Maternal and Newborn Health Service Delivery Redesign

Feasibility Assessment Toolkit

Authors: Kojo Nimako, MD, DrPH, MPH; Anna Gage, MSc; Celestin Hategeka, MD, PhD; Margaret E. Kruk, MD, MPH

October 2020

Quality Evidence for Health System Transformation
QuEST

This is a product of QuEST (Quality Evidence for Health System Transformation), a multi-country health systems research consortium. QuEST seeks to build an evidence base to support transformation to high quality health systems by improving measurement, testing solutions, and creating generalizable knowledge in partnership with change makers in low- and middle-income countries.

ACKNOWLEDGEMENTS

This work would not have been possible without the contribution of many individuals. The authors wish to thank Ms. Rachel Okumu, Dr. Collins Matemba, Mr. Ambrose Wanyama Subai, Dr. John Otieno and Ms. Hellen Odeny of the Kakamega County Department of Health, who are leading the Service Delivery Redesign work in Kakamega County, and Dr. Maximilla Wanzala, Mr. Micky Oloo and the Masinde Muliro University of Science and Technology team that assisted with data collection for the feasibility assessment of Service Delivery Redesign in the county. We also greatly appreciate the input provided by Dr. Charles Kandie and Dr. Aisha Mohamed of the Kenya Ministry of Health, Ms. Khatra Ali of the Kenya Council of Governors and Dr. Sathy Rajasekharan and the entire Jacaranda Health team. We thank Prof. Kevin Croke and Prof. Margaret McConnell of the Harvard T.H. Chan School of Public Health for providing invaluable inputs in the development of this document, as well as Ms. Betsy Katz, also of the Harvard T.H. Chan School of Public Health, who provided editorial assistance for this work. We finally thank all the stakeholders and study participants in Kenya who provided critical data and insights that have helped develop this document.

Maternal and Newborn Health Service Delivery Redesign

Feasibility Assessment Toolkit

Table of contents

1. INTRODUCTION

1.1 Background on Service Delivery Redesign for maternal and newborn health

Rationale: Despite increased utilization of facilities for childbirth, decline in maternal and neonatal mortality and morbidity has stagnated in many low- and middle-income countries.[1-3] A growing body of evidence suggests that this may be because facilities are unable to effectively manage delivery complications and sick newborns, which present without warning and require rapid, highly expert care.[4,5] Yet in many countries, 30-45% of facility deliveries occur below the level of a hospital, which cannot realistically handle complications and cannot count on emergency referral, which is often slow or non-functioning. Because of the unpredictable nature of birth complications, hospitals or birthing centers with access to surgical and sick newborn care within 30 minutes are the best option for all deliveries.[6-8]

Concept: Service delivery redesign (redesign), as proposed by the Lancet Global Health Commission on High-Quality Health Systems in the SDG Era, is a systemic reform that rationalizes the health system such that high quality services are provided at the right level, by the right provider and at the right time to optimize outcomes.[9] For maternal and newborn health (MNH), service delivery redesign means restructuring health systems so that all women deliver in hospitals providing the full scope of obstetric and neonatal care for complications—e.g., Caesarean section, blood transfusion and care for sick mothers and newborns—or in nearby affiliated birthing facilities, while lower level facilities provide quality antenatal, postnatal, and newborn care. For MNH redesign to save lives, investments are needed to ensure quality of care, access, equity, and financial protection. There are five programmatic considerations for MNH service delivery redesign. The exact content of each programmatic area will depend on the context, but some general elements are shown in figure 1.

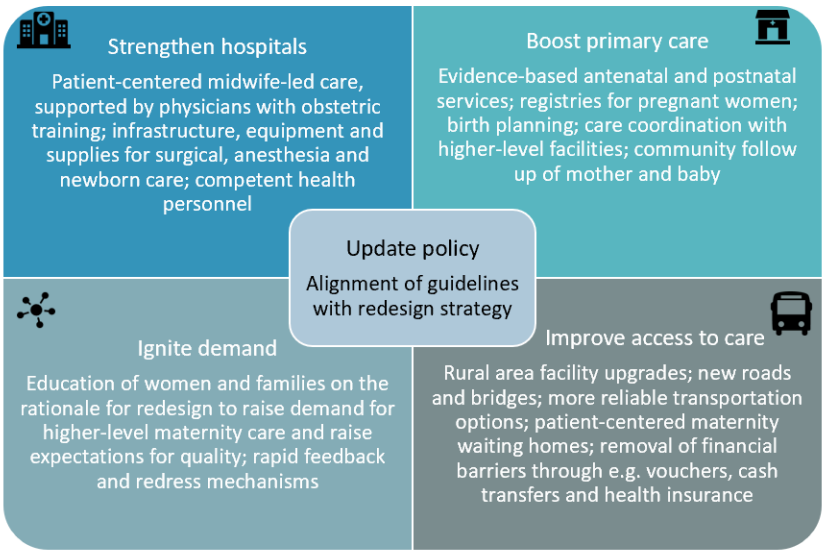

Figure 1: The five programmatic considerations for redesign

The main goal of MNH redesign is to improve survival of mothers and newborns. Other potential benefits include increased efficiency in use of health system resources such as health providers and infrastructure as these would be concentrated in fewer facilities. Redesign would also create room at the primary care level to shift management of non-communicable diseases, e.g., stable hypertension and diabetes, from hospitals. This, together with shifting routine antenatal and postnatal care away from the hospital would help to decongest hospitals to help them focus on

the management of complex conditions, which is at the core of their competency. Potential risks of redesign include an increase in iatrogenic complications if existing advanced facilities are of poor quality; increased medicalization of births; and reduced physical and financial access for rural and poor women.

The concept of service delivery redesign is applicable to other health conditions, and a description of the general components of the concept is provided in the appendix.

Political economy of redesign: Health system redesign is fundamentally a political choice and must be led by political leaders who believe that a double standard for women and newborns in LMICs is no longer acceptable. The final decision on whether or not the new policy will be instituted will not only depend on the strength of the evidence in favor of it, but also, and likely more significantly, on its political expedience to policy makers. Political commitment is central to determining whether redesign is realistic and how quickly it can be implemented.

A comprehensive discussion of the rationale, components and implementation considerations for maternal and newborn health service delivery redesign can be found in the 2020 publication by Roder-DeWan and colleagues.[10]

1.2 Stages in implementing service delivery redesign

To maximize the survival gains from redesign and minimize the risks, each country will need to customize redesign to the local context. Implementing service delivery redesign is a stepwise process (Figure 2). The process starts with a feasibility assessment that maps out health system capacity and identifies the major gaps to be filled for redesign. Next is a design phase, which identifies the most appropriate rollout strategy that best leverages existing initiatives. This design phase would also entail developing strategies to close the identified gaps from the feasibility assessment and developing a fully costed plan for redesign. The design phase would be followed by an improvement phase where the plans developed in the design phase are instituted in preparation for policy implementation. It is only after all the facility and non-facility improvements are made that redesign can be rolled out. To ensure that the process and outcomes of redesign are carefully assessed, a rigorous evaluation plan would need to be built into the design and implementation process.

