in policy development amidst external influences. This is illustrated by the following quotes:

> "*My experience is that while evidence is actually required and very strongly talked about, we also face external influences in the policy process. You actually notice that the evidence was glossed over by pressure.*" MoH respondent

> "*I think there was a lot of advocacy for ACTs. If I remember well, advocacy papers were written saying that evidence has shown that there is no resistance to ACTs at all anywhere in the world. There was an advocacy letter that had been written by [Z] saying children were dying because we are treating them with CQ and not with ACTs. And then of course, there was a lot of push, given that many countries had started to use ACTs.*" Researcher respondent

In light of these external influences, respondents decried the lack of systems to manage conflicts of interest. A MoH respondent remarked that "*we don't have systems for managing conflicts of interest. That's the difference between the MoH and some research institutions like the Uganda National Academy of Health Sciences where I am a member. The first meeting is to prove that no one has a conflict of interest. We always have to sign and agree on the procedure.*"

Discussion

Our present results identified a diverse group of stakeholders who played multiple roles and had varying levels of influence and support, which poses a challenge to evidence uptake. Woelk et al. documented similar challenges to evidence uptake in a case regarding efficacy of bed nets, where a diverse group of stakeholders differed in their interpretation and use of evidence, and aligned with different positions based on ideology and commercial interests [27]. The present findings also support the argument by Sumner et al. that the stakeholders' roles and levels of influence will differ based on the nature of the policy and their interest in a given issue [43].

Our findings showed that donors, CSOs, the MoH, service providers, and researchers engaged in the role of evidence generation. Lack of evidence is a known barrier to KT [21,39], which donors addressed by providing funding and technical assistance to undertake research. However, scholars have cautioned about remaining concerns regarding the relevance and objectivity of donor-supported research [30,43,44]. Indeed, in our study, we noted that the different donors tended to rally behind the evidence that was generated from the research studies that they supported.

Although the literature has highlighted that CSOs have limited capacity for evidence generation [20], we found that CSOs did participate in this area. Malik et al. also documented a successful experience where a CSO played a central role in evidence generation leading to change of the malaria treatment policy in Sudan [29]. This supports the augment by Tomlinson et al. that the roles played by the different actors will differ depending on the nature of the policy [26]. We further note that the researchers and policymakers showed close working relationships, which have previously been described as complex [21,45]. Researchers engaged in generating evidence addressing policy-relevant research questions, and interactions with the MoH enhanced evidence uptake.

Dissemination of evidence was performed by the MoH, parliamentarians, and opinion leaders at the national and local levels. In contrast, the literature highlighted that the media, knowledge brokers, and structures either within or external to the MoH undertake such evidence dissemination [6,9]. This difference could be explained by the present targeted dissemination of evidence and provision of advocacy materials to the parliamentarians and local leaders. The involvement of local leaders could also explain how the communities became aware of the policy change [46] despite their lack of systematic involvement in evidence generation and decision making. The lack of community participation in KT is a long-standing concern and occurs partly due to the absence of appropriate structures for meaningful community engagement [44,46]. In this regard, opinion leaders are potential stakeholders who can support evidence dissemination and subsequently improve KT. The present study also suggested a need to further explore the role of parliamentarians in KT.

The role of evidence uptake in policy development was played by donors, the MoH, researchers, and service providers through representation. Uptake of evidence performed by donors has been described as supportive or disruptive, depending on the policy in question, their interests, and the nature of the evidence [47]. One relevant concern is that significant financial flows to support health programmes may give the donors undue influence in decision making [48]. Cases have been documented in which policy decisions were made based on the donors' influence despite available evidence supporting alternative decisions [29,46,49]. This was also noted in our study, as one respondent stated that Global Fund "*…were saying the Global Fund grants should only be used for buying ACTs…*", while the MoH was relying on the Global Fund round 4 to fund implementation of the new policy. Challenges of donor dependency have also been reported in other countries. For instance, Cameroon's national efforts to coordinate research were undermined [50] and, in Ghana, changes in HIV treatment guidelines were influenced by the conditions of donor financing [49]. Hutchinson et al. similarly reported that the donors' active involvement in evidence generation and policy development influenced decision making [51].

Some have argued that the MoH should lead the KT process in order to ensure focus on country priorities [52,53]. In our present study, the top management and technical programmes within the MoH led the policy development process and considered evidence in decision making. However, it was of concern that MoH officials were divided regarding the decision to change and what alternative first-line antimalarial to adopt. This may be explained by several reasons. Firstly, although some MoH officials followed the research process, they may not have had a specific position on which evidence to adopt, as it was reported that "*…the chair at that time listened to both sides as they debated. We listened to the pros and cons of the evidence they were giving…*". Secondly, evidence may not have been comprehensive enough to allow decision making, which was supported by the statement that "*…and at the end we decided to opt for AL, based on the evidence we had and other considerations*". Similarly, Mubyazi and Gonzalez-Block [16] documented instances where the decision to change the malaria treatment policy was protracted as decision makers kept requesting more evidence on different aspects of policy development. The policy process analysed in the present study took 25 months.

The top management cadre of the MoH that was ultimately responsible for decision making was noted to be a weak and passive supporter, which could be explained by their limited involvement in the research processes. Panisset et al. documented successful experiences in Bangladesh, in which the involvement of the Directorate General of Health Services in the research process enhanced the uptake of zinc for use in diarrhoea management among young children [28]. Another possible explanation could be that the top management officials had different views regarding what the best alternative was, partly influenced by the different positions of the technical programmes. This implies that realisation of successful KT requires that the technical teams that guide top management must be convinced about the evidence and must reach a consensus on possible policy options. Additionally, despite time constraints, the top management have to take a keen interest in evidence synthesis and interpretation. The time constraints could be alleviated by provision of evidence in brief digestible formats and the use of advisors and think tanks [47,54].

The participation of researchers in the policy development process improved evidence uptake [14]. Although the researchers were divided regarding the best alternative to adopt, their participation in the policy formulation and decision making, including discussions of the different options, enabled consideration of other evidence relevant to this decision. Indeed, health expenditure trends were discussed alongside efficacy data to assess affordability.

In the majority of countries, implementation of evidence is performed by the MoH, public and private service providers, and CSOs [20]. However, in our present case study, the role of private for profit providers appears to have been maximised, as similarly noted in other studies of KT in Uganda [55,56].

It has been reported that actors play different roles depending on the nature of the policy and their level of interest in a given issue [26,27,43], and our present findings support this position. For example, in our earlier study of actors in KT in Uganda [30], CSOs were not reported to engage in evidence generation. This may be explained by the varied technical capacity of CSOs, in that they may internally possess the skills required to engage in certain types of research processes, but not in all cases. Indeed, Pollard et al. have noted that the varied capacity of CSOs is a limitation to their effective engagement [20]. Our earlier study of the roles of actors in KT also reported that CSOs and the media engaged in the dissemination of evidence. Their failure to engage in dissemination of evidence in the malaria treatment change may have been due to the absence of targeted dissemination. The literature emphasises the importance of providing information in a simple and clear format [12], which was not done in our present case study. On the other hand, donors and researchers were not reported as actors in the policy process, yet we noted their participation in the case of malaria treatment policy change.

In our present study, some respondents decried the lack of systems to manage conflicts of interest. Boyd and Bero emphasised the importance of identifying and managing conflict of interest in order to improve evidence uptake [57]. The proposed steps include soliciting information from actors regarding possible conflict of interest, having explicit criteria to determine whether the disclosed financial or other competing interest indeed constitute a conflict of interest, and finally, providing guidance on how confirmed conflicts should be managed.

Policy implications

Stakeholders in KT play different roles and exert different levels of influence and support based on the nature of the policy and the evidence under consideration. This raises the need to map relevant stakeholders and to work out mechanisms for their involvement and for how evidence can be utilised by all in an objective manner. Provision of regular updates along research processes and targeted dissemination of evidence beyond in-country stakeholders may enhance inclusiveness and consensus building. Additionally, given the multiple array of stakeholders, there is a need to utilise mechanisms to manage conflict of interest.

Strengths and weaknesses of the study

Our study has several strengths. Firstly, we interviewed a wide array of stakeholders and used multiple data collection methods, which provided a rich data set to use in assessing the roles and influence of stakeholders in evidence uptake. Secondly, the multidisciplinary nature of the research team helped to ensure objectivity in the data analysis and interpretation. Thirdly, interviews were conducted by the first author who is experienced with policy development in Uganda.

The study also had several weaknesses. Firstly, recall bias may have impacted the accuracy of the responses, given the timing of the policy process and data collection. However, we noted consistency among the responses, suggesting that perhaps recall bias was not as much of a problem as might be anticipated. Secondly, with the exception of researchers, we considered stakeholders to be organisations/institutions/units. It should be noted that individuals may not necessarily represent the views of the institution in which they work; however, this was not explored in our study. Thirdly, it is possible that the stakeholders' levels of influence and support in the uptake of evidence in policy could change at the different stages of policy development, but this was also not assessed in our study.

Conclusions

Stakeholders played multiple roles in the uptake of evidence in the malaria treatment policy change in Uganda. The donors, MoH, service providers, and researchers engaged in the role of evidence generation. The MoH, parliamentarians, and opinion leaders at the national and local levels engaged in dissemination of evidence. The donors, MoH, researchers, and service providers through representation engaged in the uptake of evidence in policy development and implementation. Stakeholders exerted varying levels of support and influence for different reasons. For example, donors were influential due to their significant financial support, researchers were influential because they commanded respect, and the MoH was influential because the uptake of evidence and subsequent policy implementation heavily depended on them. It is noteworthy that all of the influential actors were divided regarding the best alternative antimalarial to adopt.

Our findings suggest that the roles and influence of stakeholders in KT will vary given the nature of the policy and the available evidence. For a given KT process, mapping the relevant stakeholders and devising mechanism for their engagement and for resolving conflicts of interest will enhance the uptake of evidence in policy development. Additionally, structures and systems must be put in place to encourage community participation in research processes and decision making.

Additional files

Additional file 1: Documents reviewed: policies, guidelines, meeting minutes, position papers, research report. Details of milestones and list of documents reviewed.

Additional file 2: Examples of how manifest content and thematic content analyses were performed. (a) Example of how manifest content analysis was performed. Details of how data was analysed to come with categories. (b) Example of how thematic content analysis was performed. Details of how data was analysed to develop themes.

Abbreviations

ACTs: artemisinin combination therapy; AL: artemether-lumefantrine; CQ: chloroquine; CSOs: civil society organisations; GF: Global Fund; JMS: Joint Medical Stores; KT: knowledge translation; MoF: Ministry of Finance; MoH: Ministry of Health; NDA: National Drug Authority; NMS: National Medical Stores; SP: sulfadoxine/pyrimethamine.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

JNO contributed to the study design, data collection, and data analysis and interpretation, as well as led the manuscript drafting. MN contributed to data analysis and interpretation and drafting of the manuscript. BM contributed to data interpretation and drafting of the manuscript. FS contributed to the study design, interpretation of results, and drafting of the manuscript. BC contributed to the study design, data interpretation, and drafting of the manuscript. All authors read and approved the final manuscript.

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Chapter 4: The case of user fees abolition in public health facilities in Uganda

The case of abolition of user fees for health care was selected based on the likelihood of predicting contrasting results. User fees for health care is a high polarisation policy likely to cause fragmentation among the actors involved. For example, the World Bank (WB) was supporting user fees because of their concern to ensure loan sustainability, while the government was keen to address hindrances to realization of the PEAP objectives, user fees for health care being one of them. It was highly salient given the fact that a significant percentage of the population are categorised as poor and stood to benefit from the abolition of user fees. User fees for health care is a social policy which directly concerns peoples' welfare and this engenders a political currency reflected in popular support and close engagement of politicians, civil society and the community. In addition, with the abolition of user fees, some actors stood to win while others stood to lose. Politicians stood to win votes, managers of the health services and health service providers stood to lose a source of revenue, while communities stood to benefit from free health services. In such a case, consultative mechanisms, reaching a consensus and inclusive policy development processes are unlikely. As such, the scientific rigour of the evidence may not be central in the decision-making process. This implies that the uptake of evidence, if it occurred at all, is unlikely to be explained by the facilitatory factors detailed in MRT 1.

Increasing attention has in the past been paid to removing financial barriers to accessing care especially for the poor and vulnerable. In line with this, several countries have abolished user fees for health care at the point of access but results in the medium- to long-term have been mixed. Some countries have reported increase in utilization of health services while others have reported reductions with subsequent deterioration in the quality of care provided.

We investigated the short to medium term impact of user fee abolition on the attainment of universal coverage objectives in Uganda. We noted that abolition of user fees improved access to health services and efficiency in utilization of health services in that there was an increase in the use of lower level facilities compared to hospitals. On the negative side, financial protection was yet to be achieved. Out-of-pocket expenditure remained high and mainly affected the poorer population quintiles. A dual system seemed to emerge where wealthier population groups were switching to the private sector.

Published article

Orem, Juliet Nabyonga, Frederick Mugisha, Christine Kirunga, Jean Macq, and Bart Criel. "**Abolition of user fees: the Uganda paradox**" *Health policy and planning* 26, no. suppl 2 (2011): ii41-ii51.

Scholars have emphasized the importance of paying careful attention to the planning process, the need for evidence-based decision making and obtaining comprehensive evidence prior to the policy-making process. We explored the extent to which evidence guided decision making in the case of user fee abolition. We specifically assessed whether evidence was available, had or

had not been considered in policy development and the reasons why. We further explored how the context and stakeholders involved shaped the uptake of evidence. We noted that different types of evidence informed policy development in several ways, including symbolic use to support a decision that was already made, conceptual use to guide discussions, and instrumental use to inform budget allocations. MRT 1 could not adequately explain the uptake of evidence although there was some convergence with facilitatory factors identified in MRT 1. Additional factors and themes emerged. Respondents perceived the availability evidence including its dissemination; the MoH institutional capacity to lead KT processes; the existence of partnerships for KT; a favourable political context; and how evidence aligns with the overall government policy discourse as the factors that impacted the uptake of evidence. The stakeholder analysis showed that the different actors played different roles and had varying levels of support and influence. In addition, almost all stakeholders were divided regarding the best policy option but for varying reasons. We also noted the importance of stakeholders reaching a consensus on the available evidence, the MoH having the negotiating power to take a preferred course of action in line with the evidence, the reduced turnover of senior officers to ensure continuity, and availability of funding to implement evidence.

Published article

Juliet Nabyonga-Orem, Freddie Ssengooba, Rhona Mijumbi, Christine Kirunga Tashobya, Bruno Marchal, Bart Criel: "**Uptake of evidence in policy development: The case of user fees for health care in public health facilities in Uganda**" *Accepted for publication in BMC Health services research.*

We refined MRT 1 into MRT 2b as follows with additions underlined:

"Evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process, there are partnerships for KT in place and the nature of the policy issue under consideration, the overall government agenda and the political situation can be expected to play a role**"**

> **Evidence** must be available and disseminated to stakeholders and;
>
> KT requires **strengthened MoH institutional capacity to lead the KT processes** and platforms for engagement between researchers and policy makers including civil society need to be in place.
>
> **Partnerships for KT** need to be in place. Communities need involvement in evidence generation and KT as well. Stakeholders play different roles and there is need to devise mechanisms for their objective engagement and resolving conflict of interest.

A favorable political context in which a political window provides an opportunity for KT and;

Evidence aligning with the overall government policy discourse enhances its uptake.

These contribute to more ownership, adoption and better application of evidence.

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Abolition of user fees: the Uganda paradox

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Inadequate health financing is one of the major challenges health systems in low-income countries currently face. Health financing reforms are being implemented with an increasing interest in policies that abolish user fees.

Data from three nationally representative surveys conducted in Uganda in 1999/2000, 2002/03 and 2005/06 were used to investigate the impact of user fee abolition on the attainment of universal coverage objectives.

An increase in illness reporting was noted over the three surveys, especially among the poorer quintiles. An increase in utilization was registered in the period immediately following the abolition of user fees and was most pronounced in the poorest quintile. Overall, there was an increase in utilization in both public and private health care delivery sectors, but only at clinic and health centre level, not at hospitals.

Our study shows important changes in health-care-seeking behaviour. In 2002/03, the poorest population quintile started using government health centres more often than private clinics whereas in 1999/2000 private clinics were the main source of health care. The richest quintile has increasingly used private clinics. Overall, it appears that the private sector remains a significant source of health care. Following abolition of user fees, we note an increase in the use of lower levels of care with subsequent reductions in use of hospitals. Total annual average expenditures on health per household remained fairly stable between the 1999/2000 and 2002/03 surveys. There was, however, an increase of US$21 in expenditure between the 2002/03 and 2005/06 surveys.

Abolition of user fees improved access to health services and efficiency in utilization. On the negative side is the fact that financial protection is yet to be achieved. Out-of-pocket expenditure remains high and mainly affects the poorer population quintiles. A dual system seems to have emerged where wealthier population groups are switching to the private sector.

Keywords Cost sharing, access, equity, utilization

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KEY MESSAGES

- The abolition of cost sharing in Uganda has improved access to health services, and the poor have benefited the most.
- After user fee abolition, illness reporting increased, especially among poorer quintiles, and utilization increased in the period immediately after the abolition, particularly by the poorest quintile.
- The new policy has led to efficiency gains with increased use of lower-level government health centres and concomitant reductions in the use of hospital services, although the wealthier have increasingly switched to private clinics.
- However, financial protection is yet to be realized, as out-of-pocket expenditure remains worryingly high for the poor and the rich.

Introduction

Inadequate financing for health by governments of low-income countries, and heavy reliance on out-of-pocket (OOP) payments at the point of use, are noted as some of the major challenges to the attainment of the Millennium Development Goals (MDGs) (James *et al*. 2005; Borghi *et al*. 2006). OOP expenditure on health remains significant, constituting over 40% of total health expenditure in 31 countries in sub-Saharan Africa (SSA) (WHO 2006). OOP expenditures, in the form of user fees, are a deterrent to seeking care and have been a subject of debate for decades. User fees have been noted to be a big hindrance to accessing health care especially for the poor (Mwabu *et al*. 1995; Collins *et al*. 1996; Van der Geest *et al*. 2000; Boyer *et al*. 2009), even if some have argued that this can be overcome once quality issues are adequately addressed (Costello 1997; Audibert and Mathonnat 2000). Evidence has shown that OOP payments for health care predispose households to incur catastrophic expenditure and eventually impoverishment (Wagstaff and van Doorslaer 2003; Khun and Manderson 2008). In light of this, the 2005 World Health Organisation (WHO) resolution on health financing urged member states to further develop their health financing systems to guarantee equitable access to good quality services, while providing protection against financial risk (WHO 2005). Similarly, the 2006 WHO health financing strategy for the African Region emphasized the need to raise additional resources, greater equity in health services financing and accessibility, efficient use of health resources and expanded coverage of health services, especially those targeting the poor (WHO 2006).

As a result, several developing countries have been undertaking health financing reforms, among which is the abolition of cost sharing. In the recent past, some countries have abolished user fees in public facilities: this has been the case in South Africa (for pregnant women and under-5s), Mali, Niger and Uganda with subsequent increases in utilization (Wilkinson *et al*. 2001; Burnham *et al*. 2004; Nabyonga *et al*. 2005; Ridde and Diarra 2009).

Earlier studies on abolition of cost sharing have focused largely on assessing increases in utilization. This paper explores, in the context of the Ugandan user fee abolition policy, whether it has contributed to improve equitable access to quality health services and enhanced financial protection. It further explores the changes in patterns of health care utilization and household health care expenditure especially for the poorer segments of the population. Few studies have looked at these aspects in the medium to long term, i.e. 3 to 6 years after abolishing the fees. The analysis in this paper seeks to describe and contribute to better understanding of these changes.

The Uganda health system

The health system in Uganda is highly decentralized with the central level being responsible for policy formulation and oversight while the decentralized units are responsible for service delivery (MOH 2008a). Services are provided through public, private for-profit (PFP) and private not-for-profit (PNFP) sub-sectors (see Table 1). Services are delivered through a tiered system. National referral hospitals provide comprehensive specialist services and are also involved in teaching and research. Regional referral hospitals provide general preventive and curative services and specialist services, while general hospitals provide general preventive and curative services. Health centre IVs provide curative and preventive services, emergency surgery and blood transfusion services. Health centre IIIs and IIs, which are categorized as lower level health facilities, provide mainly ambulatory services.

In Uganda, low utilization of health services and poor health indicators (Statistics Department [Uganda] and Macro International Inc. 1996) were major concerns for a country that was pursuing poverty eradication measures. Uganda's 1997 Poverty Eradication Action Plan—a developmental framework aiming to halve the number of Ugandans defined as poor (living on less than US$1 a day) by the year 2015—emphasized massive inputs into the social sectors, among which is health (MOFPED 2004). Health became a major priority following concerns that ill health was a major contributory factor to poverty. Within the health sector, a new Health Policy and a Health Sector Strategic Plan were developed and were both launched in August 2000 to be implemented within a sector-wide approach (SWAp) (MOH 1999a; MOH 2000). At around the same time, efforts were made to bring services nearer to the people through a decentralization reform with decentralized units (districts) having the autonomy to raise revenue locally for their activities (Government of Uganda 1997).

Despite these reforms, health services were still underfunded. Poor quality of services resulting from shortages of drugs and other supplies, and low and irregular salaries led to poor attendance in public health facilities. The country's decentralization policy, and the autonomy that followed it, gave many of the districts the window of opportunity to introduce cost sharing and generate local revenue for health services. Without

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Table 1 Number of health facilities by level and ownership 2004 and 2006

Level of facility	Ownership							
	Government		PNFP		Private		Total	
	2004	2006	2004	2006	2004	2006	2004	2006
Hospitals	55	57	42	46	4	8	101	111
Health centre IV	151	155	12	12	2	1	165	161
Health centre III	718	762	164	186	22	7	904	955
Health centre II	1055	1332	388	415	830	261	2273	2008
Total	1979	2301	606	659	858	277	3443	3237

PNFP: Private not-for-profit.
Source: Mid-term review report of the Health Sector Strategic Plan II (MOH 2008a).

