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DEVELOPMENT DISSERTATION BRIEF

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CLOSING THE QUALITY GAP

Investigating health system bottlenecks and quality improvement strategies for maternal and newborn care in Sub Saharan Africa, focusing on Tanzania



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***Investigating health system bottlenecks and quality improvement
strategies for maternal and newborn care in Sub Saharan Africa,
focusing on Tanzania***

Ulrika Baker

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till

Expertgruppen för Biståndsanalys (EBA)

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ABSTRACT

Maternal and newborn deaths and stillbirths remain high in Sub Saharan Africa. The majority of these could be prevented through timely and effective care, but implementation is challenging in low resourced settings. Despite the large increases achieved in access to care, the expected gains in survival for mothers and newborns have therefore not materialised, giving rise to the concept of a *quality gap*.

Closing this quality gap is a global health priority and the contribution of this thesis was to provide an understanding of its underlying causes, to develop and apply approaches to measure its characteristics and to evaluate quality improvement strategies to address it.

The insights gained are of relevance for Swedish development cooperation within global gender equality and equal health. Policy recommendations include to: (1) support strengthening and use of health information to reflect quality of care and to enable identification of bottlenecks; (2) target unpredictability within health systems and promote health programmes that can be supported reliably and sustained over time; (3) support countries to achieve greater coordination of programs implemented by external partners, especially at the district level; and (4) promote contextually appropriate improvement strategies through prioritising health workers' need for support in every day practice.

BACKGROUND

In Sub Saharan Africa (SSA), maternal and newborn deaths remain high. 200,000 mothers and 1 million newborns die every year, and an additional 1 million babies are stillborn (Alkema et al., 2016, You et al., 2015, Blencowe et al., 2016, Liu et al., 2017, UN, 2015a, WHO, 2015).

The majority of these deaths occur during a critical forty-eight-hour window around childbirth (Lawn et al., 2014, Kinney et al., 2010); the majority of mothers due to excessive bleeding, high blood pressure, severe infections and complications from abortions (Say et al., 2014). The leading causes of newborn deaths include being born too soon, lack of oxygen occurring during childbirth and severe infections (Liu et al., 2017). Approximately half of all babies who are stillborn are also due to complications arising during childbirth (Lawn et al., 2011).

Sadly, the famous quote by Mahmoud Fathalla '*Women are not dying because of diseases we cannot treat. They are dying because societies have yet to make the decision that their lives are worth saving*' still holds (Fathalla, 2012). While the United Nations Human Rights Council recognised avoidable maternal deaths as a human rights violation in 2009 (Hammonds and Ooms, 2014), declarations alone do not easily translate to rights on the ground. Countries in SSA are largely dependent on external funding to support their maternal and newborn health policies (Mann et al., 2016) but while external financing for global health has increased overall, that for maternal and newborn health has proportionally increased much less than that for HIV/AIDS, malaria and TB (Ooms et al., 2012). One reason for this is that effective maternal and newborn care depends on the functionality of the entire health system, contrary to other vertical programs (Shiffman and Smith, 2007).

The reality is that *the majority of maternal and newborn deaths could be prevented* if all mothers and newborns received adequate and timely care; and what is more, *the potential to receive such care has never been higher* (Bhutta et al., 2014). Access to and utilisation of health services has increased with nearly all mothers in Tanzania, the country of focus for this thesis, attending antenatal care (ANC) at least once during their pregnancy. Over sixty percent of mothers nationwide give birth in a health facility and in some regions, this proportion reaches much higher (Ministry of Health et al., 2016).

In light of the existence of effective medical interventions that could significantly reduce the high maternal and newborn mortality in many parts of SSA, what are the key challenges ahead? Where should the focus be as we move from the Millennium Development Goals (MDGs) to the Sustainable Development Goals (SDGs) which aim to reduce the global maternal mortality ratio (MMR) to 70 per 100,000 live births and the Newborn Mortality Rate (NMR) to no more than 12 per 1000 by the year 2030 (UN, 2015b)? The answers to these questions are of high relevance for Swedish development cooperation in its aim to promote global gender equality and equal health.

A key challenge is that, in many settings, the encouraging increase in access to care has not translated into the expected gains in survival (Hurst et al., 2015, Randive et al., 2013, Koblinsky et al., 2016, Tuncalp et al., 2015, Fink et al., 2015). This discrepancy has given rise to the concept of a *quality gap*; implying that the *content* of care provided to mothers and newborns when they reach health facilities is of insufficient quality to have a substantial impact on reducing deaths (Koblinsky et al., 2016, Graham et al., 2013, Miller et al., 2016). It has been estimated that closure of this *quality gap* alone, by providing better care to all those mothers and newborns *already*

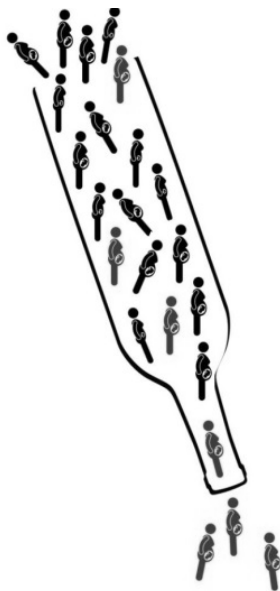
reaching health facilities, could prevent the deaths of 100,000 mothers, 500,000 still births and 1 million newborns world-wide by the year 2020 (Bhutta et al., 2014).

