MOMENTUM
Integrated Health Resilience

BASELINE RECURRENT MONITORING SYSTEM FOR HEALTH IN EASTERN DEMOCRATIC REPUBLIC OF THE CONGO

September 10, 2024

FINAL REPORT

Submitted to:

United States Agency for International Development under
Cooperative Agreement # 7200AA20CA00005

Submitted by:

IMA World Health, with JSI Research & Training Institute, Inc.; Pathfinder International; Cooperative for Assistance and Relief Everywhere, Inc.; GOAL USA Fund; and the Africa Christian Health Associations Platform

USAID FROM THE AMERICAN PEOPLE

MOMENTUM A Global Partnership for Health and Resilience

Disclaimer

MOMENTUM Integrated Health Resilience is funded by the U.S. Agency for International Development (USAID) as part of the MOMENTUM suite of awards and implemented by IMA World Health (IMA) with partners JSI Research & Training Institute, Inc. (JSI), Pathfinder International, GOAL USA Fund, CARE, and Africa Christian Health Associations Platform (ACHAP), along with Premise Data, Harvard T.H. Chan School of Public Health Department of Global Health and Population, Johns Hopkins Bloomberg School of Public Health Department of International Health, and Brigham Young University as resource partners, under USAID cooperative agreement #7200AA20CA00005. For more information about MOMENTUM, visit www.USAIDMomentum.org. The contents of this report are the sole responsibility of IMA World Health and do not necessarily reflect the views of USAID or the United States Government.

ACKNOWLEDGMENTS

MOMENTUM Integrated Health Resilience (MIHR) would like to acknowledge the North Kivu Provincial Divisional of Health (DPS) team and the Coordination Office teams (BCZ) of the health zones where the study is taking place for study authorization and approval; MIHR DRC and core teams for inputs to the questionnaire, oversight provided during data collection, and review of the reports; the MIHR Strategic Communications team for assistance with report copy editing; the surveyed households for their time to provide information and data; Internal Hub for Research in Africa (IHfRA) and the enumerators they mobilized, for support provided for data collection; BYU for data analysis; MIHR core MERL team members for inputs and guidance at all stages (study design, implementation, analysis); and USAID/Washington for valuable contributions to the questionnaire and their funding support.

Contents

Tables

Figures

ACRONYMS AND ABBREVIATIONS

ANC	Antenatal care
ATR	Ability to recover
BRS	Basic Resilience Scale
CHW	Community health worker
DHS	Demographic and health surveys
DPS	Provincial Health Division
DRC	Democratic Republic of the Congo
FAO	Food and Agriculture Organization of the United Nations
FP	Voluntary family planning
GBV	Gender-based violence
HFIAS	Household Food Insecurity Access Scale
IHfRA	International Hub for Research in Africa
JSI	John Snow, Inc.
KAP	Knowledge, attitudes, and practices
LARC	Long-acting reversible contraception
MAD	Minimum acceptable diet
MDD	Minimum dietary diversity
MICS	Multiple Indicator Cluster Surveys
MIHR	MOMENTUM Integrated Health Resilience
MMF	Minimum meal frequency
MNCAH	Maternal, newborn, child, and adolescent health
MNCH	Maternal, newborn, and child health
MOH	Ministry of Health
NGO	Nongovernmental organization
PPS	Probability proportional to size
PREG	Partnership for Economic Growth
REAL	Resilience Evaluation, Analysis, and Learning
RH	Reproductive health
RMNCAH	Reproductive, maternal, newborn, child, and adolescent health
RMS	Recurrent monitoring system
TANGO International	Technical Assistance to Non-Governmental Organizations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

PURPOSE AND OVERVIEW

The purpose of this baseline report is to establish a benchmark for follow-up rounds of a recurrent monitoring system (RMS) taking place in North Kivu Province, Democratic Republic of the Congo (DRC). An RMS is a survey and analysis method that uses panel data from the same households over several timepoints to capture real-time or near real-time information on shocks, capacities, and health and well-being outcomes. This report covers an RMS that is a part of work done by MOMENTUM Integrated Health Resilience (MIHR), a United States Agency for International Development (USAID) cooperative agreement that works alongside local organizations, governments, and humanitarian and development assistance partners to strengthen health resilience and improve overall health. USAID defines health resilience as the ability of people, households, communities, systems, and countries to mitigate, adapt to, and recover from shocks and stresses, in a manner that reduces acute and chronic vulnerabilities and facilitates equitable health outcomes. This project is significant given that it is the first attempt to measure household resilience, with a focus on health resilience, using the RMS methodology. The MIHR RMS seeks to assess the impact of shocks on health and health resilience capacities, as measured by individual and household knowledge, skills, behaviors, assets, social capital, and coping strategies related to voluntary family planning (FP)/reproductive health (RH); maternal, newborn, and child health (MNCH); and nutrition. The MIHR RMS is being implemented in collaboration with a regional partner, International Hub for Research in Africa (IHfRA).

This baseline report details the results of a 60-minute questionnaire containing 18 modules which were administered to 1,615 households across eight MIHR-supported health zones (Beni, Mabalako, Butembo, Kalunguta, Katwa, Nyirangongo, Rutshuru, and Rwanguba) in North Kivu. Households were included in this study if they contained a child under the age of 12 months. Questionnaire modules focused on measures of MNCH, FP/RH, and nutrition—including minimum acceptable diet (MAD), minimum dietary diversity (MDD), and minimum meal frequency (MMF), together with a variety of demographic variables and psychosocial indicators. Respondents were asked about environmental, biological, conflict/crime, economic, and health-related shocks faced by the household in the previous three months. In addition, they were asked about coping strategies employed in the face of these shocks.