Table 2 Investments in the health system

Financial year	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Government per capita expenditure in health (US$)	3.05	6.0	7.6	7.9	7.8	9.98	7.84	8.2	12.7
Allocation to health as a % of total government budget	7.5	7.5	7.6	7.9	9.7	8.9	9.6	9.6	8.3
GDP per capita at 2002 constant prices (US$)	302.9	300.3	293.1	291.1	291.4	304.2	295.9	366.9	391.9

Source: Annual health sector performance reports (MOH 2001; MOH 2006; MOH 2007; MOH 2008b; MOH 2009a); 2004/05–2008/09 health expenditure data, MOH; 2009 statistical abstract, Gross Domestic Product (GDP) data, Uganda Bureau of Statistics.

clear guidelines from the central Ministries of Health and Finance to support this at the district level, user fees were introduced in an *ad hoc* manner with charges being determined largely by service delivery levels. User fees provided revenue that could readily be used to provide incentives to health workers (top ups), to purchase medicines and to ensure cleanness of the health facility. Although a report by Ministry of Health in 1999 stated that cost sharing was an expression of the people's participation in the functioning and management of health facilities (MOH 1999b), its equity impact in terms of service utilization and as a viable source of health financing continued to be hotly debated.

In 2001, the government of Uganda abolished user fees at public health centres and hospitals. At hospital level, the government allowed a dual system: a paying private wing for those who can afford it and a free wing for those who are not in a position to pay. The decision to abolish user fees was taken amidst concerns that ill-health and high costs related to accessing services were hindrances to the realization of poverty eradication goals (MOFPED 2004). The policy was meant to improve access to health services among other things, especially for the poor who could not access health care because of its cost. The expectation was that more people would use the public health services and that OOP expenditure for health care would decrease. This was expected to occur across the population, but especially among the poor.

System-wide measures were put in place by the government to minimize the effects of this policy change. An immediate release of funds (US$526 315; US$0.02 per capita) for the purchase of drugs was provided,[1] alongside revision of the procurement guidelines, to minimize delays in the delivery of drugs to lower levels. There was an increase in the health sector allocation to compensate for the loss in revenue from user fees, and more flexibility in the utilization of funds which allowed districts to channel funds to areas previously supported by user fees. Wages for health workers were increased in the 2001/02 financial year by 14–63% across the different cadres of workers and, in addition, management of health workers' pay roll was greatly improved, to ensure better human resources management.

The Government of Uganda continued to increase investments in the health sector, though modestly, so as to improve physical access and quality of care in health facilities. Government per capita expenditure on health increased from US$3.07 in 2000/01 to US$7.6 in 2001/02 to US$9.98 in 2005/06 (see Table 2); per capita expenditure on medicines increased from US$0.8 per capita in 2000/01 to US$1.2 per capita in 2002/03, to US$1.7 in 2006/07, while physical access (i.e. proportion of the population living within a 5 km radius of a health facility) improved from 57% in 2001/02 to 72% in 2005/06. Percentage of approved posts filled by trained staff in the health sector improved from 33% in 1999/00 to 69% in 2004/05 (MOH 2006; MOH 2007; MOH 2008b; MOH 2008c; MOH 2009a). Over the same period, the country experienced a growth in GDP per capita from US$303 in 2000/01 to US$367 in 2007/08 (Uganda Bureau of Statistics 2009).

Methods

Data sources

The data used in this paper are based on three datasets of the Uganda National Household Surveys. The Uganda Bureau of Statistics conducted nationally representative surveys from August 1999 to July 2000 (1999/2000 survey), from May 2002 to April 2003 (2002/03 survey), and from May 2005 to April 2006 (2005/06 survey). The surveys are composed of several modules looking into socio-economic, agricultural and community activities. Health-seeking behaviour and household consumption expenditure are captured in the socio-economic module.

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Sampling design

In the 1999/2000 survey, the sampling design was a stratified two-stage sampling design except in some districts where the sample was selected in three stages due to lack of an enumeration area frame. In the case of districts with a two-stage sampling design, the first stage sampling unit was the enumeration area of the 1991 population census, and the second stage sampling unit was the household. For districts with a three-stage design, the sampling units were, at the first stage, the parish; at the second stage, the LC 1 (village); and at the third stage, the household.

In the 2002/03 survey, the Uganda National Household Surveys sample was drawn through a stratified two-stage sampling design. The sampling frame used for selection of first stage units was the list of enumeration areas with the number of households based on the cartographic work of the 2002 population and housing census. A total of 972 enumeration areas (565 in rural and 407 in urban areas) were covered. In order to select the second stage units, which are the households, a listing exercise using listing schedules was done in all selected enumeration areas.

In the 2005/06 survey, a two-stage sampling design was used to draw the sample. At the first stage, enumeration areas were drawn with probability proportional to size, and at the second stage, households (which are the ultimate sampling units) were drawn using simple random sampling. The sample of enumeration areas for the Uganda National Household Surveys 2005/06 was selected using the Uganda Population and Housing Census Frame for 2002. Initially, a total of 600 enumeration areas was selected. These enumeration areas were allocated to each region on the basis of the population size of the region. However, in the Northern region, the number of enumeration areas drawn was doubled. The extra enumeration areas were to be held in reserve to allow for enumeration area attrition due to insecurity. After this sample was drawn, it was realized that the sample size in 10 districts needed to be increased to about 30 enumeration areas in each district to have an adequate sample size for separate analysis.

Sample size

In all the three surveys, the size required for a sample was determined by taking into consideration several factors, the three most important being: the degree of precision desired for the survey estimates, the cost and operational limitations, and the efficiency of the design. The sample sizes were 10 696 households with 57 385 individuals, 9711 households with 50 504 individuals, and 7426 households with 39 322 individuals in the 1999/2000, 2002/03 and 2005/06 surveys, respectively.

In this paper, the household sample size used for each survey was, respectively, 10 696 households with 56 969 individuals (99.2% of the initial sample), 9711 households with 49 562 individuals (98.1% of the initial sample) and 7426 households with 39 310 individuals (99.9%) for 1999/2000, 2002/03 and 2005/06.

Data manipulation and analysis

We started with identifying those household members who reported an illness in the last 30 days. This criterion was consistently used in all three surveys. In all surveys, illness was reported as having suffered an illness or injury in the 30 days prior to the survey. In a few cases responses were either missing or the response was unknown (0.8%, 1.9% and <0.1% for the 1999/2000, 2002/03 and 2005/06 surveys, respectively). These household members were excluded from further analysis.

Household members who reported having had an illness or being injured in the 30 days prior to the survey date were asked whether any health worker (doctor, nurse, pharmacist or traditional healer) was consulted for the illness or injury. A patient was considered 'to have consulted' only if they sought help outside the home which was not provided by family members or friends. In the 1999/2000 and the 2002/03 surveys, this included use of hospitals (public and privately owned), private clinics, health centres, drug shops, pharmacies and traditional doctors. In the 2005/06 survey, this included use of community health workers, HOMAPAK[2] drug distributors, ordinary shops,[3] drug shops, pharmacies, private clinics, health centres, hospitals (public and privately owned) and traditional healers. However, HOMAPAK community distributors were not included in the analysis because they were few and only reported in the 2005/06 survey. Ordinary shops selling medicines, drug shops and pharmacies have been lumped together. Household members who experienced an illness and who did not seek health care were asked why this was the case. In all the three surveys, coding was made to fit into any of the following options: a mild illness, facilities that are too far, facilities that are too costly or any other reason.

Data on health care expenditure are provided per household and are not specifically related to an illness or injury episode. Health care expenditure is shaped by consultation fees, prices of medicines, hospital or clinic charges, traditional doctor fees and the accompanying remedies provided, and any other expenses in the previous 30 days for the three surveys. In all cases, the health care expenditures are at 2000 constant prices based on the consumer price index. Total household expenditure was used to compute quintiles.

Basic tables and cross-tabulations of means and sums were used as the main approach to data analysis. Tests for statistical significance were also done where appropriate.

Limitations of the study

Given the importance and the specificity of the PNFP sub-sector in the Ugandan health system, and given the policy in Uganda to partially subsidize the PNFP health care delivery sub-sector, it would have been desirable in the analysis to make a distinction between the PNFP and the rest of the private sector. This was unfortunately not possible because of the initial design of the surveys.

It would also have been desirable to distinguish 'drug shops' from 'pharmacists' given the differences in technical expertise between the two. However, this was not possible because of data limitations.

Results

The first aspect of our analysis is the frequency of reported illness. In Figure 1 we present the percentage of the population

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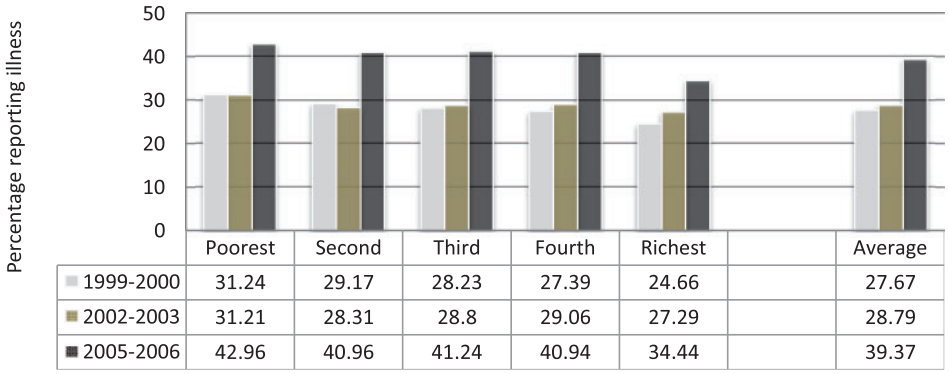

	Poorest	Second	Third	Fourth	Richest		Average
1999-2000	31.24	29.17	28.23	27.39	24.66		27.67
2002-2003	31.21	28.31	28.8	29.06	27.29		28.79
2005-2006	42.96	40.96	41.24	40.94	34.44		39.37

Figure 1 Percentage of the population reporting an illness episode 30 days prior to the survey. *Source*: Uganda National Household Surveys 1999/2000, 2002/03, 2005/06.

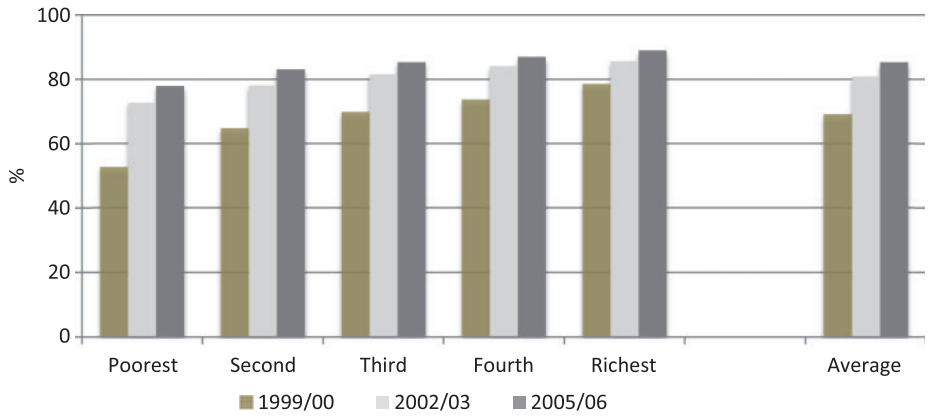

Figure 2 Percentage of population that consulted following an illness episode. *Source*: Uganda National Household Surveys 1999/2000, 2002/03, 2005/06.

in the different surveys reporting an illness or injury in the 30 days prior to the survey. The overall population is broken down into quintiles. It appears that a smaller percentage of individuals from households in the richest quintile reported an illness compared with those individuals from the poorest quintiles (see Figure 1). In all quintiles a higher proportion of the population reported an illness in 2005/06 compared with earlier surveys. The overall increase between 2002/03 and 2005/06 was 37%. This was much higher than the increase between 1999/2000 and 2002/03 when it was only 4%. When looking at the poorest quintile, there was an increase of 38% between the 2002/03 and 2005/06 surveys. There was no increase between the 1999/2000 and 2002/03 surveys. The increase in reported illness incidence between 2002/03 and 2005/06 is statistically significant ($P < 0.01$) both for the richest and poorest quintiles.

A second aspect of the analysis was whether the population seeks health care. The percentage of the population that consulted formal health services[4] following an illness episode is shown in Figure 2. Comparing the population in the richest quintile with the population in the other quintiles, it appears that households in the richest quintile consulted more often than other categories for all the periods studied.

Overall, the highest increase in consultation was between the 1999/2000 and 2002/03 surveys (17%). There was only a 5% increase between the 2002/03 and 2005/06 surveys. This increase was most pronounced in the poorest quintile: an increase of 38% between 1999/2000 and 2002/03; and an increase of 7% between 2002/03 and 2005/06. Corresponding figures for the richest quintile were 9% and 4%, respectively. Considering the entire period covered by the surveys, the increase in consultation was highest among the poorest 25% of the population. This increase was statistically significant for all quintiles ($P < 0.01$). However, the statistical significance was highest among the poorest 20%. The gradient between the poorest and richest quintiles for consultation was greater between the 1999/2000 and 2002/03 surveys, than it was between the 2002/03 and 2005/06 surveys.

In a third aspect of our analysis we explored where individuals did consult. Figure 3 indicates where the first consultation took place for those who experienced an illness episode and who decided to consult a health provider. Overall, there was an increase in utilization of health services in both the public and private sector, more specifically in government health centres and in private clinics.

Looking at the overall picture, and comparing private and government health facilities, the private sector remains the most frequently used source of health care. Clinics and health centres are used more often than hospitals. Clinics and health

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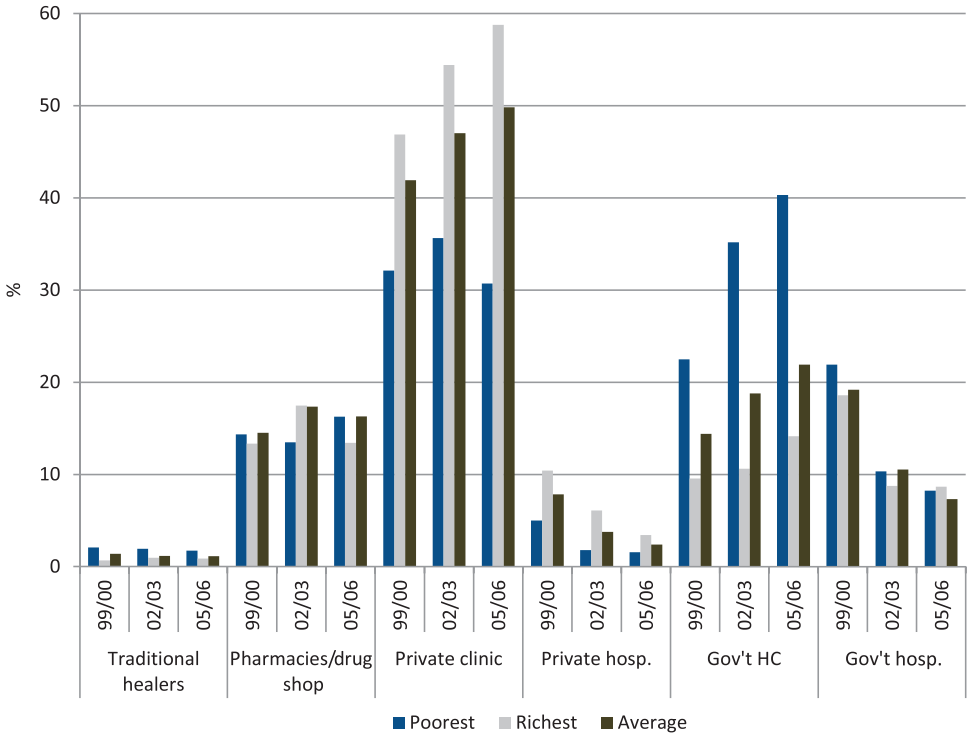

Figure 3 Place of first consultation. *Source*: Uganda National Household Surveys 1999/2000, 2002/03, 2005/06.

centres registered increases in utilization while for hospitals the reverse trend was noted. In the 1999/2000 survey, public hospitals were used more frequently than health centres. Following the abolition of cost sharing, however, we note a change in utilization whereby health centres are used more often than hospitals. Private hospitals registered a consistent decreasing trend in utilization; a 52% reduction between the 1999/2000 and 2002/03 surveys and a 37% reduction between the 2002/03 and 2005/06 surveys. Traditional healers play only a marginal role.

The decrease in utilization of government and private hospitals is statistically significant ($P < 0.001$). The increase in utilization of government health centres was statistically significant between 1999/2000 and 2002/03 ($P < 0.001$), while the increase between 2002/03 and 2005/06 was not ($P = 0.15$). The utilization of pharmacies/drug shops shows an uneven pattern. In the case of traditional healers, there is a statistically significant decline.

Comparing private clinics and government health centers, the poorest quintile consulted private clinics more often in 1999/2000. This pattern changed dramatically in 2002/03 where we see the poorest quintile using government health centres more than private clinics. On the other hand, the richest quintile utilized private clinics more than government health centres in all the surveys. Both the poorest and richest quintiles registered decreasing trends in utilization of hospitals. Use of private hospitals is lowest among the poorest quintile.

The decrease in utilization of government and private hospitals for the poorest and richest quintiles in the period covered by the three surveys is statistically significant ($P < 0.001$). The increase in utilization of government health centres was statistically significant across the surveys for the poorest quintile ($P < 0.001$), but not for the richest quintile ($P = 0.25$ between 1999/2000 and 2002/03; $P = 0.01$ between 2002/03 and 2005/06). The increase in utilization of private clinics among the poorest quintile between 1999/2000 and 2002/03 was not statistically significant ($P = 0.15$), while the decrease between 2002/03 and 2005/06 was also not statistically significant ($P = 0.08$). The increases in use of private clinics between all the surveys for the richest 20% were statistically significant ($P < 0.01$).

We computed concentration indices for the general use of health services when sick, and specifically for use of government health centres. The results are presented in Table 3. The concentration indices show a disproportionate concentration of general use of health services among the rich, but a disproportionate concentration of use of government health centres among the poor. That means that, in general, people from rich households seek health care more often when ill than those from poor households. However, the opposite is true for the use of government health centres. People from poor households seek health care from government health centres more often than those from rich households.

A fourth aspect of the analysis is an investigation of the extent to which 'cost' is a hindrance to seeking health care. Table 4 presents the relative importance of the reasons for not seeking care. Throughout the different surveys 'available facilities being costly' became less important as a reason for not seeking health care. This is especially true for the richest quintiles where 'mild illness' became the leading reason for not seeking health care. The decrease between 1999/2000 and 2002/

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Table 3 Concentration indices for utilization

	General use of services			Use of government health centres		
	1999/2000	2002/03	2005/06	1999/2000	2002/03	2005/06
Concentration index (CI)	0.0735	0.0322	0.0246	−0.1449	−0.2205	−0.2159
Variance (CI)	0.0005	0.0001	0.0001	0.0018	0.0026	0.0027
Standard Error (CI)	0.0223	0.0080	0.0071	0.0427	0.0513	0.0522
t-test (CI)	3.29	4.04	3.47	−3.40	−4.30	−4.14

Table 4 Reasons for not consulting, in percentages

Wealth quintiles	Illness mild			Facilities are too far			Available facilities are costly			Other		
	99/00	02/03	05/06	99/00	02/03	05/06	99/00	02/03	05/06	99/00	02/03	05/06
Poorest	19.14	29.68	32.77	13.65	20.51	14.32	62.03	41.32	35.19	5.18	8.5	17.72
Second	29.62	38.35	36.27	11.91	17.98	10.29	55.61	37.88	40.93	2.87	5.8	12.5
Third	37.17	35.03	45.27	12.63	19.56	10.7	44.83	36.29	31.09	5.37	9.11	12.94
Fourth	37.49	44.87	51.21	12.98	20.51	7.00	47.34	27.00	27.29	2.20	7.62	14.49
Richest	58.74	51.38	64.11	4.85	12.53	3.37	32.01	27.31	19.02	4.40	8.78	13.5
Total	**34.76**	**38.83**	**45.16**	**11.52**	**18.46**	**9.38**	**49.66**	**34.78**	**31.19**	**4.06**	**7.93**	**14.27**

Source: Uganda National Household Surveys 1999/2000, 2002/03, 2005/06.

03 was much higher for the poorest quintile at 33.4% compared with 14.7% for the richest quintile. However, between the 2002/03 and 2005/06 surveys, the decrease was much higher for the richest quintile at 30% compared with 15% among the poorest quintile. All the reductions across the surveys are statistically significant ($P < 0.001$). Overall, 'facilities being too far', as a reason for not seeking care initially, increased by 60% between the 1999/2000 and 2002/03 surveys, but decreased by 49% between 2002/03 and 2005/06. We note that the decrease between 2002/03 and 2005/06 was higher for the richest quintile at 73% compared with the poorest quintile at 30%.

A fifth aspect considered in the analysis is household (OOP expenditure on health care. Household OOP expenditure was annualized and converted into US$ in 2000 prices. Total annual average expenditures on health per household remained fairly stable between the 1999/2000 and 2002/03 surveys. There was, however, an increase of US$21 between the 2002/03 and 2005/06 surveys (see Figure 4). Expenditure categories include consultation, expenses on medicine, hospital/clinic charges, traditional healer and others. The surveys made a distinction between consultation and other charges at hospital or clinic level. It is not clear from the surveys whether there is an overlap between these categories, although other charges at hospital and clinic include expenditure for laboratory services and additional supplies[5] like syringes, intravenous fluids (IV fluids), gloves and cotton wool. The highest increase in the expenditure categories between the 2002/03 and 2005/06 surveys was in the category of hospital/clinic expenses: expenditure increased by US$42.

Table 5 provides details of household expenditure on health care according to wealth quintiles across the various categories. Household expenditure on health care increased for all quintiles between 2002/03 and 2005/06. This increase was similar across quintiles, ranging from 7% among the poorest quintile to 30% among the richest quintile. Hospital/clinic charges experienced the greatest increase compared with other items of expenditure; an increase of 56%.