The urgent need to close this quality gap has led the World Health Organization (WHO) to establish a Quality of Care (QOC) network across several countries in Sub Saharan Africa, including in Tanzania, which has developed 'Standards for improving quality of maternal and newborn care in health facilities' (WHO, 2016). QoC in these standards is defined as *'The extent to which health care services provided to individuals and patient populations improve desired health outcomes. In order to achieve this, health care needs to be safe, effective, timely, efficient, equitable, and people-centred'* (Tuncalp et al., 2015).

Ultimately, the implementation of these WHO standards relies on *skilled health workers* who need to be *appropriately supported* to provide evidence-based, safe and respectful care (Campbell, 2013, Darmstadt et al., 2013, WHO, 2004). Many of the Quality Improvement (QI) strategies promoted by various organisations also target health workers' performance through for example *Pay for performance* programmes, *Standards-based management and recognition* and *Clinical Decision Support Systems (CDSS)* (Sukums et al., 2015, Binyaruka et al., 2015, Necochea et al., 2015, Raven et al., 2011, Mazzocato et al., 2016, Kamiya et al., 2016). Health workers are often engaged as both *recipients* and *implementers* of these QI strategies, many of which are implemented in parallel in the same health facilities (Campbell, 2013). Evaluating how health workers themselves perceive these strategies, and whether these strategies meet health workers' perceived needs for support, is therefore essential. In this thesis two commonly applied quality improvement (QI) strategies used in maternal and newborn care in SSA are investigated: Clinical Practice Guidelines (CPGs) (Woolf et al., 1999) and

collaborative QI based on the Institute for Healthcare Improvement's *Breakthrough series* (Kilo, 1998).

Figure 1: Bottleneck illustration.



Note: Pregnant mothers inside the bottle are all in need of the same health care but the bottleneck limits those who receive it.

A fundamental starting point to improve care and close the quality gap is *metrics*; indicators that reflect the care that mothers and newborns receive. Such indicators are needed to track progress and to direct quality improvement initiatives. ‘*What gets measured gets done*’ is a commonly held conviction (UN, 2015a). During the MDG era, the main indicator used to track progress in maternal and newborn health was the *coverage*, or *proportion*, of mothers giving birth in the presence of a Skilled Birth Attendant (SBA) (Victora et al.), reflecting *contact* with or *utilisation* of care. While the presence of a SBA is essential for mothers and newborns to receive quality health care, this indicator in itself does not reveal what care is actually provided. It is therefore crucial to develop metrics that reflect QoC

that can be used to estimate *effective coverage*, defined as the proportion of mothers and newborns who *receive interventions of sufficient quality to have an impact on morbidity and mortality*.

Coverage estimates at different levels of health care implementation can also be used to identify *bottlenecks* (Fig 1). A bottleneck can be defined as: “*that component of a system which limits the overall capacity or performance of that system*”. Efforts spent strengthening or improving a system without

targeting its bottlenecks will therefore have little or no effect and it would make sense to identify and target bottlenecks within a system, to optimise improvements within a given area of care (Langley, 2009). This has been suggested as a priority area in maternal and newborn health (Bhutta et al., 2010).

In a seminal paper from 1978, Tanahashi presented an approach to measuring coverage of health services and to identify bottlenecks in their implementation (Tanahashi, 1978). He proposed five *conditional* stages of coverage: availability, accessibility, acceptability, contact and effective coverage of care. The first three stages represented the health system's *capacity* to provide care, and the last two the health system's *output* in terms of the achieved coverage. The Tanahashi approach has since been adapted and used by organisations such as UNICEF and the World Bank in their tool on *Marginal Budgeting for Bottlenecks* (Carrera et al., 2012). At the district level, UNICEF has used a modified Tanahashi approach to measure coverage of the *availability of essential commodities, trained human resources, physical accessibility of service delivery points, initial and continuous utilisation and effective coverage* (O'Connell and Sharkey, 2013). At the national level, large multi-country consultations have been conducted to identify bottlenecks using the *Maternal and newborn bottleneck analysis tool* (Dickson et al., 2014, Sharma et al., 2015). In all these approaches, the bottleneck analogy has been used synonymously with *barrier* to achieve effective coverage (Sharma et al., 2015). What has been missing is the link between utilisation of a health service, the capacity of that service and the consequent delivery of care; missing the opportunity to enable a step-wise analysis of an implementation pathway of health care that could point to the *level* of bottlenecks within the health system. In this thesis, a new methodology is developed and applied to fill this gap.

“The route to effective coverage is through the health worker, there are no shortcuts,” the title of a viewpoint by Campbell, reiterates the central role of health workers in closing the quality gap and to achieve effective coverage (Campbell, 2013). A firm understanding of health workers’ experiences, perceptions and needs to provide maternal and newborn care is therefore necessary. While external assessments of QoC, health facility readiness (the capacity of health facilities to provide care) and patients’ satisfaction are important; health workers’ perspectives have been less explored. How do health workers themselves identify good QoC and how do they experience the conditions for providing such care? These questions are also investigated in this thesis.