The cross-sectional nature of the baseline data limited the scope of the baseline analysis. Still, the baseline data were analyzed to examine the following research questions:

1. What are the most frequent shocks experienced by households at baseline?
2. What coping strategies, both positive and negative, do individuals and households use in response to both general shocks and health-specific shocks?
3. What is the extent of resilience capacity among households in North Kivu, particularly in areas affected by multiple shocks and stresses?
4. Which coping strategies are associated with household resilience, at baseline, as measured by ability to recover from shocks?

5. How are household-level resilience capacities (absorptive, adaptive, and transformative) associated with health resilience, at baseline, in the face of shocks?

Future rounds of data collection will explore additional research questions such as:

1. Which resilience capacities enabled households to recover from health shocks/stresses?
2. What were the coping strategies that these capacities enabled (or helped prevent)?
3. Which resilience capacities need to be bolstered to increase households' resilience to health shocks/stresses in project-supported areas?

KEY BASELINE RESULTS

Shocks/Stresses: Surveyed households reported the following shocks/stresses as most frequent: 1) food insecurity (health); 2) illness of a child (health); 3) increased food prices (economic); 4) illness of a spouse (health); and 5) personal illness (health). The fact that four of the five most common household stresses were health-related demonstrates the importance of health care needs in North Kivu.

Coping Strategies: The most reported coping strategies for general shocks/stresses at baseline were: reducing food consumption; reducing non-essential expenses; borrowing money from family or friends; making purchases on credit; and using personal household savings. The five most often used coping strategies for health-related shocks at baseline were: reducing the number of meals eaten in a day; contacting or visiting a medical clinic; self-medicating with product from pharmacy; limiting portion size at mealtimes; and restricting food consumption by adults so children could eat. Two coping strategies were associated with higher resilience at baseline (as measured by the ability to recover [ATR] index described on page 20): seeking medical advice from a health professional and contacting/visiting a medical clinic. Coping strategies associated with lower resilience included engaging in spiritual efforts (e.g., praying, attending church/religious services); visiting a spiritual leader; discontinuing visits to a medical clinic; self-medicating with herbs; changing antenatal care (ANC) practices; receiving multiple packs of modern contraceptives at one time to have in store; sending a household member to beg; limiting portion sizes at mealtimes; restricting food consumption by adults so children can eat; reducing the number of meals eaten in a day; and skipping entire days without eating.

Health Resilience: Coping strategies most associated with health resilience, as measured by the ATR index, included contacting or visiting a medical clinic and seeking medical advice from a health professional. Conversely, engaging in spiritual efforts, visiting a spiritual leader related to health issues, discontinuing visits to a medical clinic, using a home remedy, self-medicating with herbs, changing ANC practices, purchasing food on credit, sending household members to beg, limiting portion sizes at mealtimes, restricting food consumption by adults so children can eat, reducing the number of meals eaten in a day, and skipping entire days without eating were each significantly associated with decreased health resilience. Findings indicate that households are less able to recover from health-related shocks compared to other kinds of shocks and that the perceived impact of health-related shocks is greater than that of other kinds of shocks. These findings clearly demonstrate the impact of health-related shocks on households in North Kivu and the need to both increase

individual- and household-level resilience capacities and prevent or at least mitigate health-related shocks in the area.

Resilience Capacities: The association between resilience capacities (adaptive, absorptive, and transformative), as measured using cross-sectional data point estimates, and the estimated potential for health resilience, as measured by the ATR index, was similar for both general and health-specific shocks. When absorptive and adaptive resilience capacities were lower in value and transformative capacities higher, there was a higher perceived impact from health shocks. Likewise, higher estimates of absorptive, adaptive, and transformative resilience capacities were associated with a household's higher perceived ability to recover from all shocks. When absorptive and adaptive capacities are higher, the perceived impact from shocks is lower. Thus, greater absorptive and adaptive capacities are associated with an ability to maintain health resilience in the face of shocks. Transformative capacities were negatively associated with health resilience after experiencing shocks.

I. INTRODUCTION

This report defines health resilience, discusses capacities and coping strategies, and identifies gaps in the literature that can be answered by the recurrent monitoring system (RMS) implemented by MOMENTUM Integrated Health Resilience (MIHR). MIHR is a global United States Agency for International Development (USAID) cooperative agreement designed to strengthen quality voluntary family planning (FP), reproductive health (RH), and maternal, newborn, child, and adolescent health (MNCAH) care and services in fragile settings, including eastern Democratic Republic of the Congo (DRC). The project also advances global knowledge on strengthening FP/RH/MNCAH service delivery and building resilience in fragile settings. As part of the MOMENTUM suite of awards, MIHR works to ensure that investments at the humanitarian-development-peace nexus are tailored to country contexts and foster sustainability. MIHR supports countries to mitigate the impacts of fragility on health and contribute to partner countries' efforts to reduce maternal and child mortality and achieve sustainable development.

An RMS can provide information, in real time or near real time, on household experiences of shocks, coping and mitigation strategies used in the face of those shocks, and resilience. The RMS in DRC focuses explicitly on health resilience.

Resilience has been defined in a variety of ways (Norris et al., 2008). Most definitions emphasize a capacity for successful adaptation in the face of a disturbance, stress, or adversity. A concept borrowed from the physical sciences, resilience has been widely studied in the social sciences, particularly within the context of "bouncing back" from childhood adversity. While household and individual health outcomes are routinely threatened by shocks such as disease outbreaks, conflict, and climate change, the concept of *health resilience* has only recently been defined and requires further study. In 2021, drawing from its sector-agnostic definition of resilience, USAID defined 'health resilience' (i.e., resilience for health) as the ability of people, households, communities, systems, and countries to mitigate, adapt to, and recover from shocks and stresses, in a manner that reduces acute and chronic vulnerabilities and facilitates equitable health outcomes (USAID, 2021). The USAID definition is used in this report.