The current document outlines the feasibility assessment stage of service delivery redesign; it focusses on the priority area of maternal and newborn health.

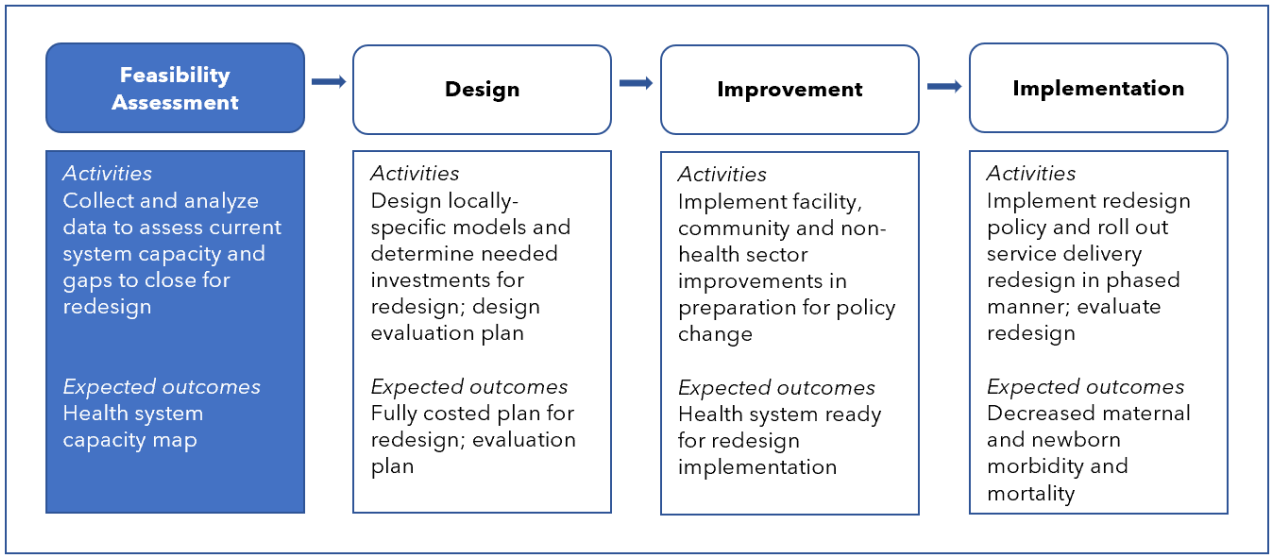

Figure 2: Stages for implementing Service Delivery Redesign

2. SCOPE

2.1 Target audience for document

This document provides guidance on how to conduct a feasibility assessment for maternal and newborn service delivery redesign (MNH redesign). It has been developed from the processes used and experiences drawn from the feasibility assessment of MNH redesign conducted in Kakamega County, in western Kenya in 2019.

This toolkit is aimed for use by a technical team of experts and the collaborating national or sub-national health administration. While it is developed for maternal and newborn service delivery redesign, the toolkit can be adapted for other conditions, e.g. non-communicable diseases.

2.2 Goals of the feasibility assessment

The feasibility assessment seeks to diagnose the prevailing capacity of the health system and identify the major gaps that would need to be closed before service delivery redesign can be implemented. The principal objectives/dimensions of feasibility to be assessed are as follows:

- Assess opportunities for integration of redesign within existing or planned programs like Universal Health Coverage (UHC).
- Assess geographic/physical access to determine distances and barriers to delivery care in hospitals.
- Assess infrastructural capacity in hospitals to determine their capacity to provide quality care (including availability of care for complications) with increasing delivery volumes.
- Assess health provider numbers and competence to provide quality maternal and newborn care
- Assess acceptability of the policy reform to health workers, health care users and other key stakeholders.

These objectives represent the minimum that must be completed during the feasibility assessment. For geographic access, infrastructure and human resource, the focus is on hospital care; this is because the relocation of all deliveries to hospitals is the most novel component of MNH redesign and the component that would generate the biggest health system disruption. In contexts where primary care is still weak, the analysis should be extended to assess primary care capacity for improved antenatal and postnatal care. The methodology and tools that follow are cross-cutting and can be used to generate capacity information for hospitals as well as the primary care level.

2.3 Framework for conducting feasibility assessment

The feasibility assessment starts with preparatory work to confirm governmental buy-in and define the extent of the feasibility assessment (Figure 3). This would expand into a broader stakeholder engagement that would help identify the key constituencies in the maternal and newborn health and related sectors in the country. These engagements would also help refine the instruments to be used for data collection and analyses. The data collection and analysis stage would involve analyzing secondary data and, as needed, collecting and analyzing primary data from facilities, health providers and health care users. The final stage is a consultative stage

where the findings are discussed with the government and other key stakeholders, and a decision taken on whether and how to implement redesign. Details of each stage are given in the following chapters.

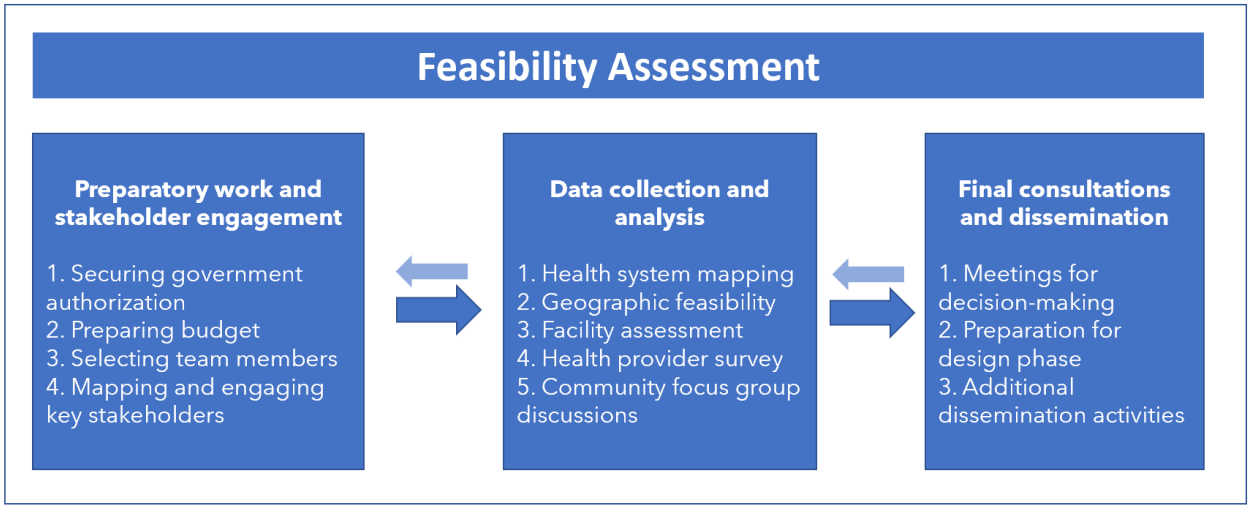

Figure 3: Framework for conducting the feasibility assessment of service delivery redesign