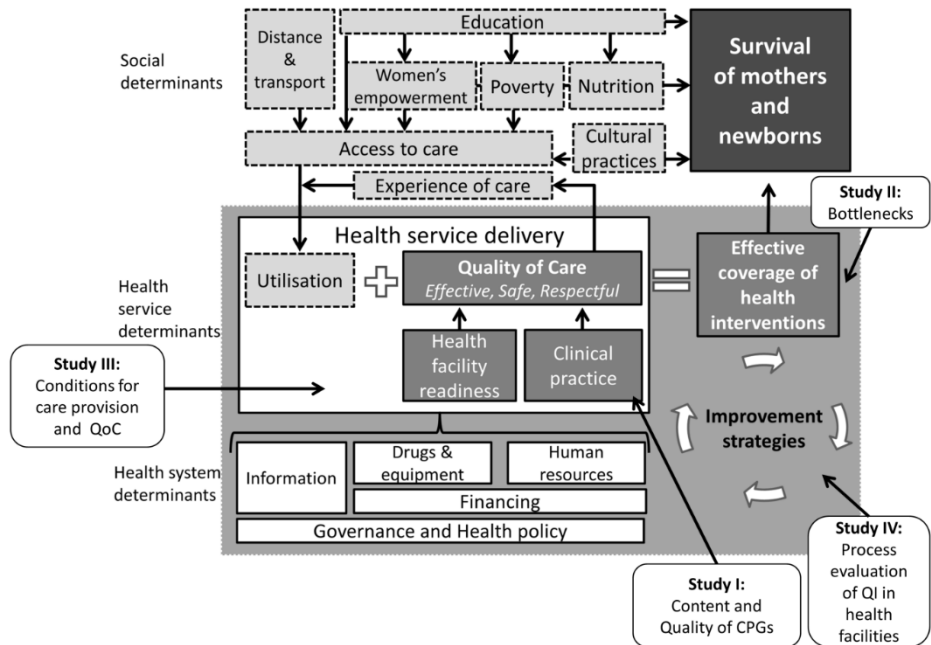
AIM AND OBJECTIVES

The aim of this thesis was to contribute to closing the quality gap, through estimating effective coverage of maternal and newborn care, assessing implementation bottlenecks in district health systems and to evaluate quality improvement strategies to address these.

The specific objectives included to: (1) assess attributes related to the use of Clinical Practice Guidelines for maternal health care in Burkina Faso, Ghana and Tanzania; (2) estimate the effective coverage of maternal and newborn health care and to identify bottlenecks in implementation in two rural Tanzanian districts; (3) examine health worker perspectives of the conditions for providing maternal and newborn and (4) investigate health workers’ perceptions of a collaborative quality improvement intervention in rural Tanzanian health facilities.

THESIS FRAMEWORK

A framework was developed to illustrate the focus of the thesis in the context of the complex web of determinants that influence maternal and newborn health (Fig 2). It was inspired by and incorporates work of Tanahashi (Tanahashi, 1978), Thaddaeus and Maine (Thaddeus and Maine, 1994), Donabedian (Donabedian, 2003), Adam and Savigny (De Savigny 2009) and Tuncalp et al (Tuncalp et al., 2015). The framework outlines three levels of determinants: *health system*, *health service* and *social determinants* (including socio-economic and socio-cultural determinants). The six WHO building blocks of the health system (De Savigny 2009) are outlined in white boxes. *Health service delivery*, one of the building blocks, has been placed in the centre of the framework, its components outlined in more detail. The functions of the other five building blocks are conceptualised as supporting health service delivery; be it promotive, preventive, curative or palliative. Health service delivery, the route to achieving effective coverage of health interventions, is conceptualised as a function of mothers' *utilisation* of health services and the *QoC* they receive (Campbell, 2013). *QoC* is here briefly described as being effective, safe and respectful (Godlee, 2009). Mothers' experience of the care they receive can modify the relationship between access and utilisation in that even when mothers have access to care, they may choose not to utilise it if they have experienced poor care (Tuncalp et al., 2015). *QoC* is directly determined by the level of *Health Facility Readiness* and the nature of *Clinical Practice*; and indirectly by the other health system building blocks. Utilisation is determined by *access to care* which in turn is determined by the various social factors; some of which also affect survival independently.

Figure 2: Thesis framework

Note: The focus of the thesis is contained within the light grey box. Areas for the individual studies are indicated.

STUDY SETTING

The studies in this thesis were conducted in the context of two intervention research projects funded by the EU: QUALMAT (Quality of Maternal and Prenatal Care: Bridging the Know-do Gap) and EQUIP (Expanded Quality Management Using Information Power) (Blank et al., 2013, Hanson et al., 2014).

QUALMAT was implemented in Burkina Faso, Ghana and Tanzania in 2009-2013 and aimed to improve quality of care through the introduction of a computer based Clinical Decision Support System (CDSS). Pre-intervention research for this project provided the setting for Study I; the results of which provided background information for the development and adaptation of the CDSS to the respective national contexts.

EQUIP was implemented in 2011-2014 in one rural district in Uganda and one rural district in Tanzania which is where studies II-IV of this PhD were conducted. It was a *collaborative QI* intervention involving the community, health facility and district levels with the aim to increase both utilisation and QoC for mothers and newborns and (Kilo, 1998, Hanson et al., 2014). In every health facility, quality improvement teams (QITs) were formed and facilitated to use *Plan-Do-Study-Act (PDSA) cycles* to structure problem solving and test *change ideas* in relation to prioritised *improvement topics*. Progress over time was monitored on *run-charts*. (Hanson et al., 2014). Every month, QITs received *mentoring and coaching* visits carried out by an *EQUIP mentor* together with a *district mentor* in individual health facilities. New improvement topics were introduced and experiences shared between QITs during *Learning sessions* for a cluster of health facilities every 3-4 months. Parallel with the collaborative QI intervention, continuous household surveys and repeat health facility census surveys were implemented in the intervention district as well as a neighbouring non-intervention district (Marchant et al., 2014). Data from these surveys were used to monitor the ongoing QI activities and to evaluate the impact of EQUIP at the end of the project (Hanson et al., 2014). Study II utilised data from these surveys and study IV evaluated health workers' perceptions of the *components* of EQUIP intervention in health facilities. Study III was

conducted in the EQUIP intervention district but the objective was independent from the EQUIP project itself.