Resilience capacities are a set of conditions or abilities believed to promote resilience in the face of shocks. Three types of capacities, *absorptive*, *adaptive*, and *transformative*, have emerged as core components of resilience, although the literature on those capacities is primarily focused at the health system level (Asmamaw et al., 2019; Bene et al., 2012; Frankenberger et al., 2013; Kruk et al., 2017; Walker et al., 2004). Absorptive capacity involves "prevention and coping measures to avoid permanent, negative impacts from shocks and stressors and to maintain health system stability" (USAID, 2021, p. 7). Adaptive capacity is "the ability to make changes in response to longer-term change" (USAID, 2021, p. 7). Adaptive capacity has also been described as the ability to adjust to external factors or respond to environmental changes in order to continue to thrive (Lauzon, 2017). Adaptive capacity allows for system adjustments while improving overall system performance. Transformative capacity is the "ability to make a fundamental change that addresses underlying vulnerabilities and contextual dynamics which impact system performance and progress towards health outcomes" (USAID, 2021, p. 7). Thus, transformative capacity addresses structural and/or systemic change.

In addition to the health system, individuals and households engage in a range of coping strategies in response to shocks and stresses. Such coping strategies can be positive (e.g., diversifying income to mitigate market flux) or negative (e.g., removing a child from school to help with household work, selling productive household assets, or reducing caloric intake).

GAPS IN THE LITERATURE

The impact of shocks on maternal, newborn, and child health (MNCH) (e.g., Le & Nguyen, 2021; Ferreira & Schady, 2009; Freudenreich et al., 2022; Thai & Falaris, 2014) and nutrition (e.g., Atara et al., 2020; Darnton-Hill & Cogill, 2010) is well documented, yet little is known about specific individual and household characteristics, capacities, and coping strategies (positive and negative) for prioritizing and maintaining the above-mentioned domains of health in the face of shocks/stresses. To date, no study has targeted the impact of shocks and stresses on health and health resilience capacities as measured by individual and household knowledge, skills, behaviors, assets, social capital, and coping strategies related to FP/RH, MNCH, and nutrition. Furthermore, no study to date has employed the RMS methodology to measure household health resilience in the face of shocks. The MIHR RMS in eastern DRC (North Kivu Province) was designed to address, at least in part, these gaps.

RELEVANCE TO HEALTH SYSTEMS AND COMMUNITY RESILIENCE

In recent years, scholars have highlighted the value of resilience at the community and health systems levels (Clark-Ginsberg, 2020; Kruk et al., 2015; Kruk et al., 2017). Research at these levels attempts to explore and measure the critical capacities of local and national leadership, infrastructure, health workforce, and global support in addressing health shocks impacting nations and communities (Kruk et al., 2017). Indeed, building resilient health systems to increase the transformative capacity of communities in the face of shocks is a priority (Ebi et al., 2018), and having resilient systems in moments of crisis can reduce the loss of life (Kruk et al., 2015) or chronic vulnerabilities. By comparison to resilience at the community or system level, household resilience remains understudied, and when it is studied, it is often not health specific but instead relates to livelihood and income, with an additional emphasis on agricultural strategies in response to shocks from climate change and disasters (Alam & Mahal, 2014; Bayer et al., 2019; Bharadwaj et al., 2019; Knippenberg et al., 2019). Studies specifically focused on health and resilience have generally done so in the context of the larger health system. A smaller number of studies have explored the aspects of household health and resilience. Among these studies include those that have examined health shocks to explore how ill health and the need to seek care are associated with diminished resources and poverty (Kabir et al., 2019; Khan et al., 2017; Leive & Xu, 2008; Wagstaff, 2002). Literature has explored the impact of a variety of shocks on FP/RH behaviors (Alam & Pörtner, 2018; Behrman & Weitzman, 2016; Carballo et al., 2005) with mixed results.

OBJECTIVES

The three objectives of the longitudinal study were to:

1. Examine in detail the frequency, nature, and context of shocks and stresses in North Kivu, DRC, and their relation to FP/RH, MNCH, and nutritional outcomes.

2. Identify the resilience capacities (absorptive, adaptive, and transformative) and coping strategies (positive and negative) used by individuals and households in North Kivu to sustain health practices in FP/RH, MNCH, and nutrition when experiencing shocks/stresses.
3. Investigate the resilience capacities and coping strategies in North Kivu that are associated with health-resilient households over time (i.e., households that effectively recover from health-related shocks and stresses).