2.4 Timeline for conducting feasibility assessment

The assessment is intended to be rapid and should utilize already existing data to the extent possible. This would be supplemented by light-touch fieldwork as necessary. The timeline for completion of the assessment will depend on the cooperation of collaborating government partners, availability and access to secondary data, the scope of the assessment (national vs sub-national) and the capacity of the assessment team. Where extensive primary data collection is needed, the following Gantt chart can serve as a guide for forecasting time requirements for performing the assessment in one sub-national setting:

	Month						
Activity	1	2	3	4	5	6	7
Preparatory work							
Stakeholder engagement and mapping							
Health system mapping							
Geographic analysis							
Preparation for primary data collection							
Primary data collection (facility assessments, health provider surveys and community focus group discussions)							
Data analysis and synthesis of findings							
Final consultations to discuss findings and decide next steps							

Figure 4: Gantt chart for regular timeline for redesign feasibility assessment

An accelerated assessment, lasting about four months is possible if the following perquisites are met: 1) the idea of service delivery redesign is already well known and understood by most key

political actors and there is demonstrated desire for the feasibility assessment to be conducted; 2) tools to be used for primary data collection are already available and only minor adaptations are needed; 3) an analysis plan has already been developed; 4) the feasibility assessment team is large enough to allow different members to handle different segments of the assessment simultaneously.

	Month			
Activity	1	2	3	4
Stakeholder engagement and mapping				
Health system mapping				
Geographic analysis				
Primary data collection (facility assessments, health provider surveys and community focus group discussions)				
Data analysis and synthesis of findings				
Final consultations to discuss findings and decide next steps				

Figure 5: Gantt chart for accelerated timeline for redesign feasibility assessment

2.5 Team members, roles, and responsibilities

The feasibility assessment should be conducted by a multi-disciplinary technical team with quantitative and qualitative expertise. This should be done in close collaboration with national and local political actors and health officials, who would form a steering committee to oversee the feasibility assessment.

2.5.1 Technical team:

The technical team should have the following members and roles:

1. Team lead: should have experience in leading multi-faceted assessments and have the competencies to coordinate quantitative and qualitative data collection and analysis and rapidly synthesize emerging data. The team lead would also facilitate stakeholder engagements, lead health system mapping and report writing, and lead dialogue/presentations to stakeholders. The team lead should be a good communicator and be able to develop and maintain high-level government relations.
2. Survey/data manager: should have competencies for survey design and administration and would be responsible for leading the development of the provider and facility surveys, and programming the surveys into a data collection/management system like SurveyCTO or RedCap. The data manager would also be responsible for organizing training for data collectors for the facility and health provider surveys, overseeing data collection and ensuring data protection.
3. Data analysts: should have competencies for geographic analysis using WHO's AccessMod tool and geographic analysis software e.g., QGIS, quantitative data analysis using STATA, Microsoft Excel or other statistical package, and qualitative data analysis using Nvivo, Atlas.ti, Dedooce or other qualitative analysis tool.
4. Focus group lead: should be skilled in qualitative data collection and should preferably be a local with understanding of the cultural dynamics.

5. Logistics coordinator: responsible for acquiring and managing resources on the ground to facilitate efficient and unhindered data collection. The logistics manager should preferably be a local with a good understanding of the local market.
6. Data collectors (for surveys): they should have competencies for uniform quantitative data collection.

Note: Given the contextual data needs for conducting the assessment, the local Health Management Information System (HMIS) data manager should be a member of the team if possible.

The exact number of team members required depends on the scope of the project and the capacity for overlapping roles. As a rule of thumb, for a regular timeline of 7 months, with an active data collection and analysis phase of 4 months, involving 30 primary care facilities, 20 mid-sized (~150 bed) hospitals, and 15 focus group discussions, the following personnel would be needed at minimum:

- Team lead- 1
- Survey/data manager- 1
- Data analysts- 3 (one each for geographic analysis, quantitative data analysis, and focus group discussions)
- Focus group lead- 1
- Logistics coordinator- 1
- Data Collectors- 6 (working in teams of 2)

2.5.2 Steering committee: In addition to the technical team, there should be a steering committee that provides direction and help contextualize the process and emerging results of the feasibility assessment. This team should at minimum include the following:

1. Technical team lead
2. Survey/data manger
3. National representative from the Ministry of Health
4. Local representative of the Ministry of Health or another similar local official
5. Local HMIS data manger
6. Representative of the national government
7. Representative of the local government

3. PREPARATORY WORK AND INITIAL STAKEHOLDER ENGAGEMENT

3.1 Preparatory work

Redesign is a large-scale policy reform and requires political buy-in. As such the assessment team must determine that there is political support for the feasibility assessment to be carried out. At this preparatory stage, it is not expected that there would be government commitment to implement redesign, but there must be the political will to consider the idea as an option to improve maternal and newborn outcomes, and the feasibility assessment must be authorized by the government. Initial meetings with country partners should focus on arriving at this determination. Preferably, the assessment should be done at the request of the government and not as an academic exercise.

As part of the preparatory work, the team should draw up a document that outlines the principles of the collaboration—this would include an explanation of the roles of each of the collaborating institutions (e.g. national Ministry of Health, sub-national departments of health and collaborating academic institutions) and describe how data will be collected, shared and used. There should be a collective agreement on the contents of the principles of collaboration document ahead of commencement of the feasibility assessment.

A detailed budget for the feasibility assessment should also be developed at this stage. A template is provided in the appendix to guide budget development.

This is also an opportune stage for the formation of the feasibility assessment team, ensuring that there is adequate local representation. Technical and Steering Committee Team members should be identified with the criteria defined above (see section on Team members, roles and responsibilities).

3.2 Stakeholder engagement

This is a multi-purpose stage with the goal of introducing the idea of redesign to stakeholders, helping the study team understand the health system better and mapping out the stakeholders working in the maternal and newborn health and related sectors. The specific objectives of the engagements are the following:

1. Discuss the concept of service delivery redesign with stakeholders, obtain their perceptions and provide an opportunity for them to raise potential redesign program risks and barriers, and identify programmatic and policy opportunities from which to build.
2. Obtain information about current system functioning and prevailing policies, and identify health system opportunities, weaknesses and local constraints for service delivery.
3. Obtain a firsthand appreciation of primary and advanced maternal and newborn care in the country.
4. Establish a concrete working relationship with country partners.

The engagements could include formal individual and group meetings, facility visits and informal interactions, and all opportunities to connect with stakeholders should be utilized.

The segments of stakeholders that need to be engaged, with examples, and some key discussion areas/outcomes are presented below in Table 1.