In the 1999/2000 survey, traditional healers, who on the whole play a relatively marginal role in health care provision, accounted for the highest expenditure. Looking at the 1999/2000 survey, other than expenditure in the traditional sector, it appears that consultation fees accounted for the highest amount of expenditure. However, this pattern changes in the subsequent surveys, where the highest expenditure is on hospital/clinic charges.

Discussion

Improving financial protection, especially for the poor, requires more than abolishing fees for health services. System-wide investments must be put in place to improve the quality of services, their accessibility, to ensure efficient use of health resources and sustainability of the gains in the medium to long term.

Reported illness

Our data point to a striking increase in illness reporting, which was more marked between the 2002/03 and 2005/06 surveys than between the 1999/2000 and 2002/03 surveys. We emphasize the fact that the definition of illness has been consistently the same in all three surveys. Several reasons could account for this marked increase. First, we suspect a rise in awareness on health issues within the population as a result of several efforts. At the community level, village health teams in several districts were put in place in the 2002/03 financial year (MOH 2000), involving a team of 10 people for every village who provide health messages and support the community in various health aspects. Second, the education sector also registered increases

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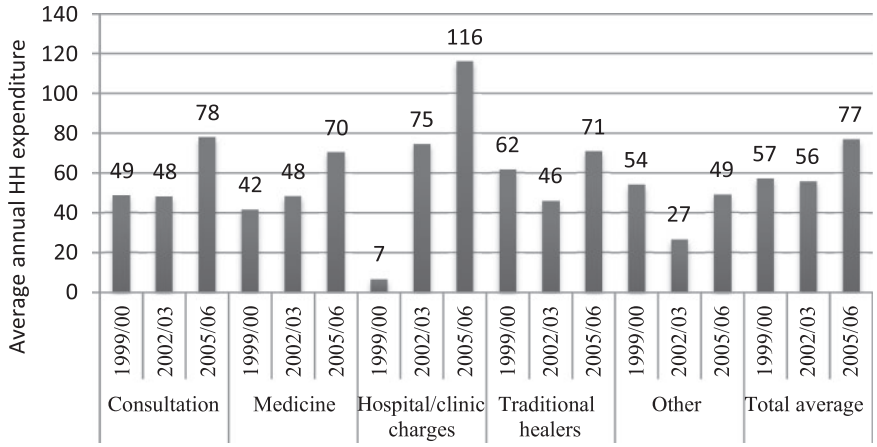

Figure 4 Annual average household expenditures in US$, 2000 prices, Uganda. *Source*: Uganda National Household Surveys 1999/2000, 2002/03, 2005/06. The category 'other' includes expenditure on hotel services when admitted and transport costs to health facilities.

Table 5 Annual average household expenditures in US$, 2000 prices

Wealth quintile	Consultation fees			Medicines			Hospital/clinic charges			Traditional doctors			Others			Total annual average		
	99/00	02/03	05/06	99/00	02/03	05/06	99/00	02/03	05/06	99/00	02/03	05/06	99/00	02/03	05/06	99/00	02/03	05/06
Poorest	6	13	12	13	14	17	2	24	25	17	18	15	11	3	18	15	17	18
Second	10	31	25	20	20	28	3	35	39	29	24	26	46	16	20	25	24	29
Third	15	34	31	31	31	45	5	44	71	35	24	59	45	10	31	39	35	48
Fourth	19	71	74	44	54	70	7	75	103	73	51	79	60	9	44	58	61	72
Richest	138	72	151	91	114	171	14	157	241	160	97	148	89	73	76	128	124	162
Total	49	48	78	42	48	70	7	75	116	62	46	71	54	27	49	57	56	77

Source: Uganda National Household Surveys 1999/2000, 2002/03, 2005/06.

The category 'other' includes expenditure on hotel services when admitted and transport costs to health facilities.

Household size for each survey was respectively was 5 (5.36509), 5 (5.363814) and 6 (5.787879) persons in 1999/2000, 2002/03 and 2005/06.

in enrolment under the universal primary education programme since 1997. Moreover, in the last 5 years a universal secondary education programme was started (Grogan 2006). An increase in literacy levels in itself can raise the degree of health awareness and thus modify health-seeking behaviour. Third, a true increase in disease incidence may yet be another explanation; however, no epidemic of a national scale has been registered over the period of the survey (MOH 2009b). It seems plausible therefore that the increase in the proportion of individuals reporting an illness in the 30 days prior to the survey is due to improvement in awareness and health-seeking behaviour rather than in an increase in illness incidence. Another explanation, however, could be that as the reduction in prices at government facilities increased use and people adjusted to the reality of easier access, they became more likely to treat symptoms of illness as significant and potentially needing treatment, so leading to an increase in self-reporting of illness.

Patterns of utilization of health services

The results show that although the poor declare a higher illness incidence, they consult formal health services less than the richer quintiles. Similarly, earlier studies found that the poor and vulnerable groups experienced a higher burden of disease but had less access to health services than those less poor (Kiwanuka *et al*. 2008). The significant use of the private sector by all quintiles as seen in our analysis, before as well as after abolition of user fees, has also been documented in other studies (Pariyo *et al*. 2009; Rutebemberwa *et al*. 2009). The highest increase between surveys in the use of the private sector was registered in the richest quintile. This finding was also reported in other studies (World Bank *et al*. 2008). Several explanations have been reported for this: private health services have been reported to offer better quality services (Seiber and Robinson 2007; Rutebemberwa *et al*. 2009) and to have more 'competent staff' (Seiber and Robinson 2007; Kiwanuka *et al*. 2008).

Abolition of cost sharing attained the objective of improving access to health care services. Indeed, utilization of health services increased soon after the policy change between the 1999/2000 and the 2002/03 surveys. The increase in illness reporting for all quintiles was highest between the 2002/03 and the 2005/06 surveys, but the highest increase in utilization occurred between the 1999/2000 and the 2002/03 surveys, coinciding with the time user fees were abolished. This finding

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is in line with the routine monitoring of the sector that has registered a per capita increase in utilization from 0.4 in 1999/2000 to 0.6 in 2000/01 (MOH 2001). Although increases were higher in the public sector, the private sector also registered modest increases but not for the poorest quintile. A similar finding has been documented in earlier studies as well (Xu *et al*. 2006). Poorer quintiles registered the highest increase in utilization of government health centres and for the poorest quintile there was a reduction in utilization of private clinics between 2002/03 and 2005/06. This suggests that the policy change may have contributed to increase the population's use of government first-line health services, i.e. health centres. The reduction in utilization of hospitals could be looked upon as an efficiency gain, encouraging people to seek care at lower level units where costs are lower. In the 1999/2000 survey, expenditure for care provided by traditional healers accounted for the highest expenditure yet had the lowest utilization, pointing to very high charges in this sub-sector which, by definition, remains largely unregulated.

Expenditure patterns

The declining trend in cost being given as a reason for not seeking care is noted, although it remains significant. Expenditure on health care by households is still significant, with important increases noted between the second and third surveys (2002/03 and the 2005/06). Overall, our data point to an average increase of US$21 (in 2000 prices) in OOP expenditure per household between 2002/03 and 2005/06. World Bank data point to an increase of US$6 in average cost per utilization over the same period (World Bank *et al*. 2008). Similarly, Basaza *et al*. (2010) found that OOP expenditure remains an important feature of health care financing in Uganda, despite the blanket abolition of user fees in government facilities. The lower increase in expenditure between 2002/03 and 2005/06 among the poorest quintile may imply lower capacity to pay. This is further supported by the fact that 'costly facilities' is cited more often by the poorest quintile than by other quintiles as a reason for not seeking care.

Similarly the World Bank study showed that although the poor spent a lower percentage of their consumption expenditure on health, the incidence of catastrophic spending was highest in the lowest quintile (World Bank *et al*. 2008). This may largely be accounted for by health system gaps and lack of basic inputs with subsequent failure of health facilities to provide optimal services. Surveys have shown that lack of essential supplies has adversely affected service delivery especially at the lower levels. For example, the percentage of health centre IIs experiencing stock-outs of essential medicines has been close to 80% for the last 3 years, compared with the national average of close to 70% (MOH 2006; MOH 2007; MOH 2008b; MOH 2009a). Only 52% of health centre IIs were able to provide antenatal care (MOH and Macro International Inc. 2008) and only 55% were in a position to offer child immunization with all equipment available (MOH and Macro International Inc. 2008). The lack of inputs into service delivery has led to patients having to purchase supplies and medicines from the private sector. This is further supported by our results that point to excessively high increases in hospital/clinic expenses.

Investment in the health system is still inadequate

Although efforts were put in place to strengthen the health system and improve quality of care, investments remain far from adequate. Funding for the sector remains very low. The government[6] per capita expenditure on health has only increased marginally from US$7.6 in 2001/02 to US$9.98 in 2005/06. It was US$8 in 2006/07, US$8.2 in 2007/08 and US$13 in 2008/09, while allocation to health as a percentage of total government budget remained around 9% over the same period. This falls far below the estimated per capita requirement of US$41 (MOH 2009c) and below the Abuja target of 15% of government budget allocated to health (OAU 2001). Per capita expenditure on medicines and essential supplies remains low, at only US$0.8 in 2000/01, US$1.2 in 2002/03 and US$1.7 in 2006/07. This is far below the estimated per capita requirement of US$3.5 [excluding antiretrovirals (ARVs), artemisinin combination therapies (ACTs) and insecticide-treated bed nets (ITNs)]. As a result, stock-outs of essential medicines in health facilities have remained above 60% for the last 7 years (MOH 2001; MOH 2006; MOH 2007; MOH 2008b; MOH 2009a). Only 69% of approved posts are filled by trained personnel and in some districts nursing assistants form close to 50% of the health workforce.

The quality of services offered in government facilities has remained low (Uganda Bureau of Statistics 2004). This is perhaps one of the reasons why better-off quintiles have shifted to using more private sector services, and the poor are having to spend on commodities, supplies and private clinics because of stock-outs in government health facilities. Other studies have also noted that if the poor are to benefit from free services, investments should be made in improving the quality of services (Van der Geest *et al*. 2000). Similarly, Gilson and McIntyre (2005) emphasize the need for careful action in the removal of user fees if it is to bear positive and sustainable results.

On the other hand, informal payments have been increasingly reported in public health facilities. The national service delivery survey reported that over 30% of women who attended antenatal care in public facilities paid informal fees (Uganda Bureau of Statistics 2004). This could be a result of the low salaries—although salaries were increased soon after the abolition of fees, there has not been further increase since then. Earlier studies also showed continued health worker disgruntlements after the pay increases, which could have resulted from the loss of a source of resources—user fees—that were readily available as needed (Nabyonga-Orem *et al*. 2008). It cannot be excluded that the amounts of fees collected were significantly higher than reported, implying a real net decrease in health workers' income that is not adequately compensated for by salary increases. This real loss in revenue could contribute to explain why informal charges have persisted.

Conclusion

The abolition of cost sharing in Uganda has improved access to health services over time. The poor have benefited the most. The new policy also led to efficiency gains with increased use of lower-level government health centres and concomitant reductions in the use of hospital services. Financial protection, however, is yet to be realized. OOP expenses remain worryingly

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high for the poor and the rich. Households continue to bear a large burden in the financing of health services. A dual system of service delivery is emerging with the rich largely switching to the private sector. Use of the private sector is significant in a context where regulatory frameworks are sorely lacking.

Abolition of cost sharing is a means and not an end in itself. Hence, the debate on whether it is a successful policy or not needs to keep track of the objectives to be attained. There is a need to significantly increase investment in the health sector and address system gaps in service delivery if the poor are to have more effective financial risk protection. There is also a need to build effective partnerships with the private sector, still an important source of health care. The design of a regulatory framework should ensure quality and control pricing.

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Conflict of interest

None declared.

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[1] This represents an additional US$0.02 per capita for drugs (current public per capita drug expenditure is US$1.2).
[2] Home-based treatment of malaria using a pack of antimalarials.
[3] These are shops selling other merchandise but also have a section for selling medicines.
[4] Formal health services include services provided outside the home, by a health provider.
[5] When all these supplies are out of stock in the health facility, patients are asked to buy from private pharmacies.
[6] This is Government of Uganda funding including donor budget support and donor projects in the Medium-Term Expenditure Framework.

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Uptake of evidence in policy development: the case of user fees for health care in public health facilities in Uganda

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Abstract

Background

Several countries in Sub Saharan Africa have abolished user fees for health care but the extent to which such a policy decision is guided by evidence needs further exploration. We explored the barriers and facilitating factors to uptake of evidence in the process of user fee abolition in Uganda and how the context and stakeholders involved shaped the uptake of evidence. This study builds on previous work in Uganda that led to the development of a

middle range theory (MRT) outlining the main facilitating factors for knowledge translation (KT). Application of the MRT to the case of abolition of user fees contributes to its refining.

Methods

Employing a theory-driven inquiry and case study approach given the need for in-depth investigation, we reviewed documents and conducted interviews with 32 purposefully selected key informants. We assessed whether evidence was available, had or had not been considered in policy development and the reasons why and; assessed how the actors and the context shaped the uptake of evidence.

Results

Symbolic, conceptual and instrumental uses of evidence were manifest. Different actors were influenced by different types of evidence. While technocrats in the ministry of health (MoH) relied on formal research, politicians relied on community complaints. The capacity of the MoH to lead the KT process was weak and the partnerships for KT were informal. The political window and alignment of the evidence with overall government discourse enhanced uptake of evidence. Stakeholders were divided, seemed to be polarized for various reasons and had varying levels of support and influence impacting the uptake of evidence.

Conclusion

Evidence will be taken up in policy development in instances where the MoH leads the KT process, there are partnerships for KT in place, and the overall government policy and the political situation can be expected to play a role. Different actors will be influenced by different types of evidence and their level of support and influence will impact the uptake of evidence. In addition, the extent to which a policy issue is contested and, whether stakeholders share similar opinions and preferences will impact the uptake of evidence.

Keywords

User fees, Health care, Public facilities, Policy development, Knowledge translation, Uganda

Background

User fees for health care have been debated for well over a decade. Though some researchers have argued that they improve the quality of care, and subsequently utilization [1,2], others have pointed out negative effects such as deterring access to care, failure to realize meaningful financial contributions, and lack of visible improvements in quality [3,4]. In an effort to improve access to health services, several low income countries (LICs) have abolished user fees [5,6], but the results in the medium- to long-term have been mixed. Some countries have reported increased utilization, whereas others have reported a reduction in utilization and deteriorating quality of health services [7,8]. Designing successful reforms is not easy, and questions as to why results are mixed continue to be explored. Some scholars have highlighted the need for; paying careful attention to the process of designing reforms, evidence-based decision making and obtaining comprehensive evidence prior to the design process [9,10]. The definition of what evidence is and how much of it is enough also

continues to be debated with researchers and academics expressing preference for peer-reviewed research [11]. However, some researchers have stated that, in the case of developing countries, evidence is much broader, consisting of monitoring reports, experience, and know how [12]. Bowen Zwi et al. also defined evidence broadly to encompass research, opinion and views of individuals or groups, results of consultative processes and published reports and documents [13]. Lomas et al. on the other hand argues that evidence concerns facts which may be actual or asserted and these may be known through experience or observation[14]. Scholars have further emphasized the importance of integrating research evidence and other types of policy relevant evidence, especially that which is considered as evidence by policy makers and stakeholders, without prioritizing one over the other but as complimentary input into policy development[15-17]. In this paper, we define evidence broadly to encompass published and unpublished research, routine monitoring reports, community complaints, clinician observations, and population-based surveys.

The policy-making process is influenced by several factors evidence being just one of them. Political processes, economic considerations, institutions, cultural issues and societal values all impact on health policy development [18,19]. Furthermore, the role of stakeholders in KT has been highlighted. Stakeholders are defined as individuals or institutions which are affected by the policy change, directly influence it, or have an interest in the outcome even when not directly involved [20]. The roles they play, their level of influence, interactions among them and their interest in a given issue, do impact the uptake of evidence [21,22].

In the past, the uptake of evidence has been restricted to instances in which the evidence led directly to development of a policy, a strategy or a guideline, but scholars have shown different ways in which evidence can be used. Evidence may be used to support a position that is already taken (symbolic use), to inform discussions and debate about a topical issue (conceptual use), or used to actually create guidelines or change practice directly (instrumental use) [23,24]. In this article, we consider symbolic, conceptual, and instrumental use as forms of evidence uptake. Much has been published on the effects of user fees on health care, but there is a dearth of literature on how much evidence guides decision making in such a reform.

In this paper, we look at the uptake of evidence in policy development, referred to as knowledge translation (KT), with specific reference to the abolition of user fees for health care in public facilities in Uganda. We use the term KT as defined by the Canadian Institute of Health Services Research: ?a dynamic and iterative process that includes synthesis, dissemination, exchange, and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system? [25]. We define policies as decisions made by those with responsibility for a given policy arena [26].This study is part of a bigger study that seeks to enhance our understanding of how we can improve uptake of evidence in health policy development in Uganda. Previous work led to the development of a Middle Range Theory (MRT) outlining the main facilitating factors for translating evidence into policy [27]. MRTs are defined as ?theories that lie between the minor but necessary working hypotheses (?) and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behavior, social organization, and social change? [28]. Our initial MRT detailing facilitating factors to the uptake of evidence was constructed around three elements that seemed particularly important in Uganda namely; the characteristics of the evidence, strengthened ministry of health (MoH) institutional capacity to lead the KT process and, existence of KT partnerships. Our MRT states the following:

?***High-quality and contextualized evidence will be taken up in policies so as to lead to evidence-informed policies in instances where the MoH leads the KT process and there are partnerships for KT in place.***

Evidence must be of high quality, contextualised, provide economically feasible recommendations, and produced in a timely manner by credible researchers. Use of local researchers is helpful but there is a need to separate the roles of researchers and policy makers.

KT requires **strengthened MoH institutional capacity to lead the KT process**. Institutionalized platforms for engagement between researchers and policymakers including civil society need to be in place, and mechanisms to coordinate evidence generation and synthesis need to be mainstreamed within the MoH. Policy makers need to be better at knowledge management and the policy-making process needs to be minimally bureaucratic.

Partnerships for KT need to be in place where all stakeholders are involved throughout the process right from evidence generation to application in order to improve trust and build interest. Communities need involvement in evidence generation and KT as well.

These contribute to more ownership, adoption and better application of evidence*?*[27].

This MRT was developed on the basis of literature review and validated through interviews with policy actors in Uganda without reference to a given research project and policy outcome. The extent to which the facilitating factors are valid in other settings needs to be tested on specific policy case studies.

Selection of the case

The selection of the case we report in this study was guided by our initial MRT on KT [29].The case on abolition of user fees seemed likely to predict contrasting results given the nature of the policy. Contandriopoulos et al. note that the characteristics of the policy have an impact on how stakeholders and policy makers consider evidence in the policy development process [30]. Whether the issue is polarizing that is, it is likely to cause fragmentation (high polarisation) among the actors involved given their positions on the issue under consideration, whether it is highly salient in that will attract a lot of attention and whether actors are familiar with the issue and as such it gains prominence on the agenda

[30]. In addition, Moat et al. point out the need to understand how the context in which evidence is produced, the issues it addresses and issue-context resonance influence on the producers and users of evidence[17]. Regarding the context, the government policy making structures involved in policy making and the extent to which they are involving, the characteristics of political actors whether they stand to win or lose given the policy choices made and societal values, will impact on how evidence is viewed and taken up in policy development [17].

In the case of abolition of user fees, there were issue-context resonance factors that would impact the uptake of evidence. Polarisation tendency were eminent in that the actors were

divided. For example, the World Bank (WB) was in for retention of user fees based on their concern to ensure loan sustainability, while the government was keen to address hindrances to realization of PEAP objectives**,** user fees for health care being one of them. It was a salient issue given that it is a social policy which directly concerns peoples? welfare and this engenders a political currency reflected in popular support. Regarding context, Moat & Abelson in their analysis of the influence of institutions in the decision to abolish user fees in Uganda, concluded that ?Big man? presidentialism and clientelism thwarted the role of formal institutions [31] indicating an exclusive policy making process. In this regard, the scientific rigor of the evidence may not be central in the decision making process.

Background to the case study

The background to this study was described previously [8]. The policy process concerning user fees occurred within a given context, which impacted the decisions that were made. The period between the late 80s and early 90s was characterized by processes at both the global and national level that had a direct influence on the user fee policy. For example, the late 80s saw the global push of communities to take charge of their own health through the ?self-help? drive, and subsequently the introduction of the Bamako Initiative schemes, which encouraged communities to contribute to the cost of health care [32,33]. At the local level, the country was just emerging from a civil war and the health care system needed rebuilding. The health sector reform programme developed at that time was unaffordable to the government, and potential donors expressed reservations due to the high cost required for its implementation. As one of the conditions for a loan to implement the programme, the WB proposed user fees, arguing that they would be key to ensuring sustainability. In addition, structural adjustment policies called for the subsidization of public service provisions by communities [34]. A second major event was decentralization. In order to bring services closer to the people, the country undertook decentralization reform in the early 90s, redefining roles and responsibilities between the central level and local governments (districts). The Local Government Act [35] allowed districts to charge fees for services they provided. Despite disagreeing with the introduction of user fees for health care at the level of parliament and the lack of an explicit policy on user fees, districts used the Local Government Act to institute their own fee systems. Implementation was patchy and poorly monitored, although some years later (in 1995), the Ministry of Health (MoH) developed guidelines [36]. The Highly Indebted Poor Countries (HIPC) initiative was the third main event. In the early 2000s, global actors pushed to reduce poverty in LICs. Uganda benefited from the HIPC initiative on the condition that the country invested debt relief funds into social services sectors, such as health. Uganda developed a Poverty Eradication Action Plan (PEAP) that prioritized investments in social services, including health. The country was keen to address all hindrances to the realization of the PEAP objectives, including user fees in public health facilities [37]. The early 2000s again saw the creation of a Sector Wide Approach (SWAp) in the health sector arguing for the alignment of all available resources to one agreed upon Health Sector Strategic Plan (HSSP) and more harmonization among donors [38]. As a result, more funding was realized to support the implementation of the HSSP [39].