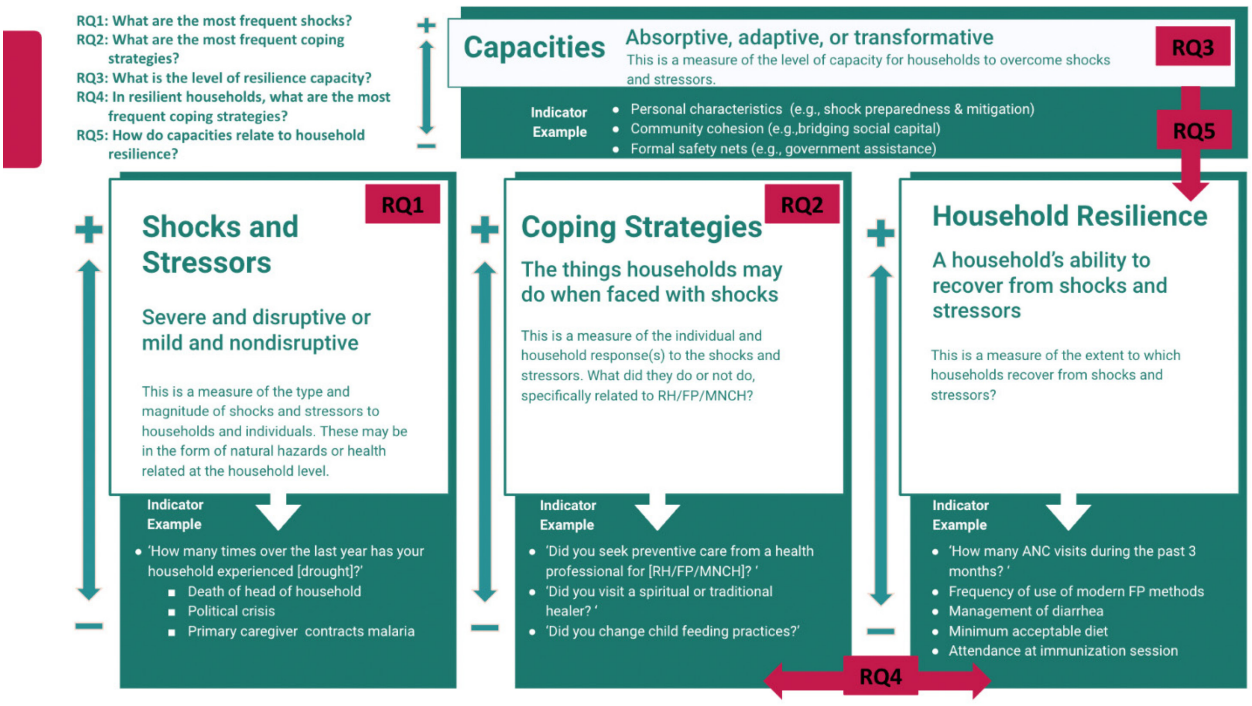
This report focuses on baseline study results, thus addressing study objectives 1 and 2 only.

RESEARCH QUESTIONS FOR THE BASELINE STUDY

1. What are the most frequent shocks experienced by households at baseline?
2. What coping strategies, both positive and negative, do individuals and households use in response to both general shocks and health-specific shocks?
3. What is the extent of resilience capacity among households in North Kivu, particularly in areas affected by multiple shocks and stresses?
4. Which coping strategies are associated with household resilience, at baseline, as measured by ability to recover from shocks?
5. How are household-level resilience capacities (absorptive, adaptive, and transformative) associated with health resilience, at baseline, in the face of shocks?

Figure 1 describes MIHR's preliminary conceptual and analytical framework for the RMS. It may be adjusted based on findings from the subsequent rounds of RMS.

Figure 1. Conceptual Framework with Research Questions (RQ1-RQ5)



II. STUDY CONTEXT, LOCATION, AND METHODS

MIHR works with governments, private sector actors, and global and local multisectoral partners to strengthen youth and gender outcomes and community responsiveness, reach underserved populations, and develop appropriate and sustainable FP/RMNCAH programming. The results are intended to improve both the health and non-health-related outcomes for women, children, families, and their communities; empower women and girls; and improve interactions between populations, health, and the environment. The project reinforces evidence-based decision-making and ongoing identification of innovative strategies to strengthen health system resilience in fragile settings.

Following the end of the 10th Ebola virus disease outbreak in North Kivu in September 2020, USAID/DRC enlisted MIHR to spearhead a post-Ebola transition and recovery plan in the region. The plan sought to support the restoration of health services while also laying the groundwork for building health resilience. A key component of the project involved enhancing cross-sectoral collaboration between the development health sector and humanitarian organizations active in North Kivu. MIHR's mandate included health system strengthening activities in 10 Ebola- and/or conflict-affected health zones: Butembo, Katwa, Kalunguta, Beni, Mabalako, Nyiragongo, Rutshuru, Rwanguba, Goma, and Karisimbi. These activities have been critical in reinstating essential health services and establishing a foundation for community and health system resilience in the face of ongoing and future shocks and stresses.

DESIGN

This study uses a longitudinal panel survey from the DRC with three planned data collection periods inclusive of a baseline and at least two follow-up rounds of data collection. Taken together, this design is referred to as a recurrent monitoring system. This report covers the baseline survey results from sampled households. Recurring monitoring will take the form of follow-up surveys.

The DRC experiences high levels of conflict and fragility. Its more than 100 million residents often encounter violence, environmental shocks (including climatic and geophysical), economic shocks, and health shocks. These cause disruptions that can impact access to the provision of, as well as the use of, services and resources that sustain health (WHO, 2021). This is especially true in North Kivu, where numerous rebel and government armed groups operate (Zarocostas, 2023). North Kivu was chosen for this study because: 1) it is where MIHR operates; 2) MIHR has a positive working relationship with local partners; and 3) it is a region that experiences frequent and diverse shocks, which can negatively impact health outcomes relating to FP/RH, MNCH, and nutrition.