Table 1. Stakeholders and discussion focus during MNH redesign feasibility assessment

Segment of stakeholders	Examples of stakeholders	Key discussion areas/outcomes
Political leaders	Local government head and representatives Ministry of Health leaders	-Determine political alignment with redesign -Define policies that can be leveraged for redesign
Heath system managers	Maternal and Newborn Health program managers Local health management teams Facility managers Local data mangers Ministry of Health Quality of Care working groups Professional bodies/unions	-Understand current maternal/newborn service delivery model -Define historical, current and future plans for maternal/newborn health -Identify health system opportunities, weaknesses and local constraints for service delivery -Identify key data sources for feasibility assessment
Healthcare providers	Doctors Nurses/Midwives Other non-physician clinicians Community Health Workers	-Obtain a firsthand appreciation of primary and advanced maternal and newborn care in the country -Understand structures for community-level health delivery -Understand systemic and community challenges to providing and obtaining care
Healthcare users	Mothers Families Local elders Women's groups Facility management committees (community members on committee)	-Understand systemic and community challenges to providing and obtaining care -Determine community strengths that could facilitate the redesign process
Development and implementation partners	WHO World Bank UNICEF USAID Local implementing organizations Local health NGOs	-Define programmatic direction of organizations -Identify synergies and conflicts of organizational paradigms for service delivery redesign -Establish concrete working relationship for subsequent phases of redesign process
Health system researchers	Local universities Independent research institutions	-Identify health system opportunities, weaknesses, and local constraints for service delivery -Identify research opportunities to incorporate in the redesign process -Establish concrete working relationship for subsequent phases of redesign process
Civil Society Organizations	Maternal/Newborn Health interest groups Local governance and accountability NGOs	-Understand systemic and community challenges to providing and obtaining care -Understand place of user voice in policy development

	Religious groups	-Identify leverage points for redesign
Non-health sector stakeholders	Local transportation authority Transport unions Local communications authority	-Understand contribution of non-health sector to maternal and newborn care delivery

Beyond helping the team to formulate the content of the analytic stage of the feasibility assessment, a key output from this stage is a map of stakeholders and how they relate to the issue of service delivery redesign. This would help the team identify potential partners for subsequent phases of the redesign process and judge the political economy (support and opposition) of redesign should a decision be taken to implement after the feasibility assessment.

Box 1 (Case study): Stakeholder engagement during Kakamega County's feasibility assessment of MNH service delivery redesign

Kakamega County, one of the most populous counties in Kenya, is considering implementing redesign. Over a 3-week period in August 2019, an extensive stakeholder engagement was held in Kenya as part of the feasibility assessment of MNH redesign. The team formally interacted with 84 individuals and groups across the health system, and visited nine health facilities in Kakamega County, six of which were surgical care centers.

Specific areas of discussion included: core principles of redesign and local relevance; current policies on maternal and newborn care delivery; current hospital and clinic roles in maternal and newborn care; range of providers and scope of practice; referral and communication norms; healthcare financing; challenges to providing quality care; users' barriers to reaching care; cultural and demographic features of population; community health care preferences and existing community mobilization initiatives. A 3-item survey on service delivery redesign was also administered after interviews to judge stakeholders' perspectives on service delivery redesign.

These consultations gave the study team a good understanding of the policy and service delivery context of Kakamega County, and Kenya as a whole. It also provided insights into the political economy of maternal and newborn policy change in Kenya and informed the content and strategy for conducting the subsequent analytic stage of the feasibility assessment. Finally, it helped establish the members of the core study team that would lead the rest of the feasibility assessment (with representation from the Kakamega County Department of Health, Kenya Council of Governors, Kenya Ministry of Health, and Harvard University). Additionally, a stakeholder map was developed, with 9 key stakeholder groups identified, and each was described under the following headings:

Stakeholder (individual or group)	**Relationship to issue of redesign**	**Potential gains**	**Potential losses**	**Level of organization/ mobilization on maternal and newborn health**

Box 2: Nuggets from the field on stakeholder engagement

1. The idea of service delivery redesign is novel and may require several encounters for stakeholders to understand and grasp fully. Factor in such repeat encounters into the timeframe for the stakeholder engagement.
2. Discussing the idea of redesign in a group setting is efficient and allows for constructive discussions. It must however be noted that there is a potential for groupthink in such a forum. Consider one-on-one interviews and small group discussions as complements to large group meetings.
3. A snowballing strategy is helpful in reaching all relevant stakeholders. Start with several national bodies like the Ministry of Health and/or institutions involved in health systems research/implementation and work down through their contacts/partners.
4. Bear in mind that there may be other governmental institutions, beyond the Ministry of Health, with significant convening authority, who should be consulted as part of the planning and stakeholder engagement process, e.g. in Kenya, the Council of Governors is one such body.
5. For a good appreciation of the contextual dynamics of maternal and newborn service delivery, it would be helpful to have a native health provider from the region of interest as a member of the team.
6. Factor in time for a thorough debrief meeting with political collaborators after the stakeholder engagement meetings (as opposed to only presenting a written report) and plan the next phase of the feasibility assessment together with them.

4. DATA COLLECTION AND ANALYSIS

There are five major components of the analytic stage of the feasibility assessment. Two of these—health system mapping and geographic assessment—use mainly secondary data sources, while the remaining—facility assessment, health provider survey, and community focus group discussions—typically require collecting and analyzing primary data. We recommend sequencing the analysis to begin with the health system mapping and geographic assessment components which will reveal the data gaps that the primary data collection can fill.

4.1 Health system mapping

Simultaneously with the stakeholder engagement and mapping, the assessment team can begin mapping the health system context and architecture using secondary data sources. The expected output of this component is an overview of the area's current health status and architecture at a broad level. This step will inform the primary data collection in both developing the sampling strategy for facilities as well as identifying potential challenges that should be explored further through specific questions in primary data collection. In conducting this stage in consultation with stakeholders, the assessment team may discover that further primary data collection is unnecessary, for example due to availability of existing data or because the majority of women already deliver in an advanced care facility.

Much of the data for this step will be available through the HMIS system, though it may also draw upon additional data sources as available including household surveys such as the Demographic and Health Survey (DHS) or the Multiple Indicator Cluster Survey (MICS), prior health facility assessments, Ministry of Health reports and policies, the census, or discussions with the stakeholders. As possible, data should be collected for the period immediately prior to the feasibility assessment (i.e. last calendar year) as well as for the preceding four years to identify trends.

Table 2 presents a list of key questions for consideration during this phase as well as examples of potential indicators that may be useful in mapping the existing health system. Additional or different indicators may be useful depending on the context. The list of potential data sources is not exhaustive but meant as a starting point; locally specific data sources may be useful as well. Where secondary data is unavailable to address the questions, additional primary data collection may be needed.