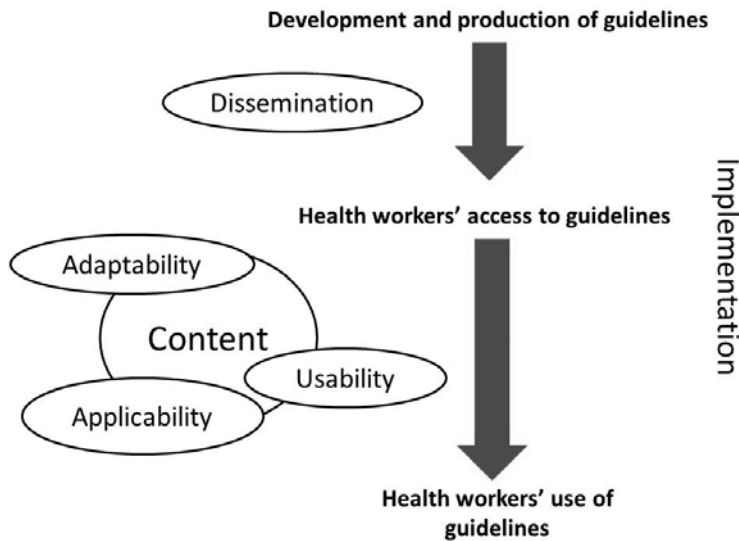
Tandahimba district, where EQUIP was implemented, is located in Mtwara region, on the Makonde plateau in rural southern Tanzania, close to the border of Mozambique. Islam is the main religion and the cultural tradition is matrilineal (Sakamoto, 2008). Tandahimba has a population of about 200,000 people; predominantly subsistence farmers, but there is also cashew nut farming serving as cash crop. The road network within the district becomes muddy during the rainy season, making transport difficult (Tandahimba-District-Council, 2011-2012). The district has 32 health facilities which provide maternal and newborn care; all of them are government facilities apart from one health centre which is faith-based. There is a severe shortage of health workers with 52% of clinical posts vacant in the district (Tandahimba-District-Council, 2011-2012). Lower cadre health workers, such as medical attendants, often have to take on the responsibilities of higher cadre health workers such as nurses and midwives. This unofficial task sharing may for example include to assist women during childbirth (Tandahimba-District-Council, 2011-2012).

METHODS

A mix of study designs was used to address the objectives in this thesis; all of which relate to the growing field of *implementation science*. This field has been defined simply as “*the scientific enquiry into questions concerning implementation*” (Peters; et al., 2013) and more elaborately as “*the scientific enquiry into questions concerning implementation—the act of carrying an intention into effect, which in health research can be policies, programmes, or individual practices (collectively called interventions)*” (Peters et al., 2013).

The focus of implementation research is “*to understand not only what is and isn’t working , but how and why implementation is going right or wrong, and testing approaches to improve it*” (Peters; et al., 2013).

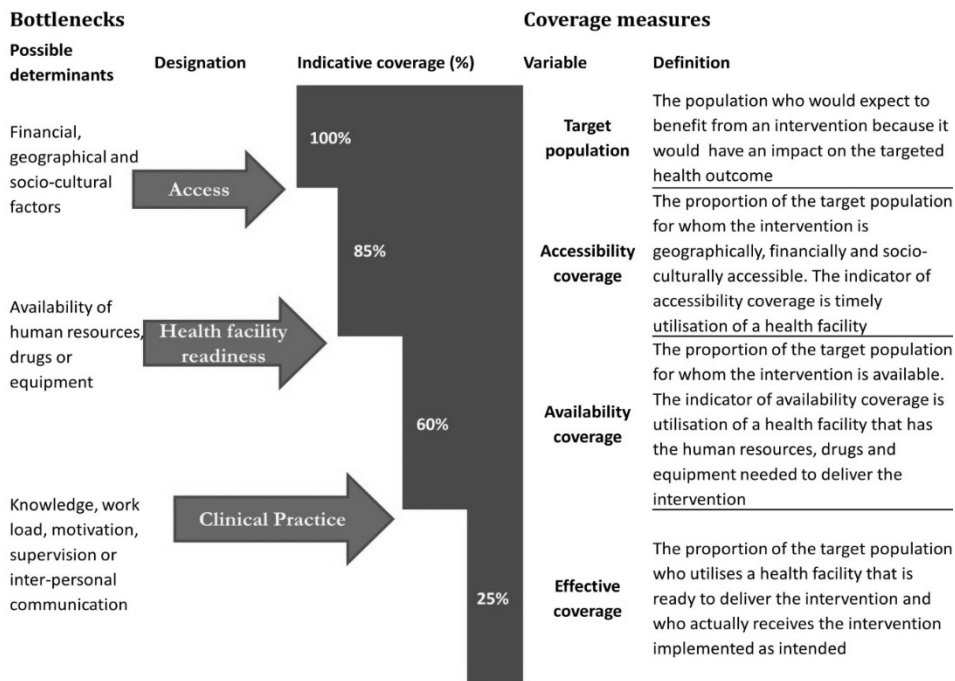
Figure 3: Framework for cross-country comparison of Clinical Practice Guidelines



Study I was a multiple case studies of maternal health CPGs across Burkina Faso, Ghana and Tanzania. It involved document review and interviews with key stakeholders engaged in the development and use of the guidelines. The framework developed to guide analysis and presentation of results (Fig 3) illustrates the process from development and production of CPGs, to health workers' access to and use of them; influenced by the content, user-friendliness, applicability to individual patient care and their adaptability to different needs (Gagliardi et al., 2011b).