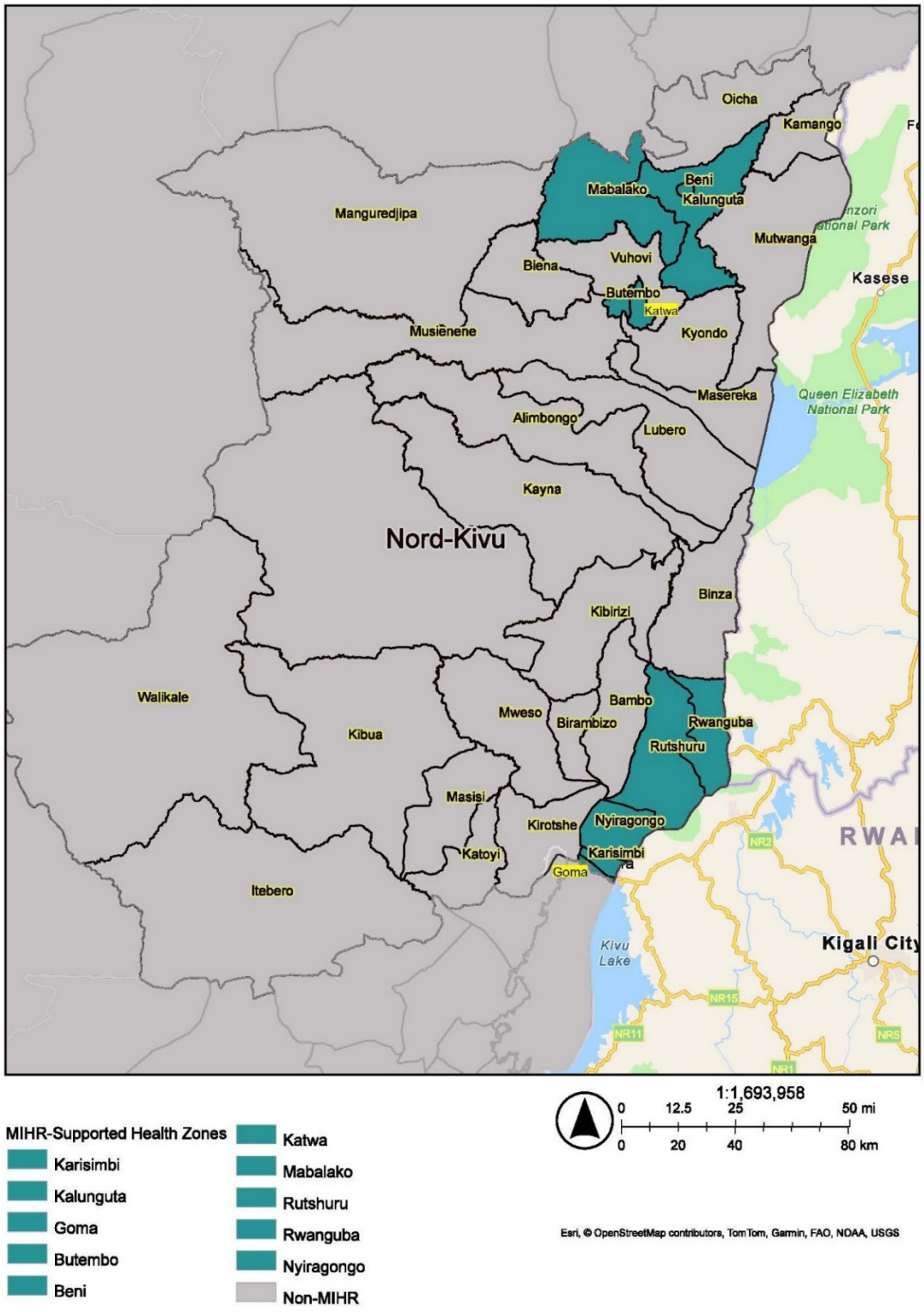
STUDY LOCATION

The study location includes villages selected using probability proportional to size (PPS) in the health facility catchment areas of all 70 health facilities MIHR supports across 8 of the 10 health zones (equivalent to districts) in North Kivu where MIHR operates.[1] The Health Zones included were Beni

[1] MIHR supports some activities in Goma and Karisimbi Health Zones, but the full package of interventions is offered in the eight health zones included in the RMS.

(urban), Butembo (urban), Katwa (urban), Nyirangongo (peri-urban), Kalunguta (rural), Rutshuru (rural), Mabalako (rural), and Rwanguba (rural).

Figure 2. Study Location: North Kivu, Democratic Republic of the Congo



POPULATION AND SAMPLING

The study sample included households with a female primary caregiver to a child under the age of 12 months at baseline. Children under one were selected so that key nutrition indicators for infants and young children could be adequately assessed. Using three nutrition indicators from the research questions listed above, multiple sample size calculations (see Figure 3) were conducted.

Figure 3. Sample Size Calculation

$$n_{initial} = D_{est} * \left[\frac{z_{1-\alpha}\sqrt{2\,\bar{P}\,(1-\bar{P})} + z_{1-\beta}\sqrt{P_{1,est}\,(1-P_{1,est}) + P_{2,est}\,(1-P_{2,est})}}{\delta} \right]^2$$

These calculations used estimates from a recent household knowledge, attitudes, and practices (KAP) survey in the same health zones of North Kivu conducted by MIHR in 2022 (MIHR, 2023). Those estimates were based on the sample size needed to detect statistically significant differences in the same outcomes of interest for this RMS. Calculations assume a design effect of two (based on a conservative estimate of intra-cluster correlation), power of 80 percent, and alpha=.05 for a one-sided test (see Table 1). Based on the most conservative estimate, approximately 1,306 households are needed to detect a difference of five percentage points in minimum dietary diversity (MDD) among children under one year of age over the course of the study (12 months). To account for attrition from the baseline sample over time, the initial household sample size was increased by 20 percent, resulting in a sample size of about 1,600 households. Ultimately, the baseline surveyed 1,616 households (approximately 25 households surveyed per cluster).