Table 2. Key questions and indicators for health system mapping

Key questions	Relevance for redesign	Examples of key indicators to inform answers	Potential data sources
What is the demographic and epidemiologic context?	This information is necessary to identify areas with poor health outcomes, identify potential challenges in accessing care, and the annual births is later	- Population size - Number of annual births - Percent urban - Land area size - Female literacy rate - Neonatal mortality rate - Maternal mortality ratio	- Census - Other vital registration systems - Household surveys such as DHS/MICS - HMIS

	used in the scenario analyses		
What are the existing health system assets?	This information can be used to develop sampling strategy for the primary data collection, for the scenario analyses, to identify which facilities may be candidates for delivery hospitals and to identify shortages or maldistribution of health workers	- Number of functional health facilities - Distribution of public, private non-profit and for-profit facilities - Health facilities providing delivery services - Health facilities with Cesarean section capability - Maternity waiting homes - Number and distribution of health workers by relevant cadres	- HMIS - Master facility lists - Health facility assessments such as SARA, SPA or SDI
What are the current patterns of health system utilization for maternity care?	This data is used to understand how many women would need to shift their delivery location under redesign, the touch points for communicating changes, and existing facility efficiency of deliveries	- Facility delivery rate - Any antenatal care utilization - Four or more antenatal care visits - Postnatal care utilization - Distribution of facility deliveries by facility level - Distribution of facility deliveries by facility management	- HMIS - Household surveys such as DHS/MICS
How is maternity care financed?	This data can be used to identify potential financial barriers or opportunities to shifting delivery care from both the perspective of the population and the health facilities	- Out of pocket payments for delivery care - Distribution of payments by facility level and management - Insurance coverage - Programs to support maternity care financing	- Household surveys such as DHS/MICS, Integrated Household Living Conditions Survey - National Health Accounts - Health facility assessments such as SPA or SDI - Policy documents
What other initiatives related to maternal and newborn care are being implemented?	This data can be used to identify synergies and opportunities in planning the implementation of redesign	- In conjunction with the stakeholder analysis, a list of relevant government, private, non-profit and partners - List of relevant initiatives such as quality improvement policies, transportation strategies, results-based financing, community engagement strategies, etc.	- Conversations with stakeholders - Policy documents

DHS: Demographic and Health Survey; HMIS: Health Management Information System; MICS: Multiple Indicator Cluster Survey; SARA: Service Availability and Readiness Assessment SDI: Service Delivery Indicators; SPA: Service Provision Assessment

4.2 Geographic feasibility

The geographic component of the feasibility assessment is used to understand the physical access barriers that women may face if service delivery redesign were implemented in a community. This assessment must be paired with community focus group discussions (described below) in order to understand other potential barriers to access such as transportation or cost. However, this analysis is useful in determining whether the area's existing health facility and road infrastructure is sufficient to support redesign.

The expected output of this component is the estimated percent of pregnant women in the area who live within 1 or 2 hours travel time of a current delivery facility, and the percent of pregnant women who would live within 1 or 2 hours travel time of a proposed redesign delivery hospital. The analysis can be conducted iteratively, for example, with different sets of proposed delivery facilities as stakeholders review the results and determine which facilities they wish to consider. Other assumptions required for the analysis, for example, the travel time and transportation methods, should also be determined collaboratively with stakeholders and may be iterated.

The WHO's AccessMod tool can be used to conduct the geographic feasibility assessment. AccessMod is a free and open source software developed by the World Health Organization to model physical accessibility to health facilities. Extensive instructions and support for using the tool are available in English and French on the website.

Much of the data required as inputs for the AccessMod software can be found online from publicly available sources. Distribution of pregnancies or births are available from WorldPop projections. Roads and road classifications are available from the Geofabrik database which sources data from Open Street Map. Administrative boundaries can be found at GADM and landcover can be found from GlobCover. Availability of facility geocoordinates varies by country. The Ministry of Health may maintain a register of facility geocoordinates such as Kenya's; a database of public health facilities in most African countries is also available here, though this does not include private facilities. The assessment team may also consider filling in missing geocoordinates through the facility assessment described below, though we recommend using all available secondary sources before collecting this data.

After collecting the necessary data inputs, the team will need to format them to meet the specifications required by AccessMod as described in the user manual. Open source software such as R or QGIS can be used to edit the files as necessary. Once the data are correctly formatted and imported into AccessMod, the accessibility estimation can be calculated through using the accessibility analysis (1) and the zonal statistics analysis (4). The first step is used to assess how physically accessible existing health services are to the target population through creating a map of access, the second step then uses this map as an input to calculate the percent of the population within a certain travel time. AccessMod can also be used to estimate access given human resource or equipment shortages (geographic coverage), measure travel times between facilities (referral analysis), or simulate different scenarios for scaling up access (scaling up).

While the AccessMod software is straightforward and does not require an expert user, ensuring that the files are appropriately formatted for use in the software does require some existing skills in managing geographic information system data. This portion of the analysis could be done remotely if the necessary skills are not available locally, or could potentially be contracted out. If an organization is doing several feasibility assessments in different areas, it would be most efficient to have a single analyst conduct all the geographic assessments across the areas.

4.3 Facility assessment

The purpose of the facility survey is to assess current facility infrastructural and human resource capacity to provide quality maternal and newborn care in the area. It can also be used to assess elements of quality of maternal and newborn care across the continuum of care, from ANC, delivery, newborn care, PNC and well-child services. A facility survey may be unnecessary to conduct depending on the availability of other recent facility assessments such as the SPA.

The sampling strategy for the survey will depend on the health system context, existing data sources, and available resources for the feasibility assessment. We recommend conducting a census of all potential delivery hospitals and a sample of other facilities currently offering delivery services.

A sample tool for the assessment is included in the appendix. Potential areas for data collection include facility administration; infrastructure; health workforce; management and data; clinical services, equipment; materials and supplies; and medicines.

The assessment can be used to diagnose current gaps in care as well as the resources that would be required under different Service delivery redesign scenarios, described below. For example, it can be used to identify which facilities have the infrastructure to become delivery hospitals, how many additional maternity beds would be needed in which facilities under Service delivery redesign, and where there are gaps in the supply chain.

4.3.1 Scenario analyses

The data collected through the facility assessment can be used to diagnose current gaps in maternal and newborn care; it can also be used in combination with the data from the health system mapping to project future needs under Service delivery redesign under different scenarios. The purpose of the scenario analyses is to assess future needs in infrastructure, equipment, and human resources if Service delivery redesign were implemented in the region. For example, it can be used to estimate how many maternity beds would be needed in which facilities. These outputs can be critical to informing the planning and costing process if Service delivery redesign were to move forward.

We recommend considering several potential scenarios depending on the health system context. Two relevant scenarios may be 1) all deliveries occurring in health facilities are shifted to the delivery hospitals but the same proportion of deliveries continued to occur at home and 2) all deliveries occurring in the area (including home and health facility deliveries) are shifted to the delivery hospitals. Additional scenarios may be useful to determine the set of delivery hospitals.

The assessment team will need to develop a set of assumptions for the scenario analyses collaboratively with the stakeholders. Key assumptions and potential sources for informing the assumption are suggested in Table 3.