In Study II, information from the EQUIP household and health facility surveys were used to estimate effective coverage and bottlenecks in the implementation of five maternal and newborn health care interventions recommended by the WHO (PMNCH, 2011). These included *Screening for syphilis and pre-eclampsia during pregnancy*, use of a *Partograph* to monitor progress and detect complications during childbirth, *Active Management of the Third Stage of Labour* (AMTSL) to prevent bleeding after childbirth and *Postpartum care* (care after childbirth) in a health facility. The approach to analysis, *the implementation pathway*, was developed as part of the study and was an adaptation of the original Tanahashi model and allowed for estimates of achieved coverage of an intervention in three conditional stages of its implementation (Fig 4). Bottlenecks were identified from the absolute drop in coverage between these stages and designated as bottlenecks in *access*, *health facility readiness* or *clinical practice*.

Figure 4: Implementation pathway



Study III was a qualitative study, based on in-depth interviews with health workers. It used a grounded theory approach to analysis which is useful when the aim is to contribute to knowledge about a phenomena which is broader than and relevant to a wider context than the immediate setting of the study (Charmaz, 2013, Bowling, 2014). With the objective to gain an understanding of the fundamental conditions for care provision in a low-resourced rural health system setting, this approach allowed the analysis to go beyond individual health worker accounts and identify a common thread.

Study IV was a qualitative process evaluation of the EQUIP intervention in health facilities with the objective to investigate which *components* of EQUIP met the perceived needs of health workers, and therefore contributed to how and why the intervention worked, also labelled “*mechanisms of effect*”. This focus has been emphasised as one of the key areas of *process evaluations* by the Medical Research Council (MRC) in the United Kingdom (Moore et al., 2015). Process evaluations are vital in the quest to illuminate the “black box of implementation”, to be able to learn about *how* interventions work, not just *if* they work (Moore et al., 2015, Fraser; et al., 2009). The analysis was based on in-depth interviews with health workers and guided by an implementation science framework: the *integrated Promoting Action on Research Implementation in Health Services* (i-PARIHS) framework (Nilsen, 2015, Harvey and Kitson, 2016, Kitson et al., 1998).

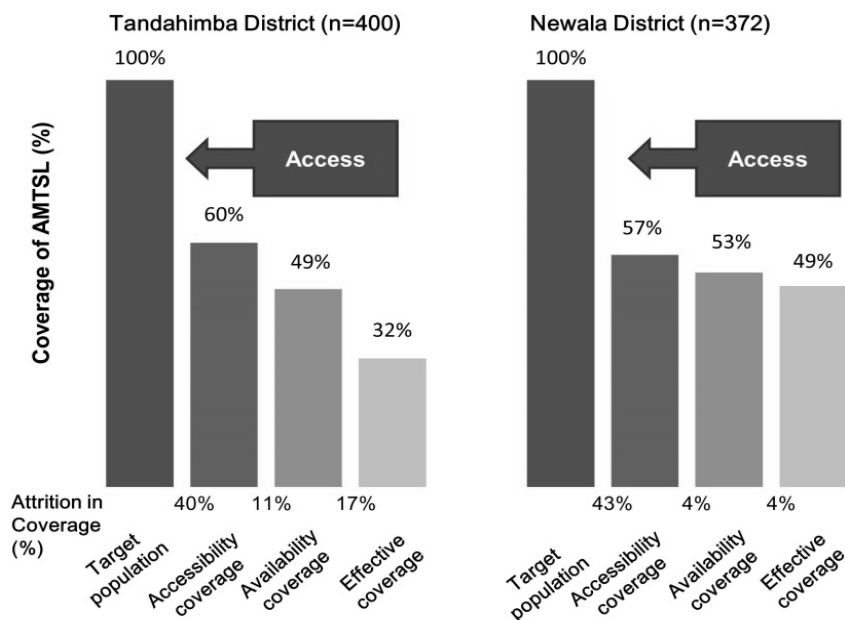
FINDINGS AND DISCUSSION

Focusing on Tanzania and primarily the perspective of health workers, the results from this thesis provides new knowledge that can inform current efforts to address the quality gap in maternal and newborn care in rural Sub Saharan Africa.

Low effective coverage and district specific bottlenecks

The application of the ‘implementation pathway’ approach to estimate effective coverage and identify implementation bottlenecks revealed that less than 50% of mothers and newborns received care of sufficient quality in two rural Tanzanian districts. Variations were however substantial (range of effective coverage: 3% - 49%) depending on the health care intervention.

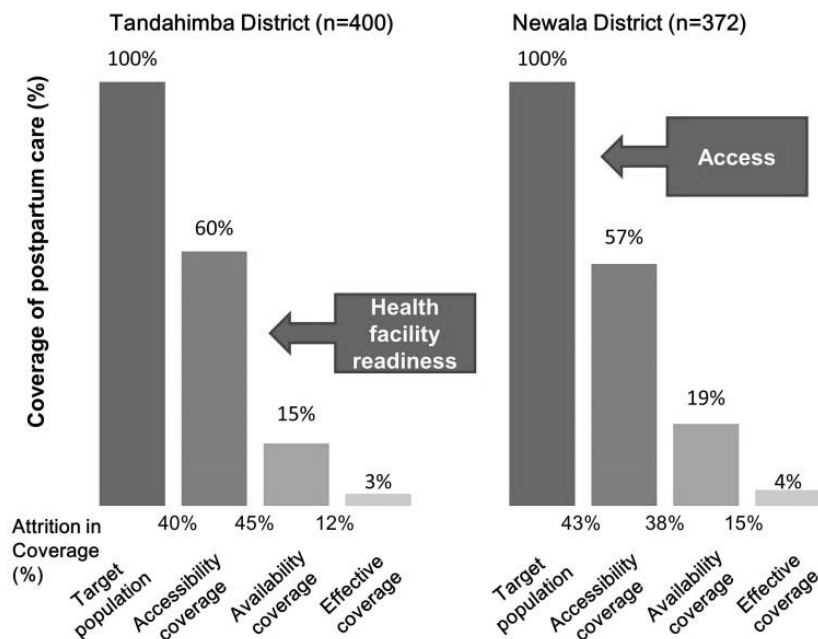
Figure 5: Implementation pathway diagram for AMTSL