Table 1. Sample Size Calculations Based on Key Indicators

	Nutrition Indicator		
	Minimum Acceptable Diet (Child)	**Minimum Dietary Diversity (Child)**	**Minimum Dietary Diversity (Women)**
Prevalence 1 (P1) (est. time 1)	0.16	0.46	0.69
C (est. change)	0.05	0.05	0.05
D eff (design effect)	2	2	2
Prevalence 2 (P2) (est. time 2)	0.21	0.51	0.74
Z1 (alpha=.05)	1.64	1.64	1.64
Z2 (beta =.20)	0.84	0.84	0.84

P (average of P1 & P2)	0.19	0.48	0.72
N	1,028	1,306	1,206
Final N w/20 percent increase from baseline	1,233	1,567	1,447

A two-stage sampling design approach was used. First, 64 clusters were selected from a list of villages from the catchment areas of MIHR-supported sites using the PPS method. Within each community, 25 households where a primary caregiver had a child under the age of 12 months were randomly selected for participation in the study. Data collectors enumerated all households in a selected cluster prior to selection. Communities that exceeded 150 households were segmented. Segmentation included dividing the total number of households in the community by 150 to determine the number of segments needed. Once segments were identified, one segment was randomly selected from the list and interviewers enumerated all households in the segment. Using that list, teams started with a randomly generated number and selected every Nth household where N was the number of households in the community or segment divided by 25. When a selected household was visited, the data collector used a short series of screening questions to determine whether the household met the primary inclusion criteria (a child under the age of 12 months) and could be included in the sample. When there was more than one child under the age of 12 months per primary caregiver in the household, the data collector tossed a coin to determine which child would be included in the survey. If a child under the age of 12 months was not found in the household, the data collector chose the next geographically closest home on the census list until a child under the age of 12 months was located. The data collector repeated this process until 25 female primary caregivers of children under 12 months had been interviewed in each community.

The intent of this study was to track the same households over time. Therefore, children less than 12 months of age were selected so that, over the course of one year, the same children (who would still be less than 24 months at a potential third round of data collection) could be included and would not "age out."

Households lost to follow-up will not be replaced in subsequent rounds. Data collectors will use geolocation and household contact information recorded at baseline during the subsequent rounds to contact as many households as possible. The baseline survey detailed in this report included a comprehensive list of household members completed with each participating household, including all possible forms of contacting the participating primary caregiver for follow-up rounds. Contact information for a designated emergency contact was collected, and GPS coordinates of households were recorded.

ENUMERATOR TRAINING AND DATA COLLECTION

MIHR contracted with the Innovative Hub for Research in Africa (IHfRA) to assist with conducting the RMS. IHfRA, headquartered in Burkina Faso, conducts surveys, studies, research and training across the African continent. IHfRA hired enumerators, conducted training, and implemented and oversaw

data collection for the RMS. Each enumerator was required to have previous data collection experience, be proficient in local languages (e.g., local Swahili, Kinande), and be familiar with the eastern DRC context. In consultation with MIHR, IHfRA provided week-long training for all data collectors inclusive of classroom teaching, role-play, and a field practicum. Topics included the study rationale, design and methods overview, human subjects research ethics, positive interviewing practices, village and household replacement protocols, and digital data collection best practices.

Prior to data collection, a MIHR research team member met with village administrators to ensure they were aware of the survey and its purpose. Trained enumerators carried a letter from the Provincial Health Division (DPS) authorizing them to conduct the survey. Oral rather than written consent was obtained because of the high illiteracy rate and as part of COVID-19 infection prevention control measures. When an eligible participant provided consent, data collectors administered the survey in local Kiswahili that was uploaded to Android device phones equipped with the CommCare program, a digital platform for data collection owned and operated by Dimagi, Inc. (Cambridge, MA). The baseline survey lasted approximately 60 minutes. Data collectors completed 5-7 surveys per day, depending on the distance between households and clusters.

Prior to data collection, a protocol for replacement of randomly selected villages due to health or security concerns was established. This protocol included a predetermined list of randomly selected replacement villages. Ultimately, four clusters (three in Beni and one in Kalunguta) were replaced following the protocol.

ETHICAL CONSIDERATIONS

This study was conducted in accordance with the Declaration of Helsinki, as revised in 2000 (Salako, 2006). Every effort was made to ensure protection and confidentiality and to reduce any potential adverse consequences to the participants. All electronic data were securely stored in a password protected cloud-based database. Any personal identifiable information was stored in files separate from the survey data. Surveys were conducted in quiet, private locations to minimize interruptions and maintain privacy for both enumerators and participants. Ethical permission was granted by the *Université Libre des Pays des Grands Lacs* in Goma, DRC, and The John Snow, Inc. (JSI) Research Ethics Boards. The DRC DPS/Ministry of Health (MOH) provided administrative approval for the study.

MEASURES

The survey instrument was based on a combination of previous surveys used in sub-Saharan Africa and developed collaboratively by the MIHR team, consultants from Brigham Young University, and USAID. The survey was written in English and translated to both eastern DRC Kiswahili and French. Although French is the *Lingua Franca* of DRC, the Eastern Region is local Kiswahili-speaking. The Kiswahili version was then “back translated” for consistency and correctness and reviewed for content validity.

The baseline survey included 18 modules. Because the first 10 modules include background information that is not likely to change substantively, subsequent rounds will include only Modules 11-18. A brief overview of each module is detailed below.

Modules 1-5: Household Demographics, Characteristics, Assets, Livelihood, and Health. The first five modules asked participants about household demographics including the age and gender for all persons living in the household, level of education, household assets, livelihood activities, and health, including handwashing behaviors. All items were taken from previous large-scale population studies such as Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS).

Module 6: Individual Resilience. Measurement of subjective individual resilience used all six items from the Brief Resilience Scale (BRS) designed by Smith and colleagues (Smith et al., 2008) and one question asking about the participant's ability to sleep during stressful events.

Module 7: Aspirations. Measurement of aspirations was done using four items from the Somalia Resilience RMS (Martin, 2019). The aspirations indicator measures locus of control on a continuum between internal and external. An internal locus of control is considered a health asset and is defined as the degree to which people believe that they, as opposed to external forces, have control over the outcome of events in their lives.

Module 8: Decision Making and Life Satisfaction. Measurement of decision-making included five items modified from Oxfam's guidance on measuring women's empowerment (Lombardini et al., 2017), which were previously used in a household survey conducted in the same geographies (MIHR, 2023). Three additional items from the United Nations Children's Fund (UNICEF) MICS were used to measure life satisfaction.