Table 3: Key assumptions and potential sources of information for scenario analyses

Key assumptions	Potential sources for informing assumption
Future delivery volumes	Trends of facility volumes from the health system mapping component can be extrapolated, potentially adjusting for changing fertility rates as applicable
Future delivery locations	Delivery volumes can be allocated according to the proportion of births currently happening in smaller administrative divisions, i.e. deliveries occurring in lower level facilities would be moved to a delivery hospital in the same sub-district. The same proportions can be used to account for home deliveries if no data is available on the distribution of home deliveries.
Needed maternity beds	Calculated based on bed occupancy rates, numbers of vaginal and Cesarean deliveries, average length of stay for vaginal and Cesarean deliveries, percent of beds used for antenatal ward and long-stay postnatal care patients. National norms and consultations with subject matter experts could provide this information. The primary data collection could also provide some of the information needed.
Needed operating rooms	National policy guidelines may have standards for operating room distribution and number of Cesarean sections they can complete
Staff for obstetric care	FIGO[11] has recommendations for surgical and non-surgical personnel required in LMICs; guidelines on neonatal care can be found from Murphy et al[12] and Tsiachristas et al.[13]

4.4 Health provider survey

A health provider survey can be conducted simultaneously alongside the facility survey to assess health provider knowledge; perceptions about confidence and competence in management of key maternal and newborn conditions; and perspectives on service delivery redesign. Similar to the facility assessment, this component can be used to diagnose gaps in both the number and training of the health workforce in comparison to what would be needed under service delivery redesign. It can also be used to assess support for service delivery redesign among health workers at different levels of the system, which could reveal opponents or champions for the reform.

All staff (doctors, nurses/midwives and other non-physician clinicians, e.g. clinical officers and physician assistants) on duty in the maternity unit during the day of the facility survey can be recruited to participate in the survey. A sample tool is included in the appendix. Potential items for collection include demographics, working conditions, respondent's perceptions of quality in their facility, provider knowledge of maternal and newborn care and perceptions of service delivery redesign.

4.5 Community focus group discussions

Finally, community focus group discussions can be used to explore practical barriers to receiving quality care and opportunities for better health system utilization among women of reproductive age and other community members. These focus group discussions (FGDs) can also provide an avenue to gather feedback on service delivery redesign and potential redesign program components such as maternity waiting homes or travel vouchers. The expected output for these discussions is an understanding of the community's acceptance of the service delivery redesign reform and the barriers that they would face if it were to be implemented in the area.

The FGDs can be designed for a number of different target audiences. First, the location of the FGDs may target different areas in the service delivery redesign region, for example, urban versus rural settlements. Second, they may have different audiences. We have included examples of FGD guides for four different types of groups: women with recent facility deliveries; women with recent home deliveries; grandmothers, mothers-in-law and traditional birth attendants; and male partners and other male community members. Discussion topics may include where women give birth and why; ideal birth location and barriers; access to and quality of maternal care; and perceptions on service delivery redesign. Community health workers may be useful in recruiting participants for the FGDs, and may be another group of interest for conducting an FGD depending on the context.

Some considerations for conducting primary data collection is included in the appendix, and a summary of the stage is provided in Table 4, below.

Table 4: Summary of data collection and analytic stage actions and objectives

Component	Objectives	Expected outputs
Health system mapping	Understand the existing health system environment Inform the strategy for primary data collection	Overview of the area's current health status and architecture at a broad level Identified data gaps Data to feed into the scenario analyses
Geographic feasibility	Understand the physical access barriers that women may face if service delivery redesign were implemented in a community	Difference in population's access to delivery facilities between current service availability and proposed availability under redesign Identified specific areas where interventions to improve accessibility may be required
Facility assessment and scenario analyses	Assess current facility infrastructural and human resource capacity to provide quality maternal and newborn care Assess current quality of maternal and newborn care	Descriptive statistics on current capacity and quality Gap analysis for what additional infrastructure and human resources would be required under redesign

Provider assessment	Assess provider knowledge, confidence and attitudes toward redesign	Statistics on provider's attitudes toward redesign at different levels of the system Identified gaps in knowledge and competence in maternal care
Focus group discussions	Explore practical barriers to receiving quality care and opportunities for better health system utilization	Synthesis of community attitudes toward redesign Identified potential barriers and solutions for implementing redesign

5. FINAL CONSULTATIONS AND DISSEMINATION OF FINDINGS

5.1 Meetings for decision-making

The importance of the feasibility assessment is to provide policy makers with local evidence to assist them in deciding on whether to and how to implement redesign. As such, at a minimum the following groups should be consulted during the final consultations:

a. Highest political decision-making body in the country/sub-national unit for health. In Kakamega County, this was the County Governor and his cabinet. Key outcome: decision on implementing redesign.
b. Health team that would be leading the redesign implementation process. In Kakamega County, this was the County Health Management Team. Key outcome: prioritization of the identified systemic deficits and planning for the subsequent stages of redesign.
c. Ministry of Health (national/subnational). Key outcome: identification of policy implications of results and planning for subsequent stages of redesign.
d. Other major convening authorities. In Kenya, the Council of Governors organized a results workshop and invited other high-burden counties to participate. Key outcome: knowledge sharing and generation of interest in idea of service delivery redesign in other regions/districts.
e. Implementing and development partners. Key outcome: identification of areas of common interest from emerging results and for subsequent stages of redesign.

The structure of these consultations could follow the following agenda:

1. Introductions
2. Summary of idea of service delivery redesign
3. Presentation of results of feasibility assessment
4. Clarifying questions/answers on results
5. Discussion of results and its implications for the context
6. Discussion of decision to implement redesign
7. Discussion of next steps

The case study below illustrates the process, stakeholders and expected outcomes for the final consultations for the feasibility assessment.

Box 3: Case study on final consultations for feasibility assessment of MNH redesign in Kakamega County

A series of consultations were held in Kenya from February 25-28, 2020 to share the findings of the feasibility assessment of service delivery redesign in Kakamega County and to determine next steps.

The consultations started in Kakamega County with meetings with the Governor of Kakamega County, members of his cabinet and senior officials of the County Department of Health, and with the CEO of the Council of Governors. This was followed by a results and brainstorming workshop with members of the Kakamega County Health Management Team. The study team visited several health facilities to interact with health providers and facility managers on the results. In Nairobi, the team held consultations with representatives from 10 counties with a high burden of maternal and newborn mortality, with unit heads and senior officials at the Ministry of Health and with development partners, including the World Bank, UNICEF and USAID.

In all meetings, the study team presented the rationale for service delivery redesign and the results of the feasibility assessment. Representatives from the Kakamega County Department of Health also provided further background on Kakamega County's commitment to improve maternal and newborn survival and on the county's plans for MNH redesign. This was followed by open discussion of the results, mainly focused on the strengths and potential challenges of the redesign model, and the rational next steps.