The process leading to the abolition of user fees was characterized by protracted debates in cabinet, among technical officers in the MoH and among donors in their interactions with government without reaching a final decision. During the presidential campaigns in 2001, the President announced immediate removal of user fees for health care. Several reasons behind this decision have been hypothesized among which is, a sign of political commitment[40] as

a strategy to secure votes given the proximity to elections [41]; or as a response to the findings of the Uganda poverty participatory assessment (UPPA) report [42].

The objective of this study was to explore the place of evidence in the design of the policy to abolish user fees in public health facilities in Uganda using a case study approach. We sought to assess the barriers and facilitating factors to the uptake of evidence in the policy development and, the extent to which the previously developed MRT explains the uptake of evidence from a policymaking perspective. In addition, we studied how the context and stakeholders involved shaped the uptake of evidence, building on earlier work in Uganda which assessed the role of actors in KT [43]. This study is part of a bigger study in which we are consolidating a MRT on KT in Uganda through testing of the initial MRT using multiple case design [44]. Eventually, the application of this MRT to concrete, selected health policy cases in an iterative manner will contribute to refining and enriching the previously developed MRT.

Methods

Over all methodological approach

Theory-driven inquiry

We adopted the theory-driven inquiry approach, which starts from the assumption that actors involved in any intervention (which should be considered to be broadly defined and encompassing any policy, strategy, or action plan) make a series of assumptions of how the intervention will work. Unearthing these assumptions is important because they help explain why actors make particular choices. Furthermore, these underlying assumptions can be compared to the existing body of evidence, the state of the art [45,46]. Eliciting this MRT (also called programme theory) not only helps us understand how the designers and implementers of an intervention think about it, but it can also be used as a hypothesis that can be tested on its explaining capacity. If done in a cyclical manner and, ever-refined insights are the result.

Case study approach

Given the need in theory-driven inquiry studies for in-depth investigation of the context, mechanisms of change, and actors, this study employed a case study approach [47]. Yin highlighted the importance of case study methodology in an investigation of real life situations in which boundaries between the phenomenon under investigation and context are not clear, and in which multiple sources of evidence are used [48] . Similarly, other researchers have used case study methodology to test theories in real life situations [49,50]. The present case study was performed between June 2012 and August 2013. The case is the policy processes related to abolition of user fees for health care in public facilities in Uganda, deliberations of which took place over a period of 8 years (1993 ? 2001). Preliminary results of the case were presented to stakeholders prior to finalization

Use of mixed methods

In a quest to improve the comprehensiveness and validity of the findings, the present study employed both qualitative and quantitative methods (QUAL + quant). Mixed methods are

increasingly being applied to the investigation of complex issues in health systems research [51,52].

Identification of respondents and key documents for review

A policy timeline, which was drawn based on review of documents and, in consultation with focal persons on health financing (2 from the MoH, 1 from the WHO and 1 from the WB - who had been in post for over 15 years) guided the identification of milestones, selection of respondents and key documents to be reviewed (Figure 1).

Figure 1 Policy timeline.

Selection of respondents

The institutions involved were identified and within these individuals central to the policy process were purposefully selected. The selection of respondents (Table 1) was further guided by the seniority of the individual and knowledge of the subject matter to be investigated [53]. Additional respondents were identified through snowballing until a level of descriptive saturation [54], some of whom had retired or changed employment. These respondents were categorized under the institutions they worked for during the policy change.

Table 1 Key informants

		no.	Average years in post
	Donors	3	10
Public sector	Ministry of Health	8	11
	Ministry of Finance	1	10
	District level manager	4	9
	Service provider	4	7
	Parliamentarian	1	6
	Researcher in public university	1	8
Private sector	Civil society	4	9
	Journalist	1	8
	Service provider	4	6
	Researcher in a private institution	1	7
Total		**32**	

Two districts were selected based on proximity, presence of a regional referral hospital (Jinja district) or general hospital (Mpigi) to obtain perceptions from across the spectrum of health care delivery system. Within these districts, two hospitals and two lower level facilities (one public and one private not-for-profit in both cases) were purposively selected based on proximity and our desire to capture the different levels of the health care system. The selection of public and private not-for-profit health facilities was to help us understand the perception in a subsector where fees were eventually abolished (public) and a subsector where fees continue to be charged (PNFP). The medical superintendent or health center employee in-charge and one clinical staff member responsible for the outpatients department were purposively selected and interviewed at each health facility. At the district level, the

district health officer and a member of the district health team in charge of supervising health facilities within the district were also purposively selected and interviewed.

Selection of relevant documents

The timeline of key events guided the identification of relevant documents to be reviewed. We included a broad range of documents relevant to the case, to ascertain the processes involved the stakeholders, and their roles. The documents that were reviewed included the policy on user fees, discussion papers on health financing, the health financing strategy, budget framework papers, and research reports. Additional file 1 is the document review guideline and Additional file 2 provides details on the reviewed documents.

Qualitative research methods

The qualitative part of the study was exploratory in nature and assessed whether evidence was available to guide policy decision-making, whether evidence was disseminated and discussed in relevant fora, and whether and why evidence had or had not been considered in policy development. This qualitative part of the study also assessed what respondents felt were the barriers or facilitating factors to the uptake of evidence. We used our previous MRT as the starting point [27]. Respondents? perceptions were sought on the roles, level of support, and influence of the actors on the uptake of evidence.

Data collection

Interviews were conducted with KIs using an in-depth interview guide consisting of open-ended questions. The interview guide was developed by the first author and was reviewed and refined by the research team prior to pretesting it with volunteer colleagues from different institutional perspectives (n = 5). KIs were contacted and invited by email or telephone to participate in the study. All identified respondents agreed to participate and were interviewed. All interviews were conducted by the first author in English and face-to-face (Additional file 3).

Relevant documents were reviewed to ascertain the type of evidence that was available, the extent to which evidence had been discussed in the different fora, and whether policy decisions aligned with the available evidence. Interviews with KI and review of documents were undertaken concurrently.

Data analysis

Interviews, which lasted an average of 45 minutes, were recorded, transcribed verbatim, and entered into MS Word software for editing as the first step in the formal analysis. The transcribed interviews were enriched by additional notes made by the first author during the interviews. The first author read all of the transcribed interviews to identify emerging issues. We analyzed the data, both from the interviews and review of documents, using content analysis. We initially did a manifest content analysis and later a latent content analysis. In manifest analysis we elicited for (during the interviews) and looked for (in the data collected) elements and factors that were physically present and easily demonstrable and/or countable, in line with the study objectives, under different categories like the fact that evidence was used to inform budget discussions, politicians considered evidence, evidence informed

cabinet discussions, evidence was used in lobbying for resources, and others. An examples of this is ??? *this evidence guided us in our discussions with the MoF, and the health sector budget increased significantly in an effort to cover the short fall from losses in user fees*.... Furthermore we went a step further to do an interpretive reading of the symbolism underlying the physically demonstrable elements by doing a latent content analysis. We assessed participants? feedback for evidence of facts like defending the evidence, advocacy for the government position, or advocacy for abolition of user fees ? see Table 2. Stakeholders were identified as institutions. Drawing upon the work of Eden and Ackermann and Bryson [55,56], we classified the stakeholders using the influence/power ? support/interest grid.

Table 2 Example of content analysis process for the study

	Meaning unit	Category	Theme
	Yes evidence has been used. We use evidence available at the time to compute how much was being collected and we compared this with the sector budget at the time. Operational research like the Uganda poverty participatory assessment undertaken by MoFPED, the Apuuli study on user fees that was commissioned by MoH were all used.	Evidence was used to inform budget discussions	Role of evidence in the policy process
	Although abolition of user fees was a political decision, at least there was some fury from the public that user fee had became politically unsustainable.	Politicians considered evidence	
	In the poverty participatory assessment study one of the biggest issues was the issue of user fees and access to services; so when this report came, it also caused worry among the politicians and we were asked to work out in financial terms, the cost of abolishing user fees. So we worked it out (.....) we made recommendation to the minister and it was actually taken to cabinet and cabinet approved.	Evidence informed cabinet discussions	
	We used routine M & E data, a study undertaken by WHO and MoH (operational research). These sources of evidence showed increases in utilisation, drug stock-outs. We used this to lobby for increases in budget allocation. Districts also did some operational research whose results we used to lobby for more funding. The subsequent year, we had more money in the MTE	Evidence was used in lobbying for resources	
	The truth of the matter is that this issue gets to be politicized because it was during campaigns that the president pronounced the abolition of user fees, but he actually used evidence from the district	Politicians considered evidence	
	Regarding international evidence, this was mixed; some studies showed that user fees had some positive effects while others showed negative results. So there was lack of a firm position.	Contradictory findings	
	There were a number of discussion either on the benefits on chargers of user fees. But many of those studies were small based at the district level its after abolition that we were looking at levels of catastrophic expenditure; we were looking at the out of pocket expenditure in totality.	evidence was from small scale studies	Characteristics of available evidence
	Most of the studies on user fees in Uganda took place after its abolition.	Timeliness of the evidence	
	There was evidence but was that evidence properly synthesized? Was it properly shared by the different fora? Was it agreed that this was credible evidence for a decision to be made?	Questionable quality of available evidence	
	Influence of stakeholders		
	These were strong but their positions were mixed. The (X) were opposed to user fees. The (Z) from capitalist background were supportive of user fees. The (Y) had invested a lot in Bamako initiative so were supportive of the user fee policy. Actually in HPAC, there was no consensus.	Strong with mixed positions due to different reasons	Strong and divided
Donors		Strong and supportive of abolition of user fees	
	Donor (X) was in favor of abolition of user fees, they were even generating some evidence to show that user fees were a burden		
	Some donors were for the abolition because the climate then was for poverty eradication and one of the things they needed to do was to help the poor to access health services. So they were saying that if now you have got the HPIC (debt relief), why are you complaining?	Strong and supportive of abolition of user fees	
	The big financial players like (X) were against provision of free services and they were bringing in all sorts of evidence some of which was good and some bad. Some donors led by (X) were just pushing it and they used whatever evidence they liked.	Strong, opposed and influential	
Health workers	They were opposed to abolition of user fees because they were beneficiaries	were opposed because of the benefits	Strong and opposed
	The health workers were using the money initially to get themselves some extra income so how can they support that such an option is stopped?	Were opposed due to potential loss of benefits	
	Health workers were opposed to abolition of user fee because of the benefits. It was a steady reading available income, small as it may have been but it was there all the time. Now the challenge was, we were relying on them to implement the new free care policy	Were against user fee abolition yet they were the ones to implement free care	

JNO, FS and BC reviewed and interpreted the findings. Converging issues were reviewed again by the research team and, when interpretation differed, consensus was achieved by revisiting the raw data and discussions. Identified regularities were compared with the previously developed MRT to identify convergent and other emerging issues, and the identified roles of stakeholders were compared with the previously developed roles of actors in KT in Uganda [43]. Similarities and contrasts between respondents? perceptions were reviewed by the research team, and possible explanations for the contrasting views were discussed. When necessary, quotations that best represented emerging issues were edited slightly for flow while preserving the meaning of the text.

Quantitative research methods

Quantitative methods were used to capture the multiple perspectives of the involved stakeholders and enable the identification of regularities and patterns [57].

Data collection

The frequency, with which evidence was cited, including details on the type of evidence, was ascertained through the review of documents. In addition, KI were asked to rate the consistency between policy decisions and available evidence. Hanney et al. developed scales for rating the consistency between evidence and policy decisions in 2008 [24]; different parameters are rated on a scale of 1 to 4 (1 - considerable level of agreement, 2 - moderate level, 3 - limited level, 4 - no indication of consistency despite availability of evidence). Respondents were asked that: on a scale of 1 ? 4, how would you rate the degree of consistence between the evidence that was available and the policy decision that was taken? They were further asked to give reasons behind their responses as a way of helping the research team assess the objectivity of a given rating. In applying the scales, the factors taken into consideration included: the extent to which the policy was consistent with evidence in terms of the definition of the policy problem, the definition of objectives, the description of the strategies and actions, and the extent to which the elements of the policy contradicted the available evidence.

A policy development framework including the steps agenda setting, analytical stage/policy formulation, decision making/selection of preferred options, and implementation [58] was used to organize the quantitative part of the case study.

Data analysis

Quantitative data were analysed using Excel spreadsheets.

Findings from the review of document and KI interviews were integrated throughout the analysis. In addition, qualitative and quantitative data were eventually triangulated.

Informed consent was obtained from all respondents prior to the interviews. Study participants were informed about the purpose of the study and the scope of issues in the in-depth interview guide. Confidentiality was ensured in data management and only aggregate information without subject identifiers is reported. All data were secured in a safe location accessible only to the study team. Ethical approval was obtained from the Institutional Review Board of the Institute of Tropical Medicine, Antwerp (Belgium; IRB number

IRB/AC/ac/197) and the Uganda National Council for Science and Technology (number SS 2920).

Results

Qualitative results

Evidence informed decision making in different ways. The MoH institutional capacity to lead the KT process, the partnerships for KT, the political context and the overall government discourse impacted the uptake of evidence.

Role of evidence

The nature of the available evidence reported by the different respondents as having been available is shown in Table 3, although majority of respondents mentioned community complaints as evidence that was available.

Table 3 Type of evidence that was available as reported by the respondents

		Community complaints	Operational research	International evidence	Routine M & E	Surveys	Experience from pilots
	Donor	2	2	2	1	1	1
Public sector	Ministry of Health	5	5	3	4	1	1
	Ministry of Finance	1	1		1	1	
	District level manager	3	1	1	1		
	Service provider	3	1	1	1		
	Parliamentarian	1	1	1			
	Researcher in public university	1	1	1		1	1
Private sector	Civil society	3	2			2	
	Journalist	1	1				
	Service provider	2	1		1		
	Researcher in a private institution	1	1	1		1	
	Total	**23**	**17**	**10**	**9**	**7**	**3**

From the late 80s to the early 90s, international evidence was mainly available from the WB, United Nations Childrens? Fund (UNICEF), and the World Health Organization (WHO). In the mid 1990s, the MoH turned to other countries to learn from their experiences in health financing. Evidence was also available from surveys, more specifically the UPPA study that aimed to inform development of the PEAP.

Evidence informed decision making in several ways. Instrumental use of evidence was reported when the MoH used evidence in their dialogue with the MoF to determine the budget allocation to the health sector, as stated by a MoH respondent, ?*We used routine monitoring data to develop scenarios of how much was being collected from user fees. This evidence guided us in our discussions with the MoF, and the health sector budget increased significantly in an effort to cover the short fall from losses in user fees.*?

Some respondents argued that, although the abolition of user fees coincided with political campaigns, the president actually used evidence in the form of community complaints: *?the truth of the matter is that this issue gets to be politicized because it was during campaigns*

*that the president pronounced the abolition of user fees, but he actually used evidence from the districts. People cried and said ?user fees for health is not for the poor?. So I still say that there was evidence based on reporting from the field through political rallies.? (*MoH respondent)

Symbolic use of evidence was reported when the president used evidence to make a politically attractive decision given the impact user fees for health on peoples? welfare, as a MoF respondent stated, ?*Evidence, which was mainly from UPPA surveys, could have been an important input but I think there was clearly a very large input that came out of the fact that it was a policy likely to win a lot of population support; where many people would be affected and, for the politicians, it made sense.*?

Conceptual use of evidence was also reported where by evidence informed discussions in cabinet. The findings from the UPPA raised a concern among politicians who then requested for more evidence, on the financial implications of abolishing user fees. Results of the study were tabled and discussed in the cabinet.

A review of documents revealed that the abolition of user fees was a policy likely to win popular support, and in the briefing paper on user fees, such a policy was mentioned to be a consideration at the launch of the new 5-year sector programme.

Nonetheless, some respondents (n = 5) argued that evidence was not used in an objective manner, as researcher stated that **?***I would say, yes, evidence was used but not in a manner that was very helpful. First of all, the evidence that was generated and upon which user fees were abolished, in my view, is a little bit questionable because it did not cover the extensive opportunities that existed with user fees. Not everything was considered and put into context.?* (Researcher respondent)

From our interviews, the ills of user fees for health care were clearly known given the available evidence from surveys like the UPPA and routine monitoring data on health service utilisation, but the planned course of action to address the problem differed between technical (MoH) and political wings. Though the MoH had a plan to phase out user fees for specific services, the political wing opted for free health services. A MoH respondent stated that ?*the expenditure on health had a huge component of out of pocket expenditure and we were going to deal with this problem. We put down that evidence and we proposed how it should be phased out, but before that took place, a political pronouncement to abolish user fees was made.*?

Factors that impacted the uptake of evidence

Available of evidence

Evidence was available although, concerns regarding the quality, comprehensiveness, objectivity, and timeliness were raised, which impacted its uptake into policy. The timeliness of the evidence varied; some respondents reported that evidence was available while others reported that evidence was only generated to justify a decision that was already made. According to a donor representative, *?Most of the research studies on user fees in Uganda took place after its abolition.?* A service provider in a public facility stated that ?*some groups of people came to ask questions about user fees but this was well after the government had made the pronouncement to abolish it.*?

A review of documents also revealed the varied timeliness of evidence. Some studies took place before the abolition of user fees while others were conducted after the policy decision.

Evidence existed for and against user fees, which to some extent was interpreted as contradictions. One MoH respondent stated that ?*some studies showed that user fees had some positive effects while others showed negative results. So there was lack of a firm position.*? A donor respondent added, ?*I don?t think we had very convincing evidence at that time. There was evidence for and against user fees and the quality of the evidence was also questionable.*?

The objectivity of some evidence was a concern as several of the available studies had been undertaken by donors, and these were judged as misleading. According to a MoH respondent, *?The MoH had been misled by the supply side evidence generated by [X] of the WB, who showed that when you abolish user fees, increases in access would not be significant.?*

The comprehensiveness of the local evidence was also in question, as a journalist stated, ?W*e did have some complaints from the community that people were staying away because of user fees but that evidence was not enough to guide us on the way forward. Although these were also echoed in the UPPA study, we should have done a thorough study to assess how the removal of the user fees would help because some of these problems have persisted even when the services are free. Community complaints should have been a starting point for a study and not a basis for decision making.*? In addition, a MoH respondent remarked that ?*although some evidence was available, it was not enough and also not credible.*?

Technocrats made an effort to disseminate evidence to politicians, as pointed out by a MoH respondent, ?*We were reading these reports, synthesizing them and bringing evidence as digestible bits to politicians. They would take it or leave it depending on what positions they wanted to take.*? Some of the recommendations made by technocrats were actually tabled in cabinet, as reported by a MoH respondent: ?*we wrote a policy brief for cabinet showing them how much the government had to invest in order to reach the level made by user fees. We made recommendations to the Minister of Health and these were taken into consideration.*?

MoH institutional capacity to lead the KT process

Weaknesses in the capacity of the MoH to lead in evidence generation, synthesis, and application were reported. The generation and dissemination of evidence was mainly donor driven, with the MoH playing a recipient role, as pointed out by a MoH respondent: ?*big players like the WB were just pushing their agenda, bringing in all sorts of evidence, some of which was good and some was bad, they used whatever evidence they liked. It is not that people were sitting down and deliberating.*? However, respondents reported that, in one of the local studies, a team headed by a researcher from a public university was put in place, with the MoH serving as the secretariat, to collect data on the various aspects of user fees.

A review of documents confirmed that the inter-ministerial task force on user fees was headed by a researcher and the MoH was the secretariat. Later, a health financing task force, involving MoH official, donors and CSO representatives was put in place to develop policy options on improving health sector financing and was chaired by the MoH.

Although leadership at the MoF was strong, the MoH suffered a high turnover at the senior officer level, which weakened its leadership capacity. The leadership in the MoF was

reportedly able to synthesize the evidence, as a MoH respondent stated, ?*Strong leadership at the MoF was a key issue - the leadership was listening to evidence*.? In the MoH, the leadership went through times of strong and weak leadership over the policy timeline for user fees; a MoH respondent stated that ?*at one point we had a strong leader and at another time we had a consortium of leaders with other interests, so they were not looking out to see what needs strengthening.*? In times of strong leadership, leaders in the MoH were reported to be visionary: ?*there was a culture of questioning whether we were doing things right all the time, we would look at evidence from research studies, surveys and routine monitoring*.? (MoH respondent)

Partnerships for KT

KT partnerships are key to improving the uptake of evidence, and these were reported to be in place although several weaknesses were reported regarding their membership, duration, and scope of work. A one-off task force was put in place to coordinate the generation, synthesis, and dissemination of evidence to decision makers, including the cabinet, although it mainly consisted of senior MoH staff, MoF staff, researchers, and the WHO. Donor involvement was only reported in the development of guidelines; the MoH respondent stated that ?*there was a lot of work to be done to produce guidelines on exemptions for those who could not pay and we requested support from UNICEF*.? Community involvement on the other hand was limited to being respondents in surveys.

In addition, a review of documents revealed that throughout the evidence generation and policy discussions, only two task forces were put in place. These task forces were short-lived and only performed specific tasks. The inter-ministerial task force on user fees was tasked with reviewing and synthesizing available data and providing policy options. The working group for health financing convened after the abolition of user fees to provide policy options on improving health sector financing.

Decision making was reported as non-consultative; one MoH respondent stated that ?*there was no consultative process in the decision to abolish user fees.*?

Political context

The year in which user fees were abolished, 2001, was marked by presidential elections, and the different candidates were moving around the country canvassing for votes. The issue of improving service delivery and access to health services, specifically the abolition of user fees for health care in public facilities, was in the manifesto of both the ruling party and the leading opposition party. The ills of user fees had been highlighted in the UPPA study whose findings were disseminated widely by the media and CSOs and, even discussed in political circles. A majority of respondents reported that this political window could have provided an opportunity to abolish user fees. According to a MoH respondent, the *?Abolition of user fees was in the election manifesto of the ruling party and this showed that they were responding to population concerns.?* Second, the community presented the ills of user fees for health care to the president while on a campaign trail, as noted by a CSO respondent: ?*complaints about user fees were raised to the president during campaigns where he had to offer an incentive to have more votes.?* A private not-for-profit service provider further added that ?*there were community cries about the ills of user fees and indeed the scrapping of user fees was announced at a political rally*.?