Module 9: Knowledge, Attitudes, Perceptions, and Practices. Module 9 includes a series of items addressing knowledge, attitudes, perceptions, and practices related to child diarrhea, contraception, and nutrition for children and women. Each series was constructed by the study team based upon primary constructs of the Theory of Planned Behavior (Ajzen, 1991).

Module 10: Social Capital and Program Participation. Social capital and program participation were measured using three items from a previous study addressing various group memberships and perceived benefits of group membership borrowed with permission from the Grameen Foundation (Crookston et al, 2018).

Module 11: General Shocks and Coping Strategies. Measurement of general shocks including environmental shocks (excessive rain or flooding, insufficient rain or drought, hail or frost, landslide or erosion, earthquake, fires, volcanic eruption), biological shocks (crop disease, crop pests, livestock disease), conflict/crime shocks (theft of money, theft of crops, theft or destruction of assets, theft of livestock, violence against household members, violence against community, sexual violence or rape, conflict over access to fodder for animals, conflict over access to water for animals, forced relocation, insecurity or violence), and economic shocks (increased food prices, unavailability of agricultural/ livestock inputs, decreased demand for agricultural/livestock products sold, decreased prices for sale of agricultural/livestock products, work-related accident, loss of land or rental property, loss of job, unemployment for youth, emigration of household members, separation or divorce from spouse) (Table 6 below) . Respondents indicated if the specific shock had been experienced in the past three months (exposure), how many times the household experienced the shock in the past three months (dose), the perceived impact of the shock, to what extent the shock impacted the participant's health

or the health of someone in the household, and to what extent the household had recovered from the shock.

Coping strategies identified in previous RMS work supported by Resilience Evaluation, Analysis and Learning (REAL) and Technical Assistance to Non-Governmental Organizations (TANGO) International, used in Sub-Saharan Africa and considered to be relevant for the DRC by the research team, were integrated into this section (FAO, 2020; Smith et al., 2018). Respondents were asked to indicate the coping strategies used when faced with shocks generally and chose from a comprehensive list of coping strategies (see Table 2).

Table 2. Components of Coping Strategies for General Shocks

Thinking of the shocks your household has experienced in the past three months, which of the following strategies has your household used to cope?
Sold small livestock (chickens, goats, etc.)
Sold large livestock (cattle, etc.)
Sold grain
Sold household items
Sold productive assets
Reduced food consumption (fewer number of meals or types of food consumed)
Used personal or household savings
Borrowed money from a savings group
Borrowed money from a financial institution
Borrowed money from family, friends, or neighbors
Made purchases on credit
Delayed payment obligations
Worked additional hours or days
Took up new/additional work (that you didn't do before the shock)
Took children out of school
Sent children to work for money
Moved to less expensive housing
Reduced non-essential household expenses
Got food on credit from a local merchant
Took out a loan (with interest) from a (formal) bank
Received unconditional gift or money (not remittances), without the person asking, from family, friends, church/mosque, or other group within the community (bonding)
Received unconditional gift or money (not remittances), without the person asking, from family, friends, church/mosque, or other group outside the community (bridging)
Received cash transfer from the government or NGO
Migrated (only some family members)
Migrated (the whole family)
Sent children or an adult to stay with relatives

Avoided going for treatment when she or someone in the household was ill
Went to a health facility that provides cheaper or more affordable care
Other

Module 12: Health Shocks and Coping Strategies to Health Shocks. Health shocks included death (spouse, child, family member who does not live with them, someone else that helps support the family), illness (personal, spouse, child, other person outside of the household), injury (child, another household member), epidemics of human disease, food insecurity, unintended pregnancy, loss of pregnancy, and gender-based violence (GBV). Respondents indicated if the specific health shock had been experienced in the past three months (exposure), how many times the household experienced the shock, the impact of the shock (dose), to what extent the household was able to recover from the shock, and what was done to cope with the shock.

Respondents were asked to indicate the specific coping strategies used when faced with each specific health shock, defined as those that potentially affect their health or access to health services. The list of coping strategies for the health shocks was compiled using previous RMS instruments and then adapted to better reflect a health focus (Smith et al., 2018; FAO, 2020) in the North Kivu context. Respondents indicated how they attempted to cope with each shock that affected their health, and interviewers selected the corresponding coping strategy listed in the questionnaire (Table 3).

Table 3. Components of Coping Strategies for Health Shocks

What did you or your household do to cope with _____ (health shock)?
Borrowed food or relied on help from a friend or relative
Changed ANC practices (If she or someone else in the household is pregnant)
Consumed seed stock held for next season
Contacted or visited a medical clinic
Discontinued ANC practices (if she or someone else in the household is pregnant)
Engaged in a sauna or steam session
Engaged in spiritual efforts (prayed, offered sacrifices, etc.)
Gathered wild food, hunted, or harvested immature crops
Limited portion size at mealtimes (reduce the global quantity of food in each meal)
Purchased a medication or medical device from street vendors
Purchased food on credit
Received care or assistance from a community health worker (CHW)
Received modern contraception from the government or NGO
Received modern contraception on credit from a local clinic or merchant
Received multiple packs of modern contraceptive method from a health provider allowing for continued use
Reduced the number of meals eaten in a day
Requested medication or care on credit
Restricted consumption by adults in order for small children to eat
Self-medicated with herbs gathered in the community

Sent household members to beg
Skipped entire days without eating
Sought medical or health information or advice from a health professional
Sought medical or health information or advice from a spiritual leader
Sought medical or health information or advice from family or friends
Stopped visiting a health clinic or provider
Switched from using modern contraception to traditional/natural contraception
Switched to methods that do not require resupply (LARCs or permanent methods)
Switched to methods that do not required assistance from a health provider (self-care)
Terminated the unintended pregnancy (used traditional mean such as herbal remedies and/or sharp objects)
Used a home remedy
Used an emergency contraceptive
Visited a spiritual or traditional healer
Other

Module 13: Health Status and Accessing Care. Respondents were asked to complete 30 items designed to measure changes in health during the past three months, ability to pay for care during the past three months, ability to access care during the past three months, and if the provision of health-related care and services has been interrupted during the past three months. Interruptions to access questions were based on the work done by Assefa et. al (2021) in Burkina Faso, Ethiopia, and Nigeria.