The highest effective coverage was seen for AMTSL, prevention of bleeding after childbirth (32 % in Tandahimba and 49% in Newala, the EQUIP non-intervention district) where the largest bottleneck was access to care, indicating that the quality gap, the discrepancy between utilisation of care and the quality of care provided, for this intervention was small (Fig 5).

Care within 48 hours of childbirth had the lowest effective coverage in both districts (Fig 6). Here, the largest bottleneck was caused by poor health facility readiness, specifically a lack of iron tablets. The inability of the health system to ensure consistent availability of iron, an essential and inexpensive nutritional supplement, has been confirmed in other studies from both Tanzania and other countries in SSA (Maina-Gathigi et al., 2013, Young et al., 2009). While this inability indicates an overall weakness of the health system, it is also an example of how disintegrated funding streams for maternal and newborn health commodities results in substantial variation in availability coverage depending on the area of health care (Baker et al., 2015, Unger et al., 2009, Ahsan, 2012).

Figure 6: Implementation pathway diagram for Postpartum care



Within districts, implementation bottlenecks were similar for 4 out of 5 health interventions (AMTSL excluded) but between districts the *levels* of bottlenecks differed. This difference points to a variability in local health system functioning, which remains concealed by national or regional assessments. In Tandahimba, poor health facility readiness was the largest bottleneck in implementing the majority of health interventions, whereas in Newala, the largest bottleneck was access to a health facility. This implies that the quality gap was smaller in Newala than in Tandahimba at the time of the study. The utility of conducting bottleneck analyses at the district level is strengthened by this finding. It also shows the importance of

disentangling the reasons behind low effective coverage, in order to target the largest bottlenecks at the right level, which could result in greater improvements, contributing towards closing the quality gap.

Clinical practice as a major bottleneck, was only observed for one health care intervention - Syphilis screening and treatment - the same finding in both districts. This suggests that limited access to care and poor health facility readiness were overall more important bottlenecks than clinical practice at the time of the study. This is an important learning point for QI programs targeting health worker performance in a district where the main bottleneck is *not* clinical practice. It may also, as we shall see below, be demotivating for health workers to engage in QI activities in the context of an unsupportive system.

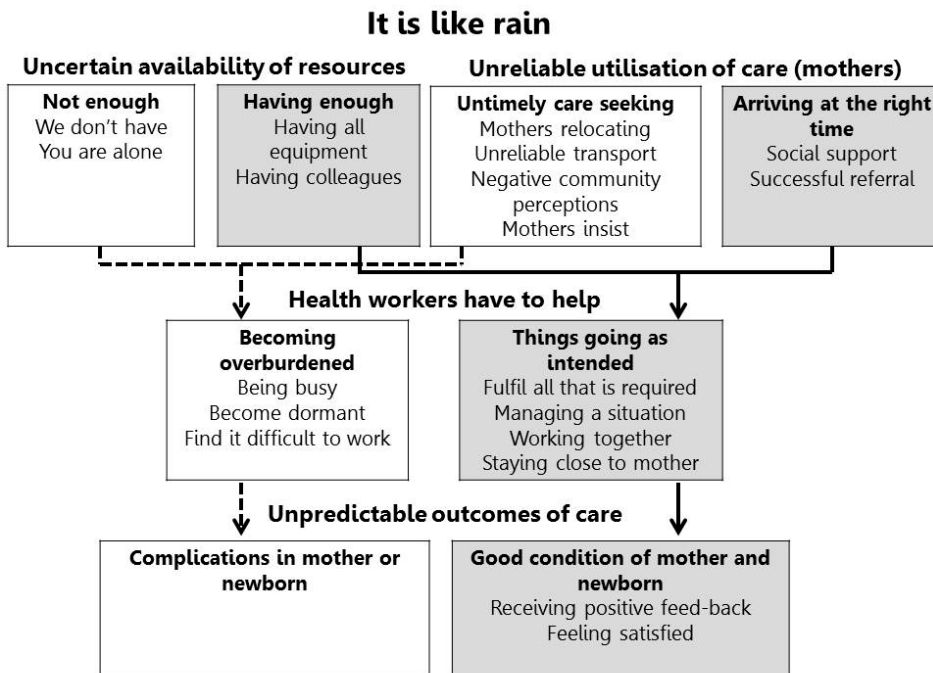
Unpredictability dictates care provision

While health facility readiness was identified as a major bottleneck in achieving effective coverage in Tandahimba district, the analysis of health workers' perspectives in the same district suggests that this readiness is not only insufficient, but uncertain and varies over time; something which cannot be easily detected in cross-sectional studies conducted at one point in time.

Unpredictability was indeed identified as the fundamental condition for maternal and newborn care provision; permeating all aspects of the district health service, not only in terms of health facility readiness but also in terms of mothers' utilisation of care. One health worker expressed this as '*it is like rain*', which was chosen as the label for the core category of the results (Fig 7).