The opposition candidate was promising to scrap user fees for health care once elected to office and the pronouncement by the president could have been a tactic to pre-empt the opposition manifesto. A MoH respondent stated, *?I suspect the pronouncement to abolish user fees was through political pressure and competition because the main opposition party was saying ?we will abolish user fees for health services immediately? so the captain could not say ?I will wait for the plan?, they could lose votes.?*

Another MoH respondent argued that evidence was taken seriously because of the political context: *?evidence by itself would not have constituted sufficient force to enable the government to make the decision, but because they were under political pressure, evidence gave them reason to make the decision to abolish user fees.?*

The political process impacted the KT process in that it did not allow enough time for the diffusion of evidence, as stated by a MoH respondent, ?*Political experience overtook this process and the decision to abolish user fees was not a health sector decision; it was a pronouncement from the head of state. We had not gone to him and given him evidence directly, but communities had complained to him.*? A parliamentarian added that the ?A*bolition of user fees was a political decision, it was not based on systematic evidence but there was some fury from the public that user fees had become politically unsustainable.*?

Overall government discourse

There was a move at the global and national level to eradicate poverty and the country wanted to address all issues that would hinder realization of the objectives of the PEAP. A MoH respondent stated, *?The Uganda poverty participatory assessment (UPPA) showed that user fees were a hindrance to accessing care and also to poverty alleviation efforts. This was at a time when the government was keen to reduce poverty and we were writing poverty reduction support credit papers.?*

Barriers to the uptake of evidence

Inadequate funding to implement evidence was cited as a barrier by a MoF respondent: ?*one of the barriers was the limited fiscal space for giving free public goods in all sectors.*? In addition, although services were free, there were gaps in service delivery, as a MoH respondent stated, ?W*e saw a tapering off of patient utilization when the community realized that a number of health facilities did not have sufficient supplies of essential medicines so it was useless going for free things when they are actually not there.*? Poor planning for the policy change was reported by a donor respondent: ?*We didn?t put in place proper system structures that when user fees are abolished, something replaces them to ensure continuity of services.*?

Roles, level of influence and support of actors in the uptake of evidence

Stakeholders played different roles in the uptake of evidence (Table 4). The MoH played multiple roles, including generating of evidence by working with researchers, disseminating evidence, and implementing policy decisions. In addition, the MoH played advocacy roles. As a MoH respondent stated, ?*The ministry?s role was advocacy, defending the position of the MoH, and persuading other people to join us.?*

Table 4 Roles of stakeholders in the uptake of evidence

	Stakeholder	Roles
Public sector	Ministry of Finance	Providing funds, generating evidence, engaging in policy development
	Ministry of Health	Generating evidence, disseminating evidence, advocacy, implementing the policy
	Managers at the district level	Implementing the policy
	Service providers	Implementing the policy
	Researchers in public universities	Generating evidence
	Donors	Generating evidence, disseminating evidence, providing funding , advocacy
Private sector	CSOs	Generating evidence, disseminating evidence, advocacy
	Community	Advocating for user fee abolition, beneficiaries of the policy change
	Researchers in private research institutions	Generating evidence
	Media	Disseminating evidence

The roles of donors were reported as providing funding and generating evidence. Some respondents reported that influential donors dominated the process of evidence generation and decision making about user fees. The CSO respondent stated, *?The WB had all sorts of publications on user fees and was making the argument that user fees need to be included in social service delivery areas like health and education.*? Respondents reported that the debate on user fees started after a WB publication showing that the introduction of user fees would not affect the utilization of health services. User fees were introduced as a demonstration project of the WB. A MoH respondent stated, ?*We had started decentralization and in each of the thirteen districts we were going to introduce user fees for health care as a pilot and demonstration project of the WB.*?

CSOs played a role in generating evidence; a CSO respondent stated that ?*CSOs generated evidence which showed that, when user fees are charged for health care, the rural and urban poor are disadvantaged.?* Respondents also highlighted the role of CSOs in disseminating evidence; a parliamentarian respondent stated that ?*CSOs produce policy briefs and distribute them. They find people with influence or who are close to policy makers and put them on their list and every time they find new ideas, new findings, new research, they just disseminate it through their network, and I usually pick a lot of those.*? The advocacy role played by CSOs was highlighted by a researcher who stated, ?*I think their advocacy role helped create sufficient pressure for the government to abolish user fees.*?

The role of the media in disseminating evidence was highlighted by a CSO respondent: ?*we used to have newspaper articles highlighting the barriers to access due to user fees.*? However, a donor respondent decried the under-utilized role of the media stating, ?*I don?t think we use the media well enough. Sometimes journalists sit outside the offices of some decision makers and fail to see them and that?s why they end up writing whatever stories they have. Once a journalist mentioned to me that he went and sat outside [X?s] office and was not given an opportunity, and yet with the politicians, they do it very well; they will always want to send their issues across.*? A MoH respondent cautioned about the possible negative role of the media, stating that ?*if the media do not base their publications on evidence, they can be a very detrimental ally.*?

The level of support and influence by the different stakeholders on the decision to abolish user fees in light of available evidence varied as shown in Figure 2 but, for different reasons. The strong stakeholders were characterized by significant funding, the power of the vote, and being key decision makers. Several respondents were divided; for example, some donors were reported as having been strong and influential supporters of abolishing user fees due to their strong considerations for the poor. Evidence had showed the poor could not access services due to cost [42]. Yet others were strong and not supportive due their ideological

background; for example, the WB believed that health care should be part of the market and indeed had generated evidence showing user fees would not affect utilization of services adversely [59], whereas others were opposed to this because of prior institutional positions on user fees, such as UNICEF and the WHO because they had invested a lot in the Bamako initiative which showed some promising results regarding improved availability of medicines and increase in utilization of health services [60] . A MoH respondent stated that ?*donors were strong but their positions were mixed. The [X] from pro poor systems were opposed to user fees while the [X] from a capitalist background were supportive of user fees. WHO and UNICEF had invested a lot in the Bamako initiative so were opposed to user fee abolition. Actually, in the health policy advisory committee, there was no consensus.?* (MoH respondent)

Figure 2 Positions of stakeholders involved in the policymaking process for the abolition of user fees.

The MoH was also divided in that some officers were strong and supportive of abolishing user fees but others were strong and opposed. Although the officers who were strong and opposed were equally concerned with the evidence which showed a high out of pocket expenditure on health [39], their course of action was reported to be different, as one researcher stated, *?The MoH was working on a cabinet memo to reorganize user fees but after 2 months, when presidential campaigns were ongoing, I heard a speech from the president saying ?I have never supported user fees,? he even said he will not support user fees, so the minister who had championed the whole user fee issue had to write memos to stop it.?*

Communities were strong supporters of the abolition of user fees, and influential given the political window as reported by a MoH respondent: ?*communities put the issue of the ills of user fees for health care on the agenda, they were strong in that they are the electorate and the president wanted votes. They kept complaining. They were supportive of the abolition of user fees and they were strong.*? A researcher added, ?*If the voters were that important then, yes, they had influence*,? and a service provider remarked that ?*the community was in full support of user fee abolition because it was to their advantage.*?

However, a civil society respondent highlighted a contrary view that the rich in the society were not supportive of abolishing fees for health, stating that ?*people who had the willingness and ability to pay were feeling that ?if you take away user fees, that means that I may not get the same quality, yet am willing to pay, I have money??*? (CSO respondent)

CSOs strongly supported the abolition of user fees, although the reasons behind their support varied. Some had concern for the poor, as a MoH respondent stated, ?*The CSOs supported the abolition of user fees. We had [X] on some of those working groups and they were really pushing for the abolition of user fees for health care, saying that evidence showed that poverty was biting.*? This was in reference to the evidence from the UPPA and CSO?s own research. Some CSOs were supportive because they believed there was enough money to fund health services without communities paying, as one donor respondent stated, ?*The CSOs were against the user fees because they believed that there is a lot of money invested in the health sector and there was no reason for people to pay in order to access health services.*?

Respondents reported that politicians at the national level had divided positions, stating that some supported the abolition of user fees because of potential political gains, whereas others

opposed it because they were concerned about service delivery given the evidence of increased availability of medicines as a result of charging a small fee for services [61,62]. A donor respondent stated that ?*politicians had a divided opinion, some supported user fee abolition for the purpose of popularity, especially votes. Some were for user fees because they believed that user fees could improve service delivery by offering a small allowance to health workers, which boosted their morale.*? The improved availability of drugs and incentives for health workers was also shown in some pilots supported by WHO [60].

Politicians at the local government/district level were also divided; some were strong and opposed to the abolition of user fees due to the potential loss in revenue and the preference to generate local revenue that could be managed at the district level rather than receiving grant from the central government s. A CSO respondent noted that ?Y*es, they were opposing the abolition of user fees just as they are still opposing the abolition of graduated tax, yet they are getting almost 10 times the money they used to collect from graduated tax! They want something they can independently manage.*?

Managers of health services at the district level and service providers in public health facilities were reported as strongly opposing the abolition of user fees and were influential because the implementation of the policy heavily depended on them; they were opposed because of the potential loss in revenue.

Although researchers were reported as being less influential, they were also divided, with some supporting and some opposing the abolition of user fees. The division was partly reported to be due to the kind of evidence they were generating. A researcher stated that ?*researchers were divided, some were for abolishing user fees, some were not, and there was evidence on both sides.*?

Quantitative results

Various types of evidence were cited in strategic documents and discussion papers as shown in Table 5. Local evidence as opposed to international evidence; operational research and evidence from surveys were cited most.

Table 5 Type of evidence cited in the reviewed documents

Nature of evidence	Local evidence	International
M&E	5	
Operational research	7	
Regular surveys	9	
Costing studies by the World Bank		2
Local costing studies	2	
Evidence on effects of user fees on utilization of health services and drug availability provided by WHO & UNICEF		4
Evidence published in Journals	1	
Total	**24**	**6**

Respondents ranked the degree of consistency between policy decisions and available evidence as weak at all stages of policy development (Table 6). Better consistency was reported at the agenda setting stage than at other stages. The consistency between available evidence and policy decisions was rated the weakest and as having no influence, mostly at the implementation stage.

Table 6 Rating of the consistency between available evidence and decisions

		Donors (n = 3)	Public sector			Private sector			Total
			MoH (n = 6)	MoF (n = 1)	Service providers and managers at district level (n = 6)	CSOs (n = 4)	Researchers (n = 2)	Service provider PNFP (n = 3)	
Agenda setting	Strong (1)		3	1		1	1		6
	Moderate (2)		1						1
	Weak (3)	3	1			3			7
	No influence (4)		1				1		2
Analytical stage	Strong (1)		2						2
	Moderate (2)		1			1	1		3
	Weak (3)	3	2			2	1		8
	No influence (4)		1			1			2
Decision making	Strong (1)		3						3
	Moderate (2)			1					1
	Weak (3)	3	1			3	2		9
	No influence (4)		2			1			3
Implementation	Strong (1)		1						1
	Moderate (2)		1	1	3			1	6
	Weak (3)	3	2		1	2	1	2	11
	No influence (4)		2		2	2	1		7

Service providers could only rank at the policy implementation stage.
MoH: two were not able to rank and were excluded from this analysis.
Service providers: three were not able to rank and were excluded from this analysis.

Discussion

The present study highlights the ongoing debate on what constitutes evidence and gives good examples of how evidence may be considered, used, or even misused in the policy development process. Our findings show that evidence informed decision making in different ways. The MoH institutional capacity to lead the KT process, the partnerships for KT, the political context and the overall government discourse impacted the uptake of evidence in the abolition of user fees for health care in public health facilities in Uganda.

The process of abolishing user fees was informed by evidence generated from formal research but also from community complaints. Though peer-reviewed research has been considered the most appropriate evidence in the past [63], it is now becoming clear that there are many forms of evidence that inform policy and decision making [12]. What is taken as evidence may vary from case to case due to the stakeholders involved and how much interest and influence they wield. In our study, we have noted that different actors are influenced by different types of evidence, the WB relied mostly on formal research as the basis to push for the introduction of user fees, technocrats in the MoH relied mostly on formal research to push for reorganization of user fees while politicians relied mostly on community complaints to abolish user fees. Not only is the definition of evidence debatable, but also how much evidence is enough and whether it is seen as comprehensive [64]. Though some respondents in our study were comfortable using community complaints as a basis for decision making, others argued that they should only have served as a basis for more formal research.

In our study, evidence informed policy and decision making in different ways. Some respondents stated that evidence was used to support a decision that was already made, implying ?symbolic use?, whereas others reported that available evidence was presented in cabinet to guide discussions, implying ?conceptual use?. Yet others reported that the analysis from losses in revenue if user fees were abolished directly guided budget allocations to the health sector, implying ?instrumental use?.

The characteristics of the available evidence may have impacted how evidence was used in several ways. Concerns were raised regarding the quality of the available evidence, the contradictory conclusions from the research studies, and the limited dissemination of evidence, which are known barriers to the uptake of evidence [24,65]. The fact that most research studies were undertaken by the WB, whose ideology was in line with the recommendations drawn from their studies, raised questions regarding the objectivity of such evidence, and some respondents mentioned that this evidence was judged as somewhat misleading. The dissemination of available evidence suffered shortcomings due to a lack of mainstream mechanisms from the MoH to coordinate the process. Technocrats in the MoH focused on disseminating evidence to the cabinet through policy briefs and cabinet memos, and donors and CSOs were also disseminating evidence generated from their studies, whereas communities were complaining directly to politicians. The timeliness of the evidence also varied; some respondents reported that there was evidence regarding the ills of user fees, and others reported that evidence was generated after the decision to abolish user fees was made. The varied timeliness and uncoordinated dissemination could explain the several forms of evidence use noted in this study in that, the uptake of evidence is influenced, to some extent, by the nature and timeliness of the evidence and how and to whom evidence is disseminated. For example, politicians received community complaints during campaigns and they used it symbolically because it favored their interest, whereas technocrats received evidence at the time of the budget process and they used it instrumentally in determining sector allocations.

The MoH?s institutional leadership of the KT processes was weak; the process of evidence generation and dissemination was mainly donor driven with the MoH playing primarily a recipient role. We noted a lack of coordinated efforts to synthesize and disseminate evidence, which could have served to resolve the seeming contradictions in the available evidence. This finding may explain the different course of action between the technical (MoH) and political (cabinet) players in addressing the high out of pocket expenditures on health; the technocrats at the central level MoH preferred a re-organization of user fees, and politicians preferred the provision of free health services. In addition, the high turnover of senior positions in the MoH further resulted in weaknesses in leadership due to lost institutional memory and having leaders at certain times who had minimal interest in the use of evidence. The high turnover of senior officers has been highlighted as one of the limitations of the enlightenment model, which infers a notion of gradual sedimentation of ideas over time and the subsequent uptake of evidence in policy [21,66]. Policymakers may not stay in positions long enough to allow for the gradual sedimentation of ideas. The significant dependence on donor aid to finance health services [67] could also have weakened the negotiating power of the MoH in that, even when they had different views on possible courses of action given the available evidence, they could not go against the donor influence. The introduction of user fees was a prerequisite to obtaining a loan from the WB. Moat & Abelson further highlight the challenge of what they characterized as policy a legacy in their analysis of the influence of institutions in the decision to abolish user fees in Uganda. They argue that in a quest to access a WB loan for the health sector reform programme, the government conceded to the demands of the WB allowing them significant authority over domestic policy [31]. Donor dependency is a documented challenge, as in the case of Cameroon, where donor dominance undermined the country?s efforts to coordinate research [68], and the case of Ghana, where changing HIV treatment guidelines was largely influenced by the conditions of donor financing [69]. Systematic platforms for engagement between researchers and policy makers have been shown to be beneficial in KT [70,71] but in this study these were informal and weak.

The consistency between available evidence and policy decisions was highest at the agenda setting stage, decreasing thereafter, implying that the political process may not have allowed enough time for the diffusion of evidence. The lack of a consultative process in decision making was found in this study. Although a challenge that cannot be overlooked is how consultative platforms within which dialogue may occur can work alongside time-bound political processes. Moat & Abelson in their analysis of the influence of institutions in the decision to abolish user fees in Uganda, highlighted the weaknesses of government structures to impact on the decision making process to abolish user fees concluding that ?Big man? presidentialism and clientelism thwarted the role of formal institutions[31]. This may explain why the symbolic use of evidence features significantly.

There were some KT partnerships in place, though these were short lived with time-bound assignments. Effective partnerships for KT require mutual trust [70,72], but respondents in the present study noted that some groups expressed a preference for certain pieces of evidence because they supported particular positions, ?misleading? decision makers. Such mistrust leads to evidence not being used or only minimally used because of skepticism. No matter how good the evidence is, if there is mistrust it will be seen in the same light, and that presents a missed opportunity for KT.

Although funding was made available as part of debt relief, it was inadequate and hampered the uptake of evidence. A tapering off of service utilization due to a lack of essential

medicines has been reported in other studies as well [8]. Other researchers also documented a lack of funding and required inputs as a hindrance to the uptake of evidence [64].

The different actors played different roles and had varying levels of support and influence. For example, the MoH played an advocacy role previously reported by CSOs and politicians in an earlier study on the roles of actors in KT in Uganda [43]. This change can potentially be explained by the MoH seeking public recognition, as the abolition of user fees is a policy that appeals to a larger section of the population due its welfare effects. On the other hand, the abolition of user fees for health care was a politically appealing policy, and the technocrats in the MoH may have had political inclinations. Donors played several roles in the dissemination of evidence and advocacy. In an earlier study on the roles of actors in KT in Uganda; donors? roles were reported as providing funding for undertaking research and implementation of research recommendations [43].The finding in this case study may be explained by the nature of the donor agencies involved; common to all of them was that they had institutional positions regarding the policy under discussion and, thus, the tendency to push agency positions. The perceived tendency to rally behind an institutional position can impact the KT process, a concern that was raised by respondents in this study when they questioned the credibility and objectivity of evidence generated by some actors. The question of how evidence can be used objectively amidst institutional agendas and donor conditions in aid-dependent countries remains unanswered.

Regarding stakeholders? level of support and influence, almost all stakeholders were divided, but for varying reasons. Divided views were found among actors on whom funding decisions and the successful implementation of evidence heavily depended. Consensus is however important for the successful implementation of evidence; for example, prioritized resource allocation to implement evidence can only be realized with an agreed upon course of action [73]. In our study, some respondents noted a suboptimal implementation of the policy to abolish user fees, which has also been documented in other studies [8].

The political context within which the abolition of user fees occurred also played a role in the uptake of evidence. The timing of presidential elections provided an opportunity. This case is a clear example of Kingdon?s problem of political and policy streams meeting up to form a policy window [74]. In the problem stream, there was agitation to try to get policy makers to focus on the problem of user fees. This had been raised from UPPA surveys whose results had been disseminated extensively. Similar agitation also came from the community as complaints. Such agitation was presented to politicians, including those campaigning for the presidency at the time. In the political stream, the issue of user fees for health care was in the election manifesto of the two presidential candidates. Yet the policy stream did have several proposals that were ongoing and were in fact advocated, like the World Bank?s proposal to make health care part of the market where one pays to get what they want. Presidential elections provided an opportunity for the three streams to meet and a window presented itself for a policy decision on user fee removal. As one respondent commented, *??if there was no pressure of any kind, evidence by itself would not have constituted sufficient force to enable the government to make the decision.?* The political window is a documented facilitating factor to the uptake of evidence [19,74]. In addition, user fees for health care were a hindrance to achieving the objectives of the PEAP, which was also reported to have influenced the policy decision. Maja de Vibe et al. noted that ideas and concepts are more likely to be chosen if they are in line with the dominant policy discourse and serve to confirm agreed upon approaches[74] .

Comparison with our previously developed MRT

There were similarities as well as differences regarding the factors that impacted uptake of evidence looking at our initial MRT and the factors identified in this study. Regarding the characteristics of the available evidence, although the availability of evidence was crucial, its timeliness, scientific rigor, credibility of researchers and separation of roles between researchers and policy makers, as identified in our initial MRT, did not feature prominently in this case study. Regarding the MoH institutional capacity to lead the KT process, although platforms for engagement were in place, they were short lived, weak and of limited involvement. Mainstreamed mechanisms (within the MoH) to coordinate evidence generation, synthesis and dissemination were absent. Regarding partnerships for KT, although these were in place, they were informal, limited in scope and membership. These weaknesses with standing, we note that there multiple uses of evidence in the decision making process.

The multiple uses of evidence and lack of emphasis on the scientific rigor of the available evidence can be explained by the nature of the case under study. Even when evidence is available, the success of efforts to effectively disseminate, legitimize and consider evidence objectively in policy development will be impacted on by the characteristics of the issue under consideration [30]. This could be explain by what Contandriopouls et al. categorize as polarizing characteristics of a policy issue where In cases of low issue polarisation, potential users of evidence share similar opinions and preferences, they all see the issue as a problem, discussions are more likely to be technically focuses and instrumental use of evidence realized [30]. On the other hand, issues of high issue polarisation have a tendency to cause fragmentation given the position of actors involved; discussions are likely to be entangled in political debates and unbalanced power plays and in such instance, symbolic use of evidence in more likely [30].