Key decisions:

- The Governor of Kakamega County expressed the County's desire and commitment to implement redesign.
- Redesign would be implemented in 3 phases in Kakamega County
- Roll-out of redesign will only commence after facility improvements have been instituted, a pregnancy registry has been established and transportation options have been provided for remote and poor women.
- The implementation of redesign will be rigorously externally evaluated to inform national policy formulation by the Ministry of Health and inform policy in other countries.

Next Steps:

- Mar 2020: develop workstreams for design phase
- Apr-Jun 2020: develop detailed model and cost projections for redesign.
- Jul-Dec 2020: Institute all preparatory improvements for redesign
- Roll out redesign after completion of all preparations.

5.2 Preparation for design phase

The final consultations would also be an avenue to identify additional analyses needed to support the design phase of the redesign process. For e.g. to assist with quantifying the extent of access barriers, a survey of pregnant women may need to be fielded to determine transportation, security and financial risks in the population. This can be done in the aftermath of the feasibility

assessment in preparation for the design phase deliberations. Other analyses that may be necessary include in-depth assessment of primary care capacity and broader stakeholder consultations.

The final consultations should also be used as a brainstorming opportunity for stakeholders to propose solutions to some of the identified gaps and discuss potential strategies to implement service delivery redesign.

5.3 Additional Dissemination Activities

Beyond the consultations, a dissemination plan must be developed to facilitate the sharing of the results with all stakeholders consulted during the feasibility assessment. The team should also consider broader dissemination to the global public health/policy community. The media through which dissemination may be done include:

1. Project report (see Box 4 for suggested outline)
2. Oral presentations
3. Policy briefs
4. Project summary (2 pages)
5. Journal publications

Box 4: Suggested outline for feasibility assessment report

EXECUTIVE SUMARY
BACKGROUND
- Service delivery redesign
- Context description (country, sub-national)
- Objectives of the feasibility assessment

METHODOLOGY
- Health system mapping
- Geographic analysis
- Facility assessment
- Health provider survey
- Community focus group discussions

RESULTS
- Current healthcare system
- Geographic access
- Facility infrastructure
- Human resource capacity
- Acceptability of redesign

WAY FORWARD
CONCLUSION
REFERENCES
LIST OF CONTRIBUTORS

6. REFERENCES

1. Alkema L, Chou D, Hogan D, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *The Lancet* 2016; **387**(10017): 462-74.
2. Liu L, Oza S, Hogan D, et al. Global, regional, and national causes of under-5 mortality in 2000–15: an updated systematic analysis with implications for the Sustainable Development Goals. *The Lancet* 2016; **388**(10063): 3027-35.
3. Bhutta ZA, Das JK, Bahl R, et al. Can available interventions end preventable deaths in mothers, newborn babies, and stillbirths, and at what cost? *The Lancet* 2014; **384**(9940): 347-70.
4. Gabrysch S, Nesbitt RC, Schoeps A, et al. Does facility birth reduce maternal and perinatal mortality in Brong Ahafo, Ghana? A secondary analysis using data on 119 244 pregnancies from two cluster-randomised controlled trials. *Lancet Glob Health* 2019; **7**(8): e1074-e87.
5. Kruk ME, Chukwuma A, Mbaruku G, Leslie HH. Variation in quality of primary-care services in Kenya, Malawi, Namibia, Rwanda, Senegal, Uganda and the United Republic of Tanzania. *Bulletin of the World Health Organization* 2017.
6. Say L, Chou D, Gemmill A, et al. Global causes of maternal death: a WHO systematic analysis. *The Lancet Global Health* 2014; **2**(6): e323-e33.
7. David K, Pricilla R, Venkatesan S, Rahman S, Sy G, Vijayaselvi R. Outcomes of deliveries in a midwife-run labour room located at an urban health centre: results of a 5-year retrospective study. *The Natl Med J India* 2012; **25**: 323-6.
8. Chalumeau M, Bouvier-Colle M-H, Breart G. Can clinical risk factors for late stillbirth in West Africa be detected during antenatal care or only during labour? *International journal of epidemiology* 2002; **31**(3): 661-8.
9. Kruk M, Gage A, Arsenault C, et al. High quality health systems—time for a revolution: Report of the Lancet Global Health Commission on High Quality Health Systems in the SDG Era. *Lancet Global Health* 2018.
10. Roder-DeWan S, Nimako K, Twum-Danso NAY, Amatya A, Langer A, Kruk M. Health system redesign for maternal and newborn survival: rethinking care models to close the global equity gap. *BMJ Global Health* 2020; **5**(10): e002539.
11. Stones W, Visser GHA, Theron G. FIGO Statement: Staffing requirements for delivery care, with special reference to low- and middle-income countries. *Int J Gynaecol Obstet* 2019; **146**(1): 3-7.
12. Murphy GAV, Waters D, Ouma PO, et al. Estimating the need for inpatient neonatal services: an iterative approach employing evidence and expert consensus to guide local policy in Kenya. *BMJ Glob Health* 2017; **2**(4): e000472.
13. Tsiachristas A, Gathara D, Aluvaala J, Chege T, Barasa E, English M. Effective coverage and budget implications of skill-mix change to improve neonatal nursing care: an explorative simulation study in Kenya. *BMJ Global Health* 2019; **4**(6).

7. APPENDIXES

7.1 General Description of the Components of Service Delivery Redesign

Service delivery redesign is a proposal to rationalize the health system such that high quality services are provided at the right level, by the right provider and at the right time to optimize outcomes.[9] In addition to the health benefits provided by this approach, service delivery redesign also offers health system benefits, by ensuring that scarce human and material resources are effectively distributed and efficiently utilized.

The idea of service delivery redesign is applicable to any condition, and has four main components:

1. **Revise and strengthen platforms for care:** This requires the segmentation of the patient population for conditions such that care is provided and received at the right level, i.e. at a hospital, primary care clinic or using community/non-visit interventions. For each disease or condition, complex presentations which require significant expertise, or activities/procedures for which there is a reasonable possibility of rapidly fatal complications arising are best managed in hospitals, while stable presentations and preventive/promotive services should be managed lower down the health system. For example, for mental health, patients experiencing debilitating symptoms and those with multi-morbidities would be managed in specialized hospitals, patients who have recently become stable would be managed with regular in-person primary care visits, while those who have been stable for a long time could be managed with non-visit care through telemedicine. For Tuberculosis, care for uncomplicated cases would be managed in community clinics, while multidrug resistant cases with complications would be managed in centralized specialist centers. The infrastructure, equipment and personnel needed to meet the various segments of needs must be identified and provided. For example, for maternal and newborn health, well-equipped theaters, sick newborn care units, adult intensive care units and blood transfusion services should be available in hospitals, while evidence-based antenatal and postnatal services should be provided at the primary care level, with pregnancy registries set up to adequately track women through gestation and in the postnatal period. Equally, for NCDs, appropriate equipment and supplies should be available at the appropriate level of care. For all conditions, there should also be competent providers (appropriate for the level of the health system) who provide respectful, person-centered care to all health care users.
2. **Improve access to care:** This is to ensure that all healthcare consumers can reach the high-quality care that redesign seeks to provide. It will involve improving road networks, transportation and communication services in some places and for some conditions. To further ensure access for the poor and disadvantaged, innovations like shared community transportation schemes, transportation vouchers and waiting options would need to be explored. Beyond ensuring physical access, financial access and the social and cultural acceptability of services should be ensured.
3. **Ignite demand:** This aims to increase public understanding of the need for quality and increase their demand for quality services. Such understanding and demand could be obtained through open sharing of information with communities and through community

monitoring programs. Health care users and communities should be involved in the redesign process and a human-centered design approach should guide any institutional changes to service provision.