The essence of ‘it is like rain’ is the inherent unpredictability of the conditions influencing maternal and newborn care, as perceived by health workers. One cannot be certain that mothers will come at the right time or that transport will be available. One cannot depend on a regular supply of sufficient medicines or functioning equipment. Colleagues may or may not be available to help manage an unforeseeable work load or a difficult case.

Figure 7: Study III results framework



Note: Four main categories were linked to the core category: ‘uncertain availability of resources’, ‘unreliable utilisation of care by mothers’, ‘health workers have to help’ and ‘unpredictable outcomes of care’. Each of these contained two sub-categories: one containing the conditions that challenge care provision or perceptions of poor quality care, and one containing enabling conditions or perceptions of good quality of care.

‘It is like rain’ also represents a sense of being out of control; that circumstances are dictated from higher levels of the system while as a health worker, one is left with no choice but to handle the situation on the ground. Health workers’ perceptions of these conditions were closely linked to how they identify good quality of care. When things go as intended, when circumstances are predictable and the system reliable, care provision was more likely to be perceived as successful.

The concept of unpredictability implies a lack of knowledge of future circumstances; whether and when a situation will change and what its characteristics may be. It offers an alternative view of what characterises a weak health system; its features not being merely a lack of resources or deficient processes, but a fluctuation in the level of these resources and processes over time. This fluctuation is frequently reflected in quantitative assessments of stock-outs and variable availability of medicines over time in many SSA countries (Binyaruka and Borghi, 2017, Masters et al., 2014, Muyinda and Mugisha, 2015, Baker et al., 2015, Wagenaar et al., 2014, Muinga et al., 2014).

Unpredictability may affect care provision negatively even at times when for example necessary drugs are available (Gross et al., 2011, Muyinda and Mugisha, 2015). This can be referred to as ‘street-level bureaucracy’ where the unpredictable circumstances necessitate a change of practice initiated by health workers themselves, sometimes against the recommended guidelines (Walker and Gilson, 2004). This phenomenon is well illustrated by health workers’ expression of ‘having to help’ regardless of whether the surrounding system supports the care they are expected to deliver. A concrete example is ‘rationing’ of syphilis tests; rather than testing all pregnant mothers, health workers reserve tests for those who display any symptoms of illness (Baker et al., 2015). This may also be the reason why

clinical practice was identified as a large bottleneck for Syphilis screening and treatment in both districts.

As well as affecting clinical practice in a direct way, the unpredictable availability of resources also affects motivation negatively; which in turn has implications for clinical practice (Alhassan et al., 2013). This finding has also been made in other studies from the same area of Tanzania (Prytherch et al., 2012, Penfold et al., 2013), and studies from other areas of the country have found that health workers feel abandoned and unsupported by the system (Mkoka et al., 2015, Prytherch et al., 2012).

Sustainability is a concept which is related, but not equal, to that of unpredictability. Sustainability can be seen as the ability of a health program to maintain its services over time, to integrate activities into routine services and to continue when external financial support ceases (Iwelunmor et al., 2016). Sustainability is frequently recognised as a challenge in SSA health systems where failures to sustain program activities have been linked to limited local ownership, time-bound financing or lack of an integrated plan to sustain the program over time (Shigayeva and Coker, 2015, Besada et al., 2016, Kruk et al., 2014). Such failures contribute significantly to the unpredictability within health systems.

While the discontinuation of a health program's support and activities contributes to unpredictability, so does the introduction of new initiatives into a health service. And although the management level, in many instances the district in SSA, may be involved in the planning of such programmes, front-line health workers are more commonly presented with a 'fait accompli' of new practices or responsibilities falling on their shoulders (Diarra and Ousseini, 2015). The plethora of programmes and partners often operating within the same district may further aggravate this tendency (Mkoka et al., 2014). This is commonly found in Tanzania and in the context

of QI strategies, this situation has been described as potentially harmful through causing duplication, inefficiency and a feeling of confusion among front-line health workers (Sundby, 2014, Jaribu et al., 2016, Mkoka et al., 2014, Mwidunda and Eliakimu, 2015).

Strategies to improve quality

The effectiveness of QI strategies is modified by the context in which they are introduced (Blacklock et al., 2016) and the findings of district specific bottlenecks and unpredictability therefore provide important insights for the interpretation of findings from studies I and IV where two different QI strategies were evaluated.

CONTENT AND USER-FRIENDLINESS

In this thesis, attributes of CPGs that influence their implementation in practice were assessed (Francke et al., 2008, Gagliardi et al., 2011a, Grol et al., 1998, Michie and Johnston, 2004). Overall, the quality of the content of maternal health guidelines in the three countries was good in that it correlated closely with WHO guidelines, but the levels of user-friendliness and applicability in every day practice varied. These findings suggest that the often lengthy processes of adapting WHO standards to national settings would benefit from less focus on content in favour of the *format* of guidelines, to increase their potential for health workers use in practice and therefore to improving QoC (Lavis et al., 2008).

Apart from the limitations revealed in CPGs format, their distribution, and consequently health workers' access to them, was perceived to be problematic, especially in Burkina Faso and Tanzania. This is an experience shared by many other low-income settings, largely due to the inadequate resource allocation for guideline implementation (Stanback et al., 2007, English et al., 2011). In all three countries, the use of guidelines by health

workers in daily practice was perceived to be limited. WHO, in their new *Standards to improve quality of maternal and newborn care in health facilities* recognises this fact through a special supplement on implementation strategies (WHO, 2016).

HIGH DEGREE OF FIT, MOTIVATION OF PROGRESS AND EMPOWERING MENTORSHIP

The context in which EQUIP was implemented was characterised by several external health programs implemented in parallel; some of which, like EQUIP, focused on maternal and newborn care. Health workers found this situation challenging. Identifying which programs did what was experienced as difficult and, contrary to health workers' day-to-day responsibilities, these different programs often only had *one* focus. At the same time, the presence of external programs in the health facilities was also experienced as positive.