In the case of abolition of user fees for health care, the high issue polarisation was noted. The WB was in support of user fees based on their concern to ensure loan sustainability**;** the government was keen to address hindrances to realization of PEAP objectives user fees for health care being one of them. CSOs were in support of abolition of user fees to improve access to health services for the poor, managers and service providers at decentralized levels were opposed because they stood to lose a source of revenue and politicians at the central and decentralized level stood to lose votes. Contandriopouls et al. further state that if an issue is highly salient in that it will attract a lot of attention and; whether actors are familiar with the issue thus it gains prominence on the agenda [30,74] will impact the uptake of evidence. The case of user fee was highly salient given that majority of the population were categorized as poor [75] and stood to benefit from the abolition of user fees, indeed community complaints featured strongly. This high salience nature of the issue was also evidenced in the media interest as noted by a respondent who stated that ?*we used to have newspaper articles highlighting the barriers to access due to user fees?.* These may explain the multiple uses of evidence, lack of consensus on the available evidence and preferred course of action and; the lack of emphasis the scientific rigor of the evidence.

Refined MRT

We refined the initial MRT as follows.

?Evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process, there are partnerships for KT in place and, the nature of the policy issue under consideration, the overall government agenda and; the political situation can be expected to play a role?

Evidence must be available and disseminated to stakeholders and;

KT requires strengthened MoH institutional capacity to lead the KT processes and platforms for engagement between researchers and policy makers including civil society need to be in place.

Partnerships for KT need to be in place. There is need to devise mechanisms for stakeholder engagement and resolving conflict of interest. Communities need involvement in evidence generation and KT as well.

A favorable political context in which a political window provides an opportunity for KT and;

Evidence aligning with the overall government policy discourse, enhance uptake.

These contribute to more ownership, adoption and better application of evidence.

Strengths and weaknesses of the study

The strength of our study is the diversity of respondents, which provides a rich set of information to study the case. In addition, we have used multiple sources of data (interviews and document review) and mixed methods which have increased the validity and reliability of our findings. The multidisciplinary nature of our study team also strengthens the study given the ability to analyze and interpret data from multiple perspectives.

Among the weaknesses of our study is recall bias, as the KT processes being studied occurred took place some time ago. However, we think that this is not so much of a limitation given the consistency in responses. The direct impact of the abolition of user fees on peoples? welfare, which makes it politically attractive, may have affected the nature of responses in cases where some respondents may have had political inclinations, but this was not assessed in our study. We have used scales developed by Hanney et al. in rating the degree of consistence between the available evidence and policy decisions taken. Although this work was been published [24], the rating scales have not been validated in low income settings. Although different types of evidence were available, community complaints, which are not categorized as systematic evidence, seem to have influence the decision of political actors. We did not study the influence of the different types of evidence on decision making because we believed that the different types are interrelated and inform each other passively. For example, expert opinion by definition is based on evidence scientific evidence then weaved with personal values and experience.

Policy implications

The objective use of evidence in donor-dependent countries remains a challenge, and part of the solution lies in having strong MoH structures to coordinate prioritized research agendas and KT processes. Although the generation of comprehensive evidence takes time, it remains

the best option in order to assess all aspects of policy implications and the feasibility of implementation. Such efforts will need to be planned prior to embarking on the policymaking process. In addition, reaching a consensus on available evidence and the possible course of action is crucial, so as to harnessed to all available resources to facilitate implementation.

Research implications

This study has also highlighted other factors which would require more exploration to assess whether outcomes would be different if they were in place, in reference to policies categorized as high issue polarization. These included effective and well-coordinated dissemination of evidence, stakeholders reaching a consensus on the available evidence, the MoH having the negotiating power to take a preferred course of action in line with evidence and, reducing the turnover of senior officers to ensure continuity. In addition, testing our MRT on additional case study will lead to more refinement and perhaps improve the extent to which the MRT can be generalized.

Conclusion

Evidence was used in several ways in the case of the abolition of user fees. We noted symbolic use of evidence in the form of community complaints by the president to abolish user fees; instrumental use of evidence in the form of routine monitoring data by technocrats in the MoH to negotiate for an increase in the health sector allocation and, conceptual use of evidence in the form of survey data by the cabinet to debate the ills of user fees for health care. What is taken as evidence may vary from case to case due to the stakeholders involved and how much interest and influence they wield. We found divergences and convergence with facilitatory factors identified in our earlier MRT on KT in Uganda. Additional factors and themes emerged as well. Respondents perceived the availability of evidence including its dissemination; the MoH institutional capacity to lead KT processes; the existence of partnerships for KT; a favorable political context; and how evidence aligns with the overall government policy discourse as the factors that impacted the uptake of evidence. We refined our initial MRT as ?**?**evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process, there are partnerships for KT in place and, the nature of the policy issue under consideration, the overall government agenda and; the political situation can be expected to play a role**?** We acknowledge that context is very important in KT and our refined MRT may not hold true in all contexts. Thus, applying the MRT calls for understanding the context within which KT processes occur; the stakeholders involved and; the nature of the policy that is to be influenced by the evidence. However, we believe that our theory can serve as a starting point for other countries planning to abolish user fees for health care and seeking to maximize the use of evidence.

Abbreviations

CSOs, Civil society organizations; HSSP, Health Sector Strategic Plan; KI, Key informants; KT, Knowledge translation; MOH, Ministry of Finance; MoH, Ministry of Health; MRT, Middle Range Theory; PEAP, Poverty Eradication Action Plan; SWAp, Sector Wide Approach; UNICEF, United Nations Children Fund; UPPAP, Uganda Poverty Participatory Assessment Project; WB, World Bank; WHO, World Health Organization

Competing interests

The authors declare that they have no competing interests.

Authors? contributions

JNO contributed to the study design, data collection, data analysis and interpretation and, led the drafting of the manuscript. FS contributed to the study design, interpretation of data and drafting of the manuscript. RM,CK and BM contributed to drafting of the manuscript. BC contributed to the study design, interpretation of data and drafting the manuscript. All authors read and approved the final manuscript.

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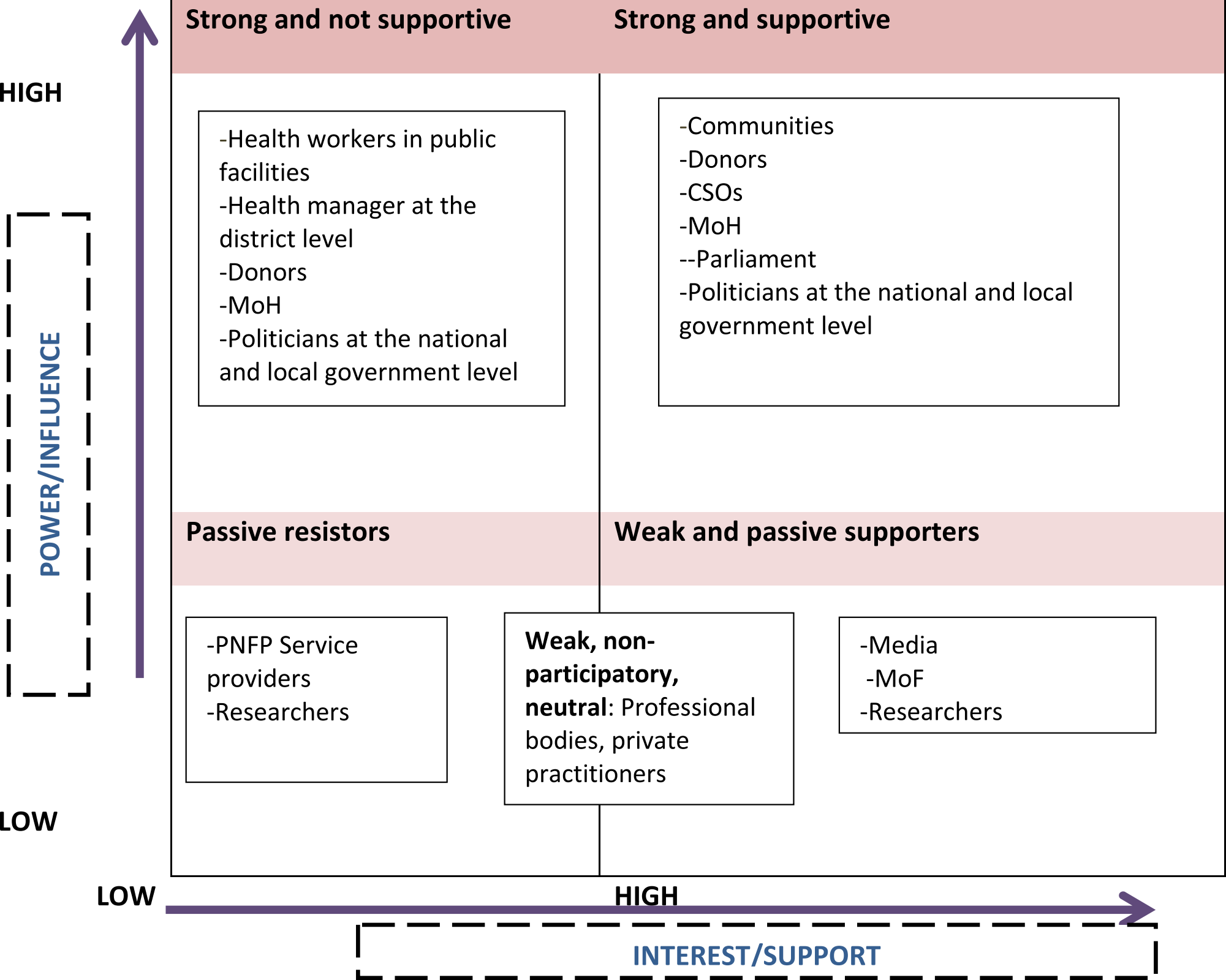
1987
1989
1993
1999
2000
2001
UNICEF & WHO
Introduce Bamako
Initiative
-Health policy review
commission – recommended
introduction of user fees
-Evidence on User fees from
the WB
World Bank- World Development Report &
WHO – Health for all
Inter-ministerial task force on user
fees set up
- Discussion paper on user fees
presented in the health policy
advisory committee
-Planning department asked to
draft a policy on user fees
User fees abolished by the President
Presidential campaigns
- MoH undertakes study tours
Cabinet memo on user fees
taken to parliament and
rejected.
- Later minister is sacked
-Ministry of Health sends
guidelines to districts on user
fee implementation
-districts introduce user fees
-MoH drafts a user fees policy
-The joint review mission; April
2000, asks MoH to finalise the user
fee policy and launch it by 1st July
2000


Strong and not supportive
Strong and supportive
HIGH
-Health workers in public facilities
-Health manager at the district level
-Donors
-MoH
-Politicians at the national and local government level
-Communities
-Donors
-CSOs
-MoH
--Parliament
-Politicians at the national and local government level
POWER/INFLUENCE
Passive resistors
Weak and passive supporters
-PNFP Service providers
-Researchers
Weak, non-participatory, neutral: Professional bodies, private practitioners
-Media
-MoF
-Researchers
LOW
LOW
HIGH
INTEREST/SUPPORT

Addtional files provided with this submission:

Additional file 1. Guideline for document review. Description: Guide used in reviewing documents (24k)
http://www.biomedcentral.com/content/supplementary/s12913-014-0639-5-s1.doc

Additional file 2. Document reviewed. Description: Details of documents reviewed (42k)
http://www.biomedcentral.com/content/supplementary/s12913-014-0639-5-s2.doc

Additional file 3. In-depth interview guide for policy makers and researchers. Description: Open ended questions to elicit responses from respondents (33k)
http://www.biomedcentral.com/content/supplementary/s12913-014-0639-5-s3.doc

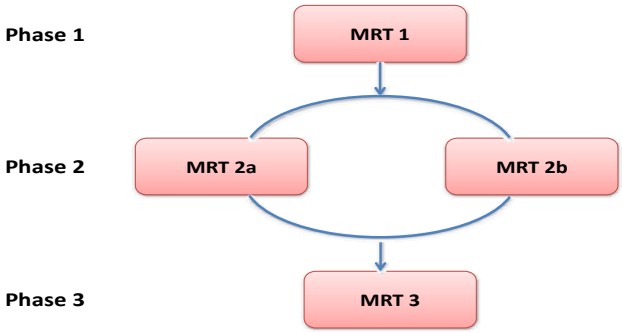
Chapter 5: General discussion and conclusion

In Uganda, attempts have been made to improve the uptake of evidence in health policy development but results remain mixed. Known facilitating factors exist to some extent, such as shared platforms for learning and decision-making, local capacity to undertake research, successful research dissemination workshops, development of policy briefs discussed with policy makers, and provision for regular updates to policy makers during the research process. However, these factors have not always resulted in successful knowledge translation (KT) [1-4]. Policy actors in Uganda acknowledge the role of evidence in policy development, but the realisation of successful KT requires further exploration [5].

The main objective of our study was to enhance our understanding of whether and how evidence can be diffused into public health policies and practice (KT) in Uganda. We studied complex KT processes and, more specifically, investigated the barriers and facilitating factors to KT as well as the roles, interactions, and influences of different actors in KT processes. We further examined how context affected evidence uptake, as well as how the nature of the evidence and the policy under consideration affected the KT processes. These elements were made explicit in a middle range theory (MRT).

Our methodological approach was theory-driven inquiry, because of its ability to address complexity [6]. We developed the MRT in three phases as shown in Figure 3. Phase 1 began with the construction of MRT 1, a detailed hypothesis on what is required for evidence uptake into public health policy and practice. Evidence was defined broadly to include research study results (both published and unpublished), findings from monitoring and evaluation (M&E) studies and population-based surveys, Ministry of Health (MoH) reports, community complaints, and clinician observations [7-8]. Phase 2 involved studying KT processes and outcomes in carefully selected cases, to assess whether and to what extent MRT 1 explained the evidence uptake in policy development from a policymaking perspective. 'Testing' this MRT 1 in each concrete health policy case eventually provided insights into its explanatory power and led to additional refining steps. In Phase 3, through a cross-case analysis of the case studies and comparison of their resulting MRTs, we sought to consolidate our MRT on improving KT, thus increasing our understanding of this subject.

Figure 3: Layout of building and refining the Middle Range Theories



Selection of cases

Case selection (in Phase 2) was guided by MRT 1 on KT (developed in Phase 1 of our study) [9], which was constructed around three elements that seemed particularly important in Uganda, namely, the characteristics of the available evidence, the institutional capacity of the MoH to lead the KT process, and the existence of partnerships for KT. Cases were selected to enhance the likelihood of contrasting these elements [10]. In one case, MRT 1 seemed more likely to explain evidence uptake given the nature of the policy implying that the uptake of evidence, if it occurred at all, is likely to be explained by the facilitating factors detailed in MRT 1. Another case seemed to predict contrasting results for reasons that can be anticipated a priori, implying that the facilitating factors detailed in the MRT 1 may not adequately explain the uptake of evidence, if it at all it occurred.

The selected cases involved the following policy changes:

- The change in the national malaria treatment policy (likely to predict similar results)
- The abolition of user fees for public health facilities (likely to predict contrasting results)

Contandriopoulos *et al* argue that even when evidence is available, the efforts to effectively disseminate, legitimise and consider evidence objectively in policy development will be impacted on by the characteristics of the issue under consideration [11]. Characteristics of the issue encompass the extent to which it is polarizing, that is, whether it is likely to cause fragmentation (high polarization) among the actors involved given their positions on a given issue; whether it is highly salient in that it will attract a lot of attention; and whether actors are familiar with the issue and as such it gains prominence on the agenda [11-12]. In cases of low issue polarisation, potential users share similar opinions and preferences, they all see the issue

as a problem and discussions are more likely to be technically focused and instrumental use of evidence realised. On the other hand, in cases of high issue polarisation, discussions are likely to be entangled in political debates and unbalanced power plays and in such instances, evidence may not be central to decision making [11]. In addition, Moat *et al* also point out the need to understand how the context in which evidence is produced, the issues it addresses, and issue-context resonance, influence the producers and users of evidence [13]. Context encompasses the government policy making structures involved in policy making and the extent to which they are open to participation, the characteristics of political actors whether they stand to win or lose given the policy choices made, and societal values [11]. These will impact on how evidence is viewed and taken up in policy development.

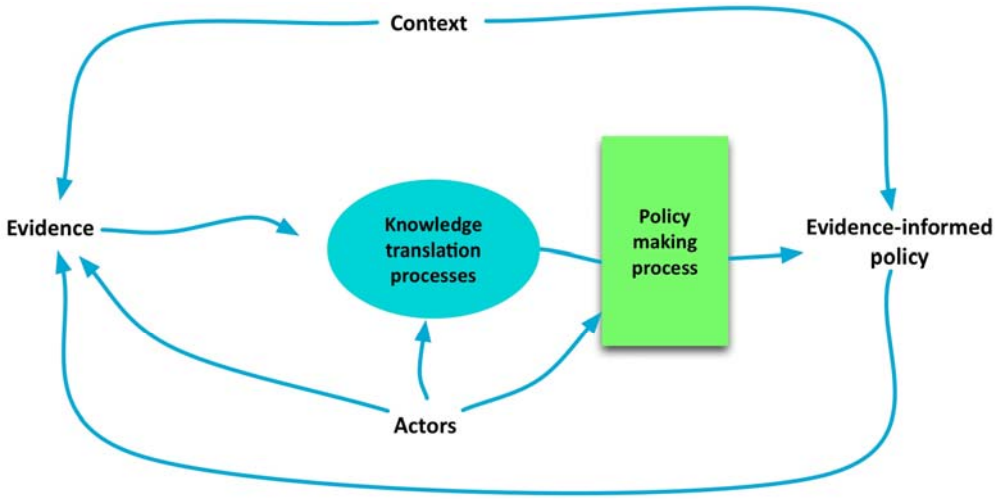
The case on abolition of user fees seemed likely to predict contrasting results given the nature of the policy. The high issue polarization tendency was eminent in that the World Bank was supporting user fees because of their concern to ensure loan sustainability, while the government was keen to address hindrances to realization of the national Poverty Eradication Action Plan (PEAP) objectives, user fees for health care being one of them. It was highly salient given the fact that a significant percentage of the population is categorised as poor [14] and stood to benefit from the abolition of user fees. Regarding the context, user fees for health care is a social policy which directly concerns peoples' welfare and this engenders a political currency reflected in popular support and close engagement of politicians, civil society and the community. In such a case, consultative mechanisms and inclusive policy development processes are unlikely. In addition, with the abolition of user fees, some actors stood to win while others stood to lose. Politicians stood to win votes, managers of the health services and health service providers stood to lose a source of revenue, while communities stood to benefit from free health services.

On the other hand, the malaria treatment policy change seemed likely to predict similar results to our MRT given that it is a biomedical policy. Importance would first be placed on the scientific rigour of the evidence regarding the effectiveness of possible drug options and patient safety, and affordability would be secondary. This then calls for the close engagement of professional bodies, with technocratic decision makers and researchers as key partners. The malaria treatment policy change is a low issue polarisation and potential users of the evidence are likely to share similar opinions and preferences. Discussions are more likely to be technically focused and instrumental use of evidence realized.

The process of Knowledge Translation

Evidence will go through a KT process to influence policy making. However, this process is not linear and occurs in a given context and amidst stakeholder interactions, which impact evidence generation, the KT, and the policy development processes, as shown in Figure 4.

Figure 4: Conceptualisation of how evidence gets into policy



Walt refers to contextual issues as systemic factors encompassing political, economic, and social dimensions which may be at the national or international level [15]. The impact of contextual issues on KT processes has been documented [16-18]. For example, a systematic review by Liverani *et al.* on the political and institutional influences on the use of evidence in public health policy concluded that the level of state centralisation and democratisation, the influence of external donors and organisations, and the framing of evidence in relation to social norms and values impacted KT [16]. Humphreys & Piot also argue that decisions contrary to social norms would be unpopular despite available evidence in their favour [17]. Young further stated that evidence generation and policy development are in themselves political processes and highlighted the importance of understanding political systems in low-income countries (LICs) in order to improve KT [19]. Furthermore, Hennink *et al.* caution against providing research recommendations that ignore affordability concerns [20].

Evidence, however, is just one of the inputs in the policy process. Kingdon documented that political agendas and stakeholder interests influence policy agenda setting [21], while Walt and Gilson stated the importance of three key components in the policy process: the content of the policy, the process of, and how power is used in the policy making process, and the context in which processes and actors interact [15]. Furthermore, Sabatier & Weibel, in the Advocacy Coalition Framework (ACF), state that policy decision making is influenced by beliefs, noting that factors that impact beliefs will also impact the policy process [22]. Coalitions among stakeholders play a central role in the ACF in that evidence shared within coalitions may influence beliefs, but also researchers may be coalition members who then influence policy decision making. A 'coalition' is here defined as "consisting of members who share policy core beliefs and engage in a nontrivial degree of coordination" [23]. Coalitions are central to the policy processes because that is where beliefs are held and shared.

Main findings

DEVELOPING THE INITIAL MRT

We employed a two-step study using qualitative approaches to examine the principal barriers and facilitating factors to KT. Step 1 involved a review of literature and identification of common themes. The results informed the development of the initial MRT, which details the facilitating factors and barriers to KT. In Step 2, these were further refined through key informant interviews with policy makers and researchers in Uganda.

Our initial MRT is detailed in Chapter 2 and also shown in Box 1. According to policymakers and researchers in Uganda, the most important facilitating factors to improve KT in Uganda are the characteristics of the available evidence, the institutional capacity of the MoH to lead the KT process, and the existence of partnerships for KT [24]. These take place amidst stakeholder interactions that play various roles and exert varying levels of influence and support. Our study highlighted the need to consider the roles that various stakeholders play best. Links and necessary platforms need to be put in place to achieve synergy in KT. In addition, relevant capacities need to be built to overcome the challenges faced by the various stakeholders [25].

Box 1: Middle Range Theory 1

"High-quality and contextualised evidence will be taken up in policies so as to lead to evidence-informed policies in instances where the MoH leads the KT process and there are partnerships for KT in place".

Evidence must be of high quality, contextualised, providing economically feasible recommendations and produced in a timely manner by credible researchers. Use of local researchers is helpful but there is a need to separate the roles of researchers and policy makers.

KT requires strengthened MoH institutional capacity to lead the KT process. Institutionalised platforms for engagement between researchers and policy makers, including civil society, need to be in place, and mechanisms to coordinate evidence generation and synthesis need to be mainstreamed within the MoH. The capacity of policy makers needs to be better at knowledge management and the policy-making process needs to be minimally bureaucratic.