4. **Update policy:** Policy review and the introduction of new practice guidelines would be necessary to reflect the aims and structures of the redesigned service provision model. As with every new policy, extensive education of health providers and healthcare users should precede policy rollout. It is also advised that policy rollout be the last step, and should only occur after a clear model for the platform revision has been determined, necessary infrastructure and human resource improvements have been instituted and access barriers for healthcare users have been addressed.

7.2 Sample instruments for feasibility assessment

7.2.1 Facility assessment (both plain MS word version and MS Excel form definition version for the SurveyCTO platform are attached to this PDF)
7.2.2 Health provider survey (both plain MS word version and MS Excel form definition version for the SurveyCTO platform are attached to this PDF)
7.2.3 Focus group discussion guides (plain MS word version attached to this PDF)

Kindly note that you will need to open this PDF document in Adobe Acrobat Reader to be able to access the attachments.

7.3 Key considerations for data collection

7.3.1 Training data collectors

Data collection must be done in a uniform manner. All data collectors must have the same understanding of questions in the instrument and have similar responses to respondents' queries. This uniformity minimizes inter-investigator variations in responses. It is thus important that data collectors be well trained. A minimum of one week should be devoted to training of data collectors, and should preferably include field-testing of the instrument. Apart from giving the data collectors real-life practice, the field-testing would also assist the team in determining the additional logistical needs for the data collection exercise. A suggested agenda for conducting the training for data collectors for the facility and health provider surveys is provided below, in Table A1.

For the qualitative components of the feasibility assessment, it is important that individuals who are competent in facilitating focus groups and in-depth interviews lead the process. The same principles of uniformity of methodology apply in this case too if there are multiple teams performing the qualitative interviews.

Table A1: Suggested agenda for a 7-day training for data collectors

Time	Item
Day 1	
8:30 am	Introductions
9:00 am	Overview and study objectives
9:30 am	Interviewer skills
10:00 am	Ethical principles
10:30 am	Break
10:45 pm	Rapid facility assessment
12:45 pm	Lunch
1:45pm	Health provider survey
3:15 pm	Break
3:30 pm	Collection logistics
4:00 pm	Introduction to the tablets and data collection software
4:30 pm	Recap and Wrap up
Day 2	
8:30 am	Role play health provider survey
10:30 am	Break
10:45 am	Role play facility survey
12:45 pm	Lunch
1:45 pm	Role play facility survey, continued
3:45 pm	Break
4:00 pm	Assuring data quality
Day 3&4	
Time	**Item**
8:30 am	Field work to test the instruments and give practical training to research assistants
2:00 pm	Debrief meeting to discuss survey tool
Day 5	
Troubleshoot problems with survey questions and finalize survey instruments. Address challenges with logistics and data collection plan	
Day 6&7	
Time	**Item**
8:30 am	Retesting of finalized survey
3:00 pm	Debrief meeting to discuss survey tool and logistics

7.3.2 Logistics for data collection

To ensure successful data collection, logistics must be well planned. We provide here some of the areas and specific items to consider in planning the logistics for data collection.

A. Organization:
    a. Teams and team leaders
    b. Schedule for data collection
    c. Advance communication with facilities for surveys and with focal points (e.g. community health workers) for focus group discussions

d. Intermittent debrief sessions during data collection

B. Gadgets:
   a. Functioning tablets with internet access; one each per data collector and a spare tablet for each team
   b. Voice recorders for qualitative interviews

C. Aids (documents):
   a. Support letters from Ministry of Health and/or other relevant authorizing agency
   b. Ethical clearance documentation
   c. Question-by-question guide on survey instruments for data collectors

D. Items for participants
   a. Refreshments
   b. Token of appreciation for participation, e.g. mobile phone airtime

E. Transportation and communication
   a. Vehicles
   b. Phones and airtime
   c. Internet connection

Box A1: Nuggets from the field on primary data collection

1. Test out gadgets well in advance of data collection. All gadgets to be used during actual data collection should be tested during the pilots.
2. Communicate with each sampled facility ahead of the visit, as best possible. Advance communication facilitates facility entry and responsiveness and helps determine facilities in which additional authorization may be required for participation, e.g., some faith-based organizations may require authorization from their parent associations.
3. Plan out travel routes to optimize efficiency of data collection.
4. Develop back-up plans for logistical challenges, e.g., where roads are not passable by car, what would be the alternative means of reaching a facility?
5. Instruments (for quantitative data) and guides (for focus group discussions) should be written (or translated into) the language of administration to ensure uniformity in administration
6. Be upfront and open with data collectors and other collaborators on the monetary and non-monetary benefits/expectations of their participation.

7.4 Budgeting

The cost of the feasibility assessment will depend on its scope and the extent to which secondary data availability obviates the need for primary data collection. Nonetheless, a comprehensive budget must be drawn to help with funding requests and to guide expenditure. A template is provided below to assist with budgeting.

Table A2: Budget template for feasibility assessment

Item	Number of units/days	Rate	Sub-total
INITIAL STAKEHOLDER CONSULTATIONS			
Air travel			
Lodging			
Ground transport			
Meals			
Printed material			
Total for Initial Stakeholder Consultations			
FIELD WORK			
Personnel			
Team lead			
Survey/data manager			
Data analysts			
Focus group lead			
Logistics coordinator			
Data collectors			
Training			
Venue for training			
Training material (stationery, audio-visual devices)			
Meals			
Travel, transport, communication, materials			
Vehicle Rental + Fuel for Assessments & Surveys (per facility)			
Vehicle Rental + Fuel for Community FGDs			
Team Communication (data collectors + logistics coordinator)			
Participant costs for FGDs (phone airtime cards + refreshments per participant)			
Participant costs for health provider surveys (phone airtime cards)			
Tablets + cases			
Air travel for long distance travel			
Total for Field Work			
DATA ANALYSIS			
Survey CTO Subscription (per month)			
STATA (or other quantitative software) Subscription			
NVIVO (or other qualitative software) Subscription			
Translation Services			
Transcription Services			
Total for Data Analysis			
FINAL CONSULTATIONS			

Air travel			
Lodging			
Ground transport			
Hiring venues			
Meals			
Printed material			
Total for Final Consultations			
Miscellaneous			
GRAND TOTAL			