Health workers expressed a high degree of satisfaction with *three* of the *intervention components* implemented as part of EQUIP. These components were interpreted as meeting the needs of health workers in their professional roles, and therefore contributing to *mechanisms of effect*: how and why the intervention worked.

The first component was that of the *improvement topics*, the areas of care that had been prioritised for the collaborative QI activities. These topics had been purposefully aligned to national guidelines and health workers perceived them as having a *high degree of fit* with their own responsibilities and routine work. Overall, the improvement topics were perceived to be within their responsibilities, rather than something added on top. Implementation of a topic has been found to be easier if it is in line with existing practice, rather than being something new and unknown (Harvey; and Kitson, 2015, Gagliardi et al., 2011b). The integrated approach of the

EQUIP intervention, through its focus on *all mothers and newborns*, as opposed to for example only those infected with HIV, was also appreciated.

The use of *run-charts*, to monitor progress of improvement work over time, was the second component which health workers experienced as motivating and expressed high satisfaction with. As a standalone intervention, without the other associated activities of collaborative QI, run-charts have been found to have positive effects on health worker motivation in high-income settings (Wells et al., 2016). In Rwanda, visualising data on run-charts in the staff room was identified as one of the key factor of success in a district hospital QI initiative (Kotagal et al., 2009). Run-charts have been described as *useful and simplistic* tools which can provide actionable information without the need for mathematical complexity (Perla et al., 2011). When created from routinely collected information, they allow health workers to utilise and understand data which may otherwise remain “hidden” in registers. And, as one of the challenges in improving QoC is improving its documentation, the use of run-charts may have dual benefits.

Contrary to the simplicity of run-charts, there is evidence from high-income settings that the understanding and use of PDSA-cycles is more complex, leading to inconsistent application (Taylor et al., 2014, Leis and Shojania, 2016, Walley and Gowland, 2004). In this thesis, health workers’ understanding and reported use of PDSA-cycles varied substantially between QITs. A similar finding was made in another study of collaborative QI in the same region of Tanzania (Jaribu et al., 2016). While it is possible that the use of PDSA-cycles to structure problem solving and test change ideas was appropriate in some health facilities; it may have been more useful as a tool for the EQUIP *mentors* who directed and guided the QI activities than for health workers themselves.

Health workers' positive experiences of the *mentoring and coaching* visits in individual health facilities was an area of strong consensus and was identified as the third component contributing to mechanisms of effect in EQUIP. These visits had traits in common with the supportive supervision typically carried out periodically in lower level facilities (health centres and dispensaries) in Tanzanian and other SSA health systems (Zinnen et al., 2012, Harvey; and Kitson, 2015). This supportive supervision is however expected to fulfil a range of tasks and is often experienced as a control function by health workers (Mkoka et al., 2015, Nkomazana et al., 2016). A recent analysis across SSA countries was not able to detect any positive effect of supervision on the quality of maternal care provided (Leslie et al., 2016) but several other studies have made the opposite conclusions; that high quality supportive supervision can have positive impacts on health workers' knowledge, skills, motivation and performance (Tibandebage et al., 2016, Magge et al., 2015, Okereke et al., 2015, Bradley et al., 2017). Our results mirror these positive findings and emphasise the importance of good quality supervision, or rather mentorship, as an important strategy to improve the quality of maternal and newborn care in Tanzanian districts and other similar settings.

As WHO now introduces new standards for improving QoC for mothers and newborns in health facilities, it is important to carefully evaluate the evidence of the potential implementation strategies to achieve these standards. The findings from this thesis suggest that an effective approach could be to focus on reducing the unpredictability of health facility readiness, coupled with mentoring and coaching in individual health facilities and the use of data for locally generated run-charts. The application of PDSA-cycles in this setting may be less useful at the facility level, but its

utility at the district, regional and national level, as suggested by the new WHO standards, remains to be evaluated.

CONCLUSIONS AND POLICY RECOMMENDATIONS

The insights gained in this thesis are of immediate relevance for policy makers at global and national levels including for Swedish development assistance. Key policy recommendations are summarised in four messages below.

1. **Support *strengthening and use of health information* for mothers and newborns**
 - Support development of *indicators that reflect quality of care*
 - *Strengthen health information systems* to produce high quality, locally relevant data that can be used to *identify the level of implementation bottlenecks*
 - Promote the use of *effective coverage* by global and national policy makers as a measure to track progress and direct priorities
2. **Target the *unpredictability* within weak health systems to improve maternal and newborn care**
 - Acknowledge and address unpredictability as a dimension in its own right when planning and evaluating health programs
 - Direct development assistance towards health initiatives that aim to increase predictability of, for example, availability of medicines and equipment, that can be supported reliably and sustained over time

3. **Strengthen *coordination of external health programs* for mothers and newborns**
 - Support countries to achieve greater coordination of health programs implemented by external partners, for example through establishing district-level inventory platforms of partners and activities
 - Support coordination, ideally by Quality Improvement units in Ministries of Health, to evaluate and integrate the different approaches applied to improve QoC
4. **Promote contextually appropriate improvement strategies**
 - Prioritise support for health workers; their needs in everyday practice should guide the choice of quality improvement strategies, including tools that are easy to understand and use for those health workers with limited education
 - Support mentoring and coaching, or *supportive* supervision, to catalyse quality improvement in lower level health facilities in Sub Saharan Africa; ideally integrated across different areas of care to ensure benefits beyond mothers and newborns

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