Partnerships for KT need to be in place and all stakeholders must be involved throughout the process to improve trust and build interest. Communities need involvement in evidence generation and KT as well. There is need to take into consideration the roles different stakeholders can play best and challenges they have to overcome. Links must be built and necessary platforms put in place in order to realize the synergies in KT among stakeholders.

These contribute to more ownership and adoption of policy and better application of evidence.

The application of the MRT 1 to real policy cases yielded different results. There were some convergences but additional themes and parameters also emerged as shown in Box 2 (MRT 2a: case of Malaria treatment policy change), Box 3 (MRT 2b: case of Abolishing user fees for public health facilities), and Table 1 (MTR 1, 2a, and 2b).

The development of Middle Range Theory 2a: The case of Malaria treatment policy change

There was instrumental use of evidence in changing the malaria treatment policy. There was consensus on the need to change the treatment policy based on evidence from drug efficacy studies and policy discussions and decision making were informed by the available evidence. The parameters under MRT 1 explained the uptake of evidence although additional parameters and an additional theme emerged as underlined in Box 2 (MRT 2a). The uptake of evidence was further enhanced by its effective and tailored dissemination, the intervention of the World Health Organisation (WHO) and regional professional bodies, building a culture of partnerships in health development over time which enhanced trust, and the availability of tools and inputs to support implementation.

Box 2: Middle Range Theory 2a: The case of Malaria treatment policy change

"High quality and contextualized evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process, there are partnerships for KT in place, WHO and regional professional bodies play a role, and implementation is feasible in that tools and inputs required to implement evidence are available".

Evidence must be high-quality, contextualised, able to provide economically feasible recommendations, and produced in a timely manner by credible researchers. Use of local researchers is helpful but there is a need to separate the roles of researchers and policy makers. There must be effective dissemination of evidence to communities and tailored dissemination to influential stakeholders.

KT requires strengthened MoH institutional capacity to lead the KT process. Institutionalised platforms for engagement between researchers and policy makers, including civil society, need to be in place. Mechanisms to coordinate evidence generation and synthesis need to be mainstreamed within the MoH, although regional professional bodies also play a role and the intervention of the WHO is helpful. Policy makers need to be better at knowledge management and the policy-making process needs to be minimally bureaucratic.

Partnerships for KT need to be in place, and all stakeholders must be involved throughout the process to improve trust and build a common vision. Building a culture of partnerships in health development enhances trust. Stakeholders play different roles and there is need to devise mechanisms for their objective engagement and resolving conflicts of interest.

Feasibility of implementation needs to be taken into consideration. Funding must be available, operational tools must be provided and implementers must receive required training to implement evidence.

These contribute to more ownership and adoption of policy and better application of evidence.

The development of Middle Range Theory 2b: The case of Abolishing user fees for public health facilities

Evidence was used in several ways in the case of abolishing user fees. There was conceptual use of evidence when technical officers in the MoH presented evidence in parliament to inform deliberations. There was symbolic use of evidence when the community presented evidence to the President of the country on the campaign trail and he made the decision to abolish user fees. Instrumental use occurred as well when technical officers used evidence to negotiate an increase in health sector funding to cover the losses from abolishing user fees. The parameters in MRT 1 could not fully explain the uptake of evidence as shown in Box 3 (MRT 2b). Although evidence was available and was used, the quality of the evidence and credibility of the researchers were not emphasised. Partnerships for KT were limited with regards to the scope of issues addressed, membership, and were of short duration. The WHO and professional bodies

did not play significant roles. The political context and alignment with the overall government agenda enhanced the uptake of evidence.

Box 3: Middle Range Theory 2b: The case of Abolishing user fees for public health facilities

"Evidence will be taken up in policies so as to lead to evidence informed policies in instances where the MoH leads the KT process, there are partnerships for KT in place and the nature of the policy issue under consideration, the overall government agenda and the political situation can be expected to play a role".

Evidence must be available and disseminated to stakeholders.

KT requires strengthened MoH institutional capacity to lead the KT processes and platforms for engagement between researchers and policy makers including civil society need to be in place.

Partnerships for KT need to be in place. Communities need involvement in evidence generation and KT as well. Stakeholders play different roles and there is need to devise mechanisms for their objective engagement and resolving conflicts of interest.

A favourable political context in which a political window provides an opportunity for KT and;

Evidence aligning with the overall government policy discourse enhances uptake.

These will contribute to more adoption and better application of evidence.

Comparison of Middle Range Theory 1, 2a, and 2b

Table 1 shows commonalities between MRT 2a and 2b compared to MRT 1, and the importance or unimportance of the different parameters to the two case studies. Additional parameters and themes in MRT 2a and 2b compared to MRT 1 are also shown. Looking at commonalities in all three, under the theme of characteristics of available evidence, only contextualised evidence appeared in all. Under the theme of MoH institutional capacity to lead the KT process, only institutionalised platforms for engagement between researchers and policy makers appeared in all three. This was similarly noted in a systematic review by Innvaer *et al.* who showed that platforms for engagement are crucial in KT processes irrespective of the nature of the policy under consideration [26]. Under the theme of partnerships for KT, involving all stakeholders, including communities, and building a culture of partnerships in health development over time were deemed important in all MRTs.

Similarities in Middle Range Theories 2a and 2b

There were parameters that were important in designing the consecutive MRTs. For example, regarding characteristics of the available evidence, contextualised evidence that is disseminated to influential stakeholders was common to both cases. These parameters were emphasised more in the malaria treatment change case than in policies with wider social implications; that

may be explained by the malaria treatment policy being a biomedical policy, in which case, evidence is likely to play a more central role as indeed noted by respondents in our study.

Regarding MoH institutional capacity to lead the KT process, platforms for engagement between researchers, policy makers, and civil society organisations (CSOs) appeared in both MRTs but were weaker in the case of abolishing user fees.

In the case of partnerships for KT, involvement of stakeholders appeared in both cases although weaker in the case of abolishing user fees as partnerships were informal, limited in scope, had limited membership mainly involving researchers, the MoH and a few donors, and created minimal trust. Community involvement was more pronounced in the case of abolishing user fees; this could be explained by the nature of a policy that has popular support, given the welfare implications. In the case of the malaria treatment policy change, trust had been built over the years because the malaria partnership had been in existence for over ten years. There were roles played by actors in both cases as shown in Table 2 and in Annex I. For example, the role of the MoH was to uptake evidence and to establish platforms for KT; researchers played a role in evidence generation; donors engaged in evidence generation, providing funding for research and for implementation of evidence; while CSOs advocated for implementation of evidence and engaged in generation and dissemination of evidence. In both cases we noted donor influence in the decision making process. Stakeholders exerted varying degrees of influence and support impacting uptake of evidence.
The availability of funding to implement evidence featured in both cases, but more so for the malaria treatment policy change.

Table 1: Comparison of the different Middle Range Theories

Theme	Parameters	MRT 1	MRT 2a (malaria treatment policy change)	MRT 2b (user fees abolition in public health facilities)
Characteristics of available evidence	High-quality evidence	+	++	
	Contextualised evidence	+	++	+
	Economically feasible recommendation	+	+	
	Timeliness	+	+	
	Credible researchers	+	++	
	Use of local researchers	+	+	
	Separate roles for researchers and policy makers	+	+	
	Effective dissemination of evidence to communities and tailored dissemination to influential stakeholders		++	+
MoH institutional capacity to lead the KT process	Institutionalised platforms for engagement between researchers and policy makers	+	++	+
	Civil society involvement	+	+	
	MoH mainstreamed mechanisms to coordinate evidence generation and synthesis	+	+	
	Policy makers' capacity for knowledge management	+	+	
	Reduced bureaucracy in policy making	+	+	
	Involvement of regional professional bodies		++	
	WHO intervention		++	
Partnerships for KT	Involvement of all relevant stakeholders throughout the process	+	++	+
	Community involvement	+	+	+++
	Building a culture of partnerships in health development to enhance trust.	+	+++	
Feasibility of implementation	Availability of funding		+++	+
	Availability of operational tools		++	
	Implementers receive required training		++	
Context	A favourable political context			+++
Overall government discourse	Evidence aligning with the overall government policy discourse			+++

Evidence generation and subsequently KT goes through a process that is impacted by the actors involved, characteristics of the evidence and the nature of the policy. The extent to which actors are polarised regarding the policy issue under consideration, how power influences decision making, participation in and mutual trust within partnerships, the roles played by actors and, the capacity of the MoH to lead the KT process will impact the KT process.

Characteristics of the available evidence

Scholars have stated that different policies and the different stages of policy development may require different types of evidence [27]. In addition, the question of how much evidence is enough continues to be debated. Mubyazi *et al.* documented a case of malaria treatment policy change in Tanzania where the policy development process was protracted as decision makers demanded for more evidence addressing different aspects of policy development and implementation before making a decision [28]. Similarly, Basaza *et al.* documented a case of a protracted process of designing a health insurance scheme in Uganda emphasizing the need for comprehensive evidence encompassing financial feasibility, political acceptability, popular support, impact on employment, and private sector growth to guide decision making [29]. In our case studies, we noted that in the case of the malaria treatment policy change, evidence was available from multiple perspectives, mainly from formal research processes, to adequately inform decision making. There was evidence regarding drug efficacy, cost, implementation feasibility, and community health-seeking behaviour. On the contrary, available evidence in the case of user fee abolition was mainly on the ills of charging fees for health care. This evidence was generated from both the formal research process and the informal process through community complaints, and this largely guided decision making. Though peer-reviewed research has been considered the most appropriate evidence in the past [30], it is now becoming clear that there are many forms of evidence that inform policy and decision making [8]. What is taken as evidence may vary from case to case due to the stakeholders involved and how much interest and influence they wield. In our study, we noted that in the case of abolition of user fees, the World Bank relied mostly on formal research as the basis to push for the introduction of user fees; technocrats in the MoH relied mostly on formal research to push for reorganization of user fees; while politicians relied mostly on community complaints to abolish user fees. On the other hand, in the case of the malaria treatment policy change, actors relied mostly on formal research and perhaps the biomedical nature of the policy explains this observation.

The availability of quality evidence, credibility of researchers, and use of local researchers are known factors that facilitate the uptake of evidence [20, 31-33]. Systematic reviews have also shown that timing is an important factor in determining whether evidence gets used [26, 34]. In the case of the malaria treatment policy change, the malaria programme had a long-standing research programme under the East African Network on Monitoring Antimalarial Treatment (EANMAT) that had built research capacity over time. As a result, local, credible researchers

and high-quality evidence were readily available. Reaching consensus on the available evidence was easier because of existing platforms where evidence was routinely shared and discussed. Although the majority of known favourable factors were present in the case of the malaria treatment policy change, several of these were absent in the case of abolishing user fees. Still, evidence was used in decision making in several ways.

The timing of evidence also differed in the two cases. In the case of the malaria treatment policy change, evidence was available prior to the policy process and indeed sparked and guided dialogue, perhaps explaining its 'instrumental' use. In the case of user fees, the timing varied. Evidence was generated before, during and after the policy process which may also explain the multiple modalities of evidence use. This implies that known favourable factors regarding the characteristics of the available evidence do not solely determine the extent to which KT is realised in some policies.

There was separation of roles between evidence generation and policy development in the case of the malaria treatment policy change. Researchers led evidence generation with the MoH participating, while policy makers led the policy development with researchers participating. The argument on separation of roles between researchers and policy makers identified in our MRTs is also supported by Lavis *et al.* who emphasised the separation between health system guidance developers and policy developers in order to enhance evidence-informed policy making [35]. In this respect, the use of think tanks to undertake research and to provide results to policy makers have shown promising results for the realisation of KT [19]. However, this does not mean a complete separation where policy makers pay no attention to ongoing research, but rather that the terms of engagement have to be clarified to ensure objectivity. This separation must be weighed carefully as there are instances where a separation of roles may not play well, as in the case of operational research [36].

Effective and systematic dissemination is important to gain consensus on the available evidence and course of action [26]. In instances where there are no coordinated dissemination mechanisms in place, the nature of the evidence that reaches the decision making level is what will affect decision making. That is why, in the case of user fee abolition where partnerships were weak, some respondents referred to 'selective use of evidence' and again we see several modalities of evidence use. In this case, MoH technocrats only disseminated evidence to the Cabinet through policy briefs, CSOs disseminated evidence to those who they felt were key decision makers, and donors disseminated evidence to MoH technical teams. There was no consensus on the available evidence and indeed the preferred course of action differed between the political and technical groups.

Strengthened Ministry of Health institutional capacity to lead the Knowledge Translation process

The capacity of the MoH to lead the KT process has been shown to enhance KT [26, 36]. MoH institutional capacity to lead the KT processes was stronger in the case of the malaria treatment policy change than in the abolition of user fees. Several reasons may account for this. In the case of user fees, the political implications of the policy decision could have affected the

stewardship function of the MoH given the fact that the ruling party was campaigning for another term in office. Indeed Moat & Abelson, in their analysis of the influence of institutions in the decision to abolish user fees in Uganda, highlighted the weaknesses of government structures to impact on the decision making process to abolish user fees concluding that "Big man" 'presidentialism' and 'clientelism' thwarted the role of formal institutions [37]. Also, the country's donor dependence to finance health programmes [38] could have allowed donors undue influence on the policy process, thus weakening the leadership capacity of the MoH. This was also highlighted by Moat & Abelson stating that in a quest for the government of Uganda to access a World Bank loan for the health sector reform programme, the government conceded to the demands of the World Bank allowing them significant authority over domestic policy [37].

In the case of the malaria treatment policy change, institutional capacity was already in place as part of strengthening the malaria research programme in East African countries under the EANMAT. At the time of the KT processes, the malaria programme was already working within existing structures. Platforms where systematic engagement between researchers and policy makers can be realised have been shown to improve uptake of evidence, as have mainstream MoH mechanisms to coordinate the synthesis and dissemination of evidence [20, 35-36, 39-42]. This may perhaps contribute to an explanation for the systematic dissemination and instrumental use of evidence in the case of malaria treatment policy change.

Some authors have argued that MoH mainstream mechanisms to synthesise and disseminate evidence would be more effective in cases of public health policies as opposed to health care and/or clinical policies [43]. On the other hand, successful synthesis and dissemination of evidence have been reported with the use of structures outside the government, including professional bodies, although these focussed on clinical areas and technology assessment [44]. In the case of malaria treatment policy change, the presence of both mainstream and outside professional structures (a regional professional network) enhanced the leadership capacity of the MoH in KT. A regional approach would be helpful where local research capacity may be insufficient; embedding in professional bodies allows for coalitions and consensus building [23]. However, in the case of public health policies, this may need further exploration. We caution that in mainstream mechanisms (embedded in a ministry), the independence of research processes needs to be guarded. Indeed, this was raised in our exploration of views of policy actors in Uganda (Chapter 2).

Varskevisser *et al.* demonstrated that building the capacity of policy makers and health services managers in basic research methodologies and evidence synthesis enhanced ownership and uptake of evidence in ten countries in Southern Africa [36]. Our case on malaria treatment policy change supports this proposition where the research capacity of policy makers was built as part of an East African initiative to strengthen research on malaria. This contributed to building a culture of evidence-based decision making and of ownership of research processes, demonstrated by the MoH setting up sentinel sites to monitor drug resistance.

The role of WHO has been shown to enhance credibility of KT processes in other countries [28, 45] although more prominently in biomedical policies. Indeed, this was more prominent in the malaria treatment policy change case than in the user fee case. Possible reasons may be the highly technical nature of evidence that was generated; not many players would have the capacity to undertake biomedical research. Also, as WHO is a member-state organisation, decisions that are taken at the World Health Assembly are binding [46].

Partnerships for Knowledge Translation

Partnerships for KT enhance the uptake of evidence [20, 26, 39-41, 47] and cross-coalition learning [23]. Innvaer *et al.* and Kathryn *et al.* further highlight the importance of mutual trust within such partnerships as an element that facilitates evidence uptake [26, 47]. Within these partnerships, research evidence can be considered alongside other sources of evidence and allow dialogue among stakeholders [35]. Our findings on the case of malaria treatment policy change are also in support of this; the malaria programme had a long history of partnerships for KT and through these, trust was built over time. Consultation and decision making were already embedded in partnerships that were broadly inclusive and thus evidence could easily be widely disseminated to reach consensus. In addition, evidence-based decision making was already a culture. Stakeholders were able to reach a consensus on the need to change the treatment policy given available evidence. However, the decision on the alternative antimalarial to adopt was debatable because evidence was available on two different options.

In the case of user fees, the decision-making process was centralised with minimal consultations. Partnerships for KT, although they existed, were informal, short lived, and narrow in both the scope of issues addressed and of the membership. This may explain the poor dissemination of evidence, lack of consensus on the available evidence, and mistrust. Some respondents noted that some groups were pushing certain evidence because it supported particular positions, thereby 'misleading' decision makers. In addition, the importance of allowing enough time for dialogue and decision making has been emphasised [26], but in the case of user fees, this seems to have been overtaken by the political process.

Although much of the literature talks about partnerships between researchers, policy makers and service providers, we emphasise the importance of communities being part of the process. Community involvement is also emphasised by Varskevisser *et al.* as a precondition for evidence uptake in their study of ten countries in Southern Africa [36]. Partnerships for KT are undoubtedly beneficial, but the nature of the policy, its political implications [17], and systems of centralised or democratic governance [16] will impact their effectiveness.

The nature of the policy, the evidence, and the actors' level of interest in a given policy issue will influence the roles actors will play and, in turn, their level of influence [48]. Although the roles played by the different actors will differ based on the nature of the policy, we have observed repeated patterns regarding roles played by different stakeholders in KT. We mainly focus on roles actors played repeatedly across the two case studies, as shown in Table 2 and in Annex I. In both cases, the role of the MoH was to uptake evidence and to establish platforms for KT, which is in line with what has been documented by other scholars [27, 38, 65].

Contrary findings have however been documented, for example, in Sudan, where a NGO took the lead in putting a KT platform into place in the malaria treatment policy change [41]. In our study, the strengthened capacity of the MoH in KT could have enabled this in the malaria treatment case, while the MoH could only comply in the case of user fees due to the political interest in the policy case from the high level.

Researchers played a role in evidence generation across the two case studies. Their involvement in the policy process is beneficial [26, 32] as noted in the case of the malaria treatment policy change where there was instrumental use of evidence. Their failure to engage in the policy processes in the case of user fee abolition could be explained by the messy policy process that did not allow enough room for dialogue. On other hand, the nature of the evidence they were generating, which was judged as poor quality, contradictory and inconclusive, could have weakened their position. Indeed, they were reported as weak and passive actors.

Donors also engaged in evidence generation, providing funding for research and for implementation of evidence. Given the undue influence donors exert on policy processes in LICs, their role in evidence generation and dissemination needs to be reassessed. Indeed, in these two cases, there was undue influence by donors in the decision-making processes based on the evidence that they were generating or funding. A study by Hutchinson *et al.* documented similar findings where donors' active involvement in evidence generation and policy development influenced decision making [29]. In the absence of strong MoH leadership in KT processes and lack of systematic and inclusive processes of setting up research agendas, the role of donors in generating evidence will continue to be a challenge. However, the role of WHO, supportive in providing policy guidance to the MoH, has been documented by other researchers as well [41]. The WHO could also play a coordinating role between donor involvement in research and strengthening MoH health research systems.

In both cases, CSOs advocated for implementation of evidence and engaged in generation and dissemination of evidence. However, the role of CSOs in undertaking research, which was noted in our case studies, will require more scrutiny. The capacity of CSOs to undertake research has been documented as weak, mainly due to lack of skills and the limited scope of their research, focusing on evaluation of their programmes [66]. Some scholars have proposed partnerships with research institutions as a way of mitigating the weak research capacity of CSOs [67]. Although opinion leaders at the local level did not play any role in the user fee abolition case, their involvement in the malaria case enabled mobilisation of communities to embrace the new policy. The role of opinion leaders in KT needs further exploration.

Different stakeholders will have varying levels of support and influence for KT for varied reasons. We have noted that while the World Bank, CSOs, and the community were strong and influential stakeholders in the case of user fees, they were not influential actors in the case of malaria treatment. Likewise, while the Global Fund to Fights AIDS, Tuberculosis and Malaria (GFATM) and researchers were strong and influential in the case of malaria treatment, they were either not categorised as stakeholders (GFATM) or were weak (researchers) in the case of user fees. Similar findings have been documented by other scholars, for example, in a

comparative study on the uptake of evidence on magnesium sulphate and vector control interventions for malaria in Southern Africa. Woelk *et al.* documented a diverse group of stakeholders with varied interest in the latter but not in the former [49].

In both of these cases we have noted donor influence in the decision making process. Lavis *et al.* raised a concern about the limited capacity of some donor agencies to engage in health system issues, although their level of funding allows them undue influence on decision making [35]. Donor influence on policy processes in LICs is a documented concern: as reported in the case of Cameroon, donor dominance undermined the country's efforts to coordinate research [50], and the case of Ghana, changing HIV treatment guidelines was largely influenced by the conditions of donor financing [51]. Similarly, Weibel highlighted the resource dependency theory whereby actors who control resources, typically influential organisations, influence other stakeholders' beliefs in the policy process amidst asymmetrical relationships [52], which was the case in both our case studies. However, this is contrary to Sabatier & Weibel's argument in the ACF framework that presumes that coalitions are built around common policy beliefs [22].

Conflicts of interest were noted in the two case studies although more pronounced in the user fee abolition case than in the malaria treatment policy change case. This observation may be explained by the weaker partnerships that were noted in the former case study compared to the latter. Indeed, in the case of user fee abolition, there was polarisation with no commonly agreed course of action among the actors. For a given KT process, mapping the relevant stakeholders and devising mechanisms for their engagement and for resolving conflicts of interest will enhance the uptake of evidence in policy development. This calls for strengthened partnerships and putting in place mechanisms to identify and manage conflicts of interest.

Feasibility of implementation

The availability of required resources to implement evidence is crucial [53-54]. This was a facilitating factor for the uptake of evidence in the case of malaria treatment policy change but was not very much emphasised in the case of user fees. The nature of the policy may account for the difference. In the case of malaria treatment policy change, the inputs are specific to a programme and implementation can be directly related to the availability of guidelines, medicines, and trained health workers. Malik *et al.* also reported that the availability of ACT and guidelines were essential for the successful implementation of the new malaria treatment policy [45]. Experiences have been different in instances where inputs are lacking. For example, Kenyan implementation of the new malaria treatment policy faced challenges due to lack of ACT [55], and in Uganda midwives could not implement newly acquired knowledge due to lack of required inputs [56].

In the case of user fee abolition several reasons may account for the lack of emphasis on the availability of funding, tools, and inputs to implement evidence. First, the implementation of evidence may not be easily linked to the availability of tools and inputs given the systemic nature of the policy. Second, because people are used to paying direct out-of-pocket for health care, it may be difficult for them to attribute the gaps in financing to the health system.

Thirdly, given the fact that it was a presidential directive, implementers could only comply without paying much attention to the availability of required inputs. However, this does not mean that availability of funds and other inputs are not important, because, in the background to the user fee case (Chapter 4), Nabyonga *et al.* demonstrated that lack of adequate funding and system-wide weaknesses hampered implementation of the free health care policy in Uganda [57].

Guidelines can be used as a knowledge source, but also as a way to translate evidence into practice [58-59]. Concerns that continue to be raised include whether guidelines development is informed by evidence and whether guidelines actually influence implementation of health programmes [60-62]. Evidence shows inconsistencies between available research and expert recommendations and practice [63]. In our study (Introduction chapter) we noted that guidelines were not effectively influencing implementation of health programmes due to a suboptimal development process and lack of required inputs to support implementation. The weak consultative process was noted which could be addressed within strengthened KT partnerships as highlighted from our case studies. Evidence discussed within KT partnerships would then inform development of the guidelines to ensure that implementation decisions are evidence informed. Uptake of evidence into policy and implementation both call for effective dissemination and indeed the lack of systematic dissemination of guidelines was also noted to hamper their utility. In the case of malaria treatment policy change, availability of guidelines in terms of operational tools was reported as one of the factors that enhanced the uptake of evidence. In addressing uptake of evidence into implementation, addressing dissemination weaknesses is crucial.

Alignment with the overall government discourse

Attainment of wider government objectives was another difference between the two cases. In the user fee case, realisation of the government agenda on poverty eradication and focus on attaining the objectives of the PEAP enhanced evidence uptake. At the international level, global actors were also pushing to reduce poverty in LICs. The wider government agenda has been shown to influence uptake of evidence. For example, in China, findings on the impact of health expenditures on rural poverty had a direct impact on policy because this was in line with the broader government agenda of poverty reduction [16]. Similar findings have been documented in a comparative study of three countries in Africa [33]. This was also the case in Costa Rica where the visibility of regulating fatty acids at the international level was an important consideration for evidence uptake in the nutrition policy [64]. In the case of malaria treatment policy change, although the policy issue was not central to the government-wide agenda, there was a global push to change first-line malaria treatment.

Why would Middle Range Theory 2a and 2b differ?

Reflecting different results, the resulting MRT for each case is different for a number of reasons.

THE CONTENT OF THE POLICY (PROBLEM)

The policy problems involved in these two cases differ in terms of social and political implications. The nature of the problem, to some extent, determines the evidence required. In addition, the role evidence plays in policy development depends on the nature of the policy. Walt draws a distinction between 'high-politics' policies with wider social and political implications, and 'low-politics' policies dealing with more specialised issues with minimal social and political implications, such as biomedical policies [65]. Furthermore, Hanney *et al.* point out that in cases where the evidence is highly technical and specific, there is a greater probability that it will be utilised directly by policy makers without significant ideological or political considerations [40]. In the case of policies with wider social implications, the role of evidence may be less instrumental than in cases of technocratic nature, in this case, biomedical policies [66].

The malaria treatment policy change is a biomedical policy, so evidence would play a key role in informing decision making. The scientific rigour of the evidence will be important with reference to effectiveness of alternative drugs. Evidence would also be required to assess uptake of the new treatment policy, implementation feasibility and affordability. The close engagement of professional bodies, with technocratic decision makers and researchers will be crucial. In our study, in the case of malaria treatment policy change, there was high-quality contextualised evidence that was effectively disseminated. In addition, there was a close linkage between a regional professional network and decision makers. Evidence was used instrumentally and in a systematic manner, leading to a concrete policy decision.

On the other hand, the abolition of user fees is a social policy that directly concerns individual welfare. The scientific rigour of the evidence may not be central in the decision-making process and, indeed, community complaints feature strongly. Evidence was of varied quality and lacked systematic dissemination. Evidence was used 'conceptually' to discuss the issue without making a decision and 'symbolically' to justify a political decision.

POLICY PROCESSES IN THE TWO CASES DIFFER

The political window will provide different opportunities for KT based on the political implications of the decision. In the case of user fees, the timing of presidential elections provided an opportunity. This case is a clear example of Kingdon's problem, political and policy streams meeting up to form a policy window [67]. In the problem stream, there was agitation to try to get policy makers to focus on the problem of user fees. This agitation came from the community as complaints. Such agitation was presented to politicians, including those campaigning for the presidency at the time. In the political stream, the issue of user fees for health care was in the election manifesto of the two presidential candidates. Yet the policy

stream did have several proposals that were ongoing and were in fact advocated, like the proposal of the World Bank to make health care part of the market where one pays to get what they want. Presidential elections provided an opportunity for the three streams to meet and a window presented itself for a policy decision on user fee removal.

CONTEXT

The role of context in evidence uptake has been emphasised [16-17]. There are cases where lack of political support impacted the uptake of evidence. An example is the failure to adopt co-trimoxazole prophylaxis among HIV+ persons as policy in Zambia [32]. Another example is the delayed uptake of high-quality evidence from the medical male circumcision study in Uganda [42]. This also happened with the evidence uptake on indoor residual spraying for malaria vector control in Zimbabwe [33]. On the contrary, successful KT has been realised much faster amidst political support, as in the case of evidence uptake for fatty acids in the nutrition policy in Costa Rica [64]. The nature of the political system and the extent to which it is open to consultation and dialogue is important [19, 68].

We note that in the case of the abolition of user fees, the political process did not allow time for KT processes. The political context partly explains the nature of evidence use in this case study as stated by Weibel *et al.* that amidst opposition, evidence will be used symbolically against the opponent, while in cases of collaboration, evidence will be used conceptually to influence a change of beliefs [23]. Humphreys & Piot also caution that scientists need to be mindful of the fact that politicians are swayed by the possible electoral consequences of different policy options [17] and thus decisions contrary to political interest may be difficult despite the availability of evidence in their favour.

In the case of user fees, there was evidence for and against user fees; the policy direction differed between the political and technical groups [69-72]. The need for votes amidst political opposition could explain the symbolic use of evidence. Looking at the economic context, Mubyazi *et al.* documented a case in Tanzania where an inferior drug was adopted due to affordability concerns [28]. In the case of the malaria treatment policy change, affordability was indeed one of the considerations in the policy process. The institutional arrangements for policy-making have also been highlighted whereby restricted policy-making processes with minimal consultations are not open to evidence uptake [37, 73]. This is seen in our case of user fees where consultations were minimal, partnerships were informal, membership was restrictive and role of formal decision making institutions overtaken [37].

Strengths and weaknesses of the PhD thesis

Our study has several strengths. First, in developing the initial MRT, we undertook extensive review of the literature on KT in LICs and synthesised findings that were validated by policy makers and researchers in Uganda. This ensured that our MRT was contextualised to the realities of Uganda given that KT processes are context specific, as emphasised in the literature.

Second, our methods were well suited to study complexity, specifically, theory-driven inquiry, and the use of case studies. These enabled us to explore complexities of KT processes embedded in real contextual and stakeholder interactions. Third, the use of mixed methods and multiple data-collection methods provided a rich set of data to answer the research questions from multiple perspectives. Fourth, data collection was conducted by the PhD student who has worked in policy development in Uganda for a long time. Her experience provided an in-depth understanding of the context as well as easy access to key documents and selected respondents.

Our study also had several weaknesses. First, recall bias may have impacted the accuracy of responses, given the timing of the policy process and data collection. However, there was consistency among the responses, suggesting that perhaps recall bias was not that much of a problem. In addition, the recall bias was ameliorated by the use of multiple sources of data. Second, with the exception of researchers, we considered stakeholders to be organisations, institutions or units. We acknowledge that individuals may not necessarily represent the views of the institution in which they work but this was not explored in our study. We believe that member checking and presentation of preliminary findings to stakeholders in Uganda ameliorated this weakness. Third, it is possible that the stakeholders' levels of influence on and support for evidence uptake in policy could change at different stages of policy development, but this was also not assessed in our study. Fourth, we tried to rate the degree of consistency between available evidence and the decisions made at the different stages of policy development, but in reality the stages are not distinct, as the policy process is iterative. In the quantitative methods we used scales developed by Hanney, *et al* in rating the degree of consistence between the available evidence and policy decisions taken. Although this work was been published [40], the rating scales have not been validated in low income settings. Lastly, the direct impact of the abolition of user fees on peoples' welfare, which makes it politically attractive, may have affected the nature of responses in cases where some respondents may have had political inclinations, but this was not assessed in our study.

Conclusion of the PhD thesis

Amidst scarce resources, faced with the double burden of communicable and non-communicable diseases and a call for strengthening health systems to deliver effective health interventions and move towards universal health coverage, low-income countries continue to explore options and generate evidence to address prevailing challenges. The need to use evidence in decision making continues to be emphasised. There is no simple formula for improving evidence uptake in policy making but a better understanding of facilitating factors and the interactions of stakeholders in KT can help researchers and advocates improve the uptake of evidence [32]. We refined our MRT in line with the cross-case analysis looking at repeated patterns and differences between the cases, and discussing these in light of the published literature.

We refined our MRT on KT in Uganda as shown in Box 4 and Figure 5.

Box 4: Refined Middle Range Theory on improving uptake of evidence in public health policy development

"High quality and contextualised evidence will be taken up in policies so as to lead to evidence informed policies through a process of KT, whereby the nature of the problem, stakeholder interactions, the overall government policy and the political agenda can be expected to play a role".

Evidence to guide decision making must be: from multiple perspectives, contextualised, able to provide economically feasible recommendations, and produced in a timely manner by credible researchers. Use of local researchers is helpful but the roles of researchers and policy makers must be separate. There is a need for effective and tailored dissemination of evidence to communities and influential stakeholders.

KT requires strengthened MoH institutional capacity to lead the KT process. Institutionalised platforms for engagement between researchers and policy makers, including civil society, need to be in place. The mechanisms to coordinate evidence generation and synthesis need to be mainstreamed within the MoH, although regional professional bodies also play a role and the intervention of the WHO is also helpful. Policy makers' skills in knowledge management need to be strengthened and the policy-making process must be minimally bureaucratic.

Partnerships for KT need to be in place and all stakeholders must be involved throughout the process to improve trust and build interest. Building a culture of partnerships in health policy development enhances trust. Communities need to be involved in evidence generation and translation. Stakeholders play different roles and their level of influence on and support for KT processes will vary based on the nature of the policy, the evidence available, and their level of interest in the issue under consideration. There is need to devise mechanisms for stakeholder engagement and resolving conflicts of interest.

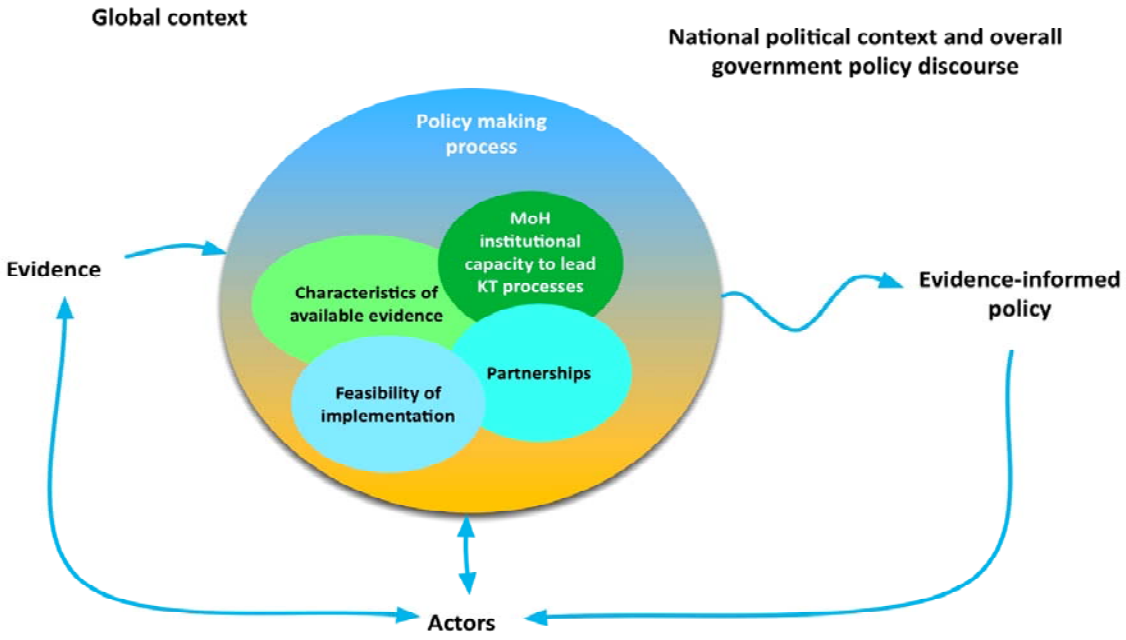
Feasibility of implementation: Availability of tools and inputs to implement evidence is crucial. Funding must be available, operational tools must be provided, and implementers must receive required training.

A favorable political context in which a political window provides an opportunity for KT is helpful.

Evidence which aligns with the overall government policy agenda is likely to be considered.

Such KT processes contribute to more ownership and adoption, and to better application of evidence, but the nature of the problem may moderate this uptake: evidence concerning non-contested, 'technical' issues, will be more easily taken up than evidence of contested issues.

Figure 5: Diagramatic presentation Middle Range Theory 3



Lessons learnt

We have studied the uptake of evidence in policy development from a policy-making perspective. Although this allowed us to assess the impact of evidence from several sources, it is difficult to disaggregate which type of evidence was significant for a given policy decision. Different types of evidence are likely to influence policies and stages of policy development differently [40], and the iterative nature of policy development does not seem to allow such an assessment.

Alternatively, we could have considered a tightly defined focus where specific pieces of evidence are followed to assess how and to what extent they informed decision making. The challenge, however, is that a single piece of evidence on its own may not lead to any decision; more often, it is accumulated evidence from different sources that impels action or change of belief. In addition, evidence is defined broadly beyond scientific evidence and in instances where certain pieces of evidence may not be documented, for example, community complaints; these will be difficult to follow through. In this case, the latter option would not be adequate.

Theory-driven methods are well suited to study KT processes as their complexities can be explored. Complex interactions between actors and the evidence, policy process and context can be studied whilst linking theory to empirical research.

We employed a *case-study* approach that was indeed suited for the study given its ability to study complexity. We endeavoured to define the boundaries of the case study with regards to timeframe and geographical area (restricted to Uganda) but noted that this may not always hold. For example, policy decisions encompass the global arena whereby influential partners who may not have an in-country presence may be making a decision at the global level. This poses a challenge as KT processes take place at a country level and decisions are made in platforms for engagement with in-country partners where some of the influential global partners may not be present. The extent to which country level decisions prevail over global decisions is difficult to ascertain. In our case studies, for the case on malaria treatment policy change, influential global partners included the Novartis Pharmaceutical Company and the GFATM. The same dilemma may arise even in cases where some partners have an in-country presence but agency positions are determined at a headquarter level.

We have appropriately used *mixed methods* in undertaking this study as qualitative methods adequately address complexity and allow for flexibility to probe and explore issues in depth. In addition, quantitative methods enhance comprehensiveness. However, quantitative methods in KT need further refinement. We have used the rating scales developed by Hanney *et al.* for rating the consistency between evidence and policy decisions. These are in the form of descriptive scales of the degree of research utilisation [40]. Different parameters are rated on a scale of 1 to 4 for levels of agreement. Several concerns arise; one is the subjective nature of the responses which may also be influenced by the agency position on a given policy issue and the roles they played in the KT process. In addition, Buxton *et al.* caution that consistency of research findings with policy may not automatically imply that particular findings influenced decision making [74]. There is a need to further validate the rating scale developed by Hanney *et al.* in different settings to assess the extent to which it reflects reality. Other quantitative techniques that have been attempted include altmetrics, measuring formal citation counts, citations in specialist platforms, mass-media references and data from publishers, such as web page views, PDF downloads, and number of presentations to policy makers [75]. However, this has several limitations, including a restricted definition of evidence, limited access to journal articles and specialised platforms especially in low-income countries, and the failure to link citations and numerical records to concrete policy decisions.

Implications for policy

Results of this study contribute to ongoing efforts to improve uptake of evidence in policy development in Uganda but also provide lessons for other LICs that wish to maximise the uptake of evidence in policy development. There is a need to rethink KT and appreciate that it is a lengthy process, including evidence generation, synthesis and interpretation, and subsequent application just as the definition entails…"dynamic and iterative process that

includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system". KT therefore has to be planned for, funded, required capacity built and mainstreamed in health policy processes and decision making. KT however needs to be tailored to the nature of the policy because the process will differ depending on the extent to which the policy issue is polarising or salient. Different actors define evidence in different ways, and their level of influence impacts the evidence that is considered; hence the need to take this diversity into consideration in the dissemination process.

We do not attempt to rank the level of importance of the different parameters in the refined MRT but emphasise the importance of partnerships in KT. Stakeholder involvement needs to start at the evidence synthesis stage and will require more effort and time if the issue is contested (low agreement). In addition, we do not suggest that all parameters in the MRT need to be present in order to realise successful KT although the more you have the better. Evidence uptake may contribute to consensus building when the policy issue is contested. In that, actors take a policy decision that is not influenced by other interests although the extent to which this is realised will depend on how strong the partnership is with regards to mutual trust and inclusiveness.

Our refined MRT can be used as a starting point but caution needs to be exercised: contexts will differ and stakeholders' interactions will to some extent be influenced by the nature of the policy and the evidence available. However, there are repeated patterns with regard to facilitating factors and roles played across the two cases that may apply to most policies. These repeated patterns are not exhaustive as each policy case has some unique factors. This means that each policy may have additional specific factors based on the nature of that policy and the evidence and stakeholders involved. These may be added to what we have demonstrated to be repeated patterns with regards to facilitating factors and roles played by actors.

The objective use of evidence in donor-dependent countries remains a challenge, and part of the solution lies in having strong MoH structures to coordinate prioritized research agendas and KT processes. In this regard, the strengthened capacity of MoH to lead KT processes is crucial. Policy actors require evidence informing different aspects of decision making. Although the generation of comprehensive evidence takes time, it remains the best option in order to assess all aspects of policy implications and the feasibility of implementation. Such efforts will need to be planned prior to embarking on the policymaking process. In addition, consensus needs to be reached on available evidence and the possible course of action, and this will enable all available resources to be harnessed to facilitate implementation, thus, enhancing getting evidence into practice.

Implications for further research

The refinement of the MRT would have benefitted from more case studies but this was not possible due to time and resource constraints. Testing our MRT with more policy cases and in

different settings may contribute to further refinement and enhance the extent to which it can be generalised.

Our study has also highlighted other factors which would require more exploration to assess whether outcomes would be different if they were in place, in reference to polices categorised as high issue polarisation. These included effective and well-coordinated dissemination of evidence, stakeholders reaching a consensus on the available evidence, the MoH having the negotiating power to take a preferred course of action in line with evidence, and reducing the turnover of senior officers to ensure continuity.

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Annex I

Table 2: Roles played by different actors: a comparison of Middle Range Theories

Stakeholder	MRT 1	MRT 2a	MRT 2b	Roles played by actors in MRT 2a and 2b
MoH	Evidence uptake	Adapting and implementing policy	Generating evidence	Evidence uptake
	Establishing KT platforms	Decision making	Disseminating evidence	
		Establishing KT platforms	Establishing KT platforms	Establishing KT platforms
			Advocacy	
			Implementing policy	
MoF		Providing funds	Providing funds	Providing funds
			Generating evidence	
			Engaging in policy development	
Parliament	Disseminating evidence	Disseminating evidence and information on the policy change		
	Community mobilisation	Community mobilisation		
NMS		Supplying drugs		
NDA		Regulating medicines		
Health managers at district level Service providers at the national level		Providing evidence, participating in the policy process	Implementing policy	Implementing policy
Service providers at		Implementing policy		

local levels				
Researchers	Generating evidence	Providing evidence	Generating evidence	Generating evidence
		Participating in the policy process		
Media	Disseminating evidence		Disseminating evidence	Disseminating evidence
Donors	Funding research and implementation of evidence	Funding the policy change	Generating evidence	Providing funding
		Providing evidence and technical assistance	Disseminating evidence	Generating evidence
		Participating in the policy process	Providing funding	
		Funding research	Advocacy	
		Providing free medicines (AL)		
CSOs	Evidence uptake	Participating in policy discussions	Generating evidence	Participating in research processes
	Disseminating evidence	Participating in research	Disseminating evidence	Advocacy
	Advocating for the implementation of evidence	Implementation and monitoring of the new policy	Advocacy	
		Advocacy		
Communities	Participation in research processes	Beneficiaries of the policy change	Beneficiaries of the policy change	Beneficiaries of the policy change
Pharmaceutical companies		Manufacturing medicines		
		Importing drugs		
Local leaders		Disseminating information on the policy change		

		Disseminating information on the policy change		
Private sector - companies		Advocacy		
		Publicity		
		Donating medicines		

CSO: Civil Society Organization; KT: Knowledge Translation; MRT: Middle Range Theory; MoH: Ministry of Health; MoF: Ministry of Finance; NDA: National Drug Authority; NMS: National Medical Store