Module 14: Assistance. Respondents were asked if their household had received assistance from formal and informal sources including government, NGOs, and family or friends, during the past three months. A total of six items specifically targeted assistance with cash, food, medications, FP supplies, and water, sanitation, and hygiene (Bower et al., 2022).

Module 15: Child Nutrition and Health. Child nutrition was measured using a total of nine questions about minimum meal frequency (MMF), minimum dietary diversity (MDD), minimum acceptable diet (MAD), and breastfeeding. These questions were obtained from recent World Health Organization (WHO)/UNICEF guidelines. Child diarrhea served as the proxy indicator for child health and was measured using six questions covering cases of diarrhea, care-seeking and management of diarrhea, and prevention of diarrhea. WHO/UNICEF guidelines questions were used to calculate exclusive breastfeeding, early initiation of breastfeeding, MDD, MMF, and MAD.

Module 16: Family Planning, Reproductive Health and Contraceptive Use. FP/RH was measured using six questions addressing needs for contraceptive methods, access, and use. These questions are a combination of standardized questions from the DHS and MICS.

Module 17: Caregiver Diet. Nutrition, specifically dietary diversity for women, was measured using a total of 13 questions about foods consumed the previous day. These items had been included previously in the Feed the Future Ethiopia Livelihoods for Resilience Learning Activity (Feed the Future, 2019). These items were used to create an indicator of MMD for women.

Module 18: Food Security. Food security was measured using a total of nine questions from the Household Food Insecurity Access Scale (HFIAS) (Coates et al., 2007).

In addition to the indicators in the modules described above, several composite variables were used in the analyses. These are described below.

COMPOSITE VARIABLE CONSTRUCTION AND ANALYSIS FRAMEWORK

This study used established RMS methodologies to identify key resilience capacity variables hypothesized to contribute to health outcomes, aligned with USAID's resilience framework. These variables were categorized into three distinct types of capacities: absorptive, adaptive, and transformative. These categories were derived from previous research and are integral to understanding how households cope with and recover from various shocks. Figure 3 illustrates the conceptual relationship between shocks and stressors, coping strategies, resilience capacities, and household resilience. Regression analyses were completed to explore the relationship between each resilience capacity and households' ability to recover (ATR) from shocks. All models were adjusted for confounding factors, including primary caregiver age, primary caregiver education level, and household wealth (the household wealth measure is described below).

Considering the novel nature of this research, our approach to variable construction was exploratory and aimed at uncovering associations that could inform building resilience. A systematic testing method was employed, using statistical significance ($p < .05$), to discern and validate associations. This iterative process ensured a more empirical and data-driven selection of variables to include in regression models.

RESILIENCE CAPACITIES

A. Absorptive capacity included:

Wealth Index. A measure of household wealth was created using factor analysis (principal components analysis) and household asset variables, resulting in a summed composite variable with a skewed distribution. For this reason, the variable was broken into tertials.

Individual Resilience Index. This index provides an additional subjective measure of general perceived resilience using the BRS (Smith et al., 2008). The index is constructed by taking the average Likert-scale score (1-5) of six questions that focus on how the individual responds to challenging times. Because it is the average of the six Likert scores and not the sum, the index value ranges from 1-5, with higher scores indicating higher levels of self-perceived resilience.

Perceived Vulnerability. This variable was created by summing the values of the following four questions:

1. If an environmental shock (earthquake, flood, drought, heat wave, volcano) were to occur, how likely is it that you or your household will be severely affected?
2. If a biological shock (crop disease, epidemic of human disease or zoonotic disease) were to occur, how likely is it that you or your household will be severely affected?

3. If a conflict shock (community violence, crime, political unrest) were to occur, how likely is it that you or your household will be severely affected?
4. If an economic shock (sudden increase in food prices, unemployment) were to occur, how likely is it that you or your household will be severely affected?

The scaled variable was recoded into tertials.

Bonding Social Capital. Individuals who reported that their household participated in at least one external group were coded as having bonding social capital. The groups included village savings and loan associations, religious groups, tontines, women's associations, men's associations, parents' associations, community garden groups, farmers' trade groups/women's economic groups, workplace associations, ethnic group associations, neighborhood social gathering groups, extended family groups, school alma mater associations, farmers' cooperatives, and illness or burial societies.

Informal safety nets. This variable included information about whether the household had received any assistance from family, friends, or neighbors in the past three months.

Life satisfaction. This category of variables included happiness, current life status, and life outlook. Happiness was determined by respondents who reported being "very happy" or "somewhat happy" when asked: *Taking all things together, would you say you are very happy, somewhat happy, neither happy nor unhappy, somewhat unhappy or very unhappy?* The *current life status* variable was determined by respondents reporting their life improved when asked: *Compared to this time last year, would you say that your life has improved, stayed more or less the same, or worsened, overall?* And the *life outlook* variable was determined by respondents who answered "better" when asked: *In one year from now, do you expect that your life will be better, will be more or less the same, or will be worse, overall?*

B. Adaptive capacity included:

Knowledge, attitudes, and practices. This variable was constructed using the 20 items from *Module 9: Positive Knowledge, Attitudes, Perceptions, and Practices*. Combining these items resulted in a variable reflecting none, low, and high KAP.

Bridging social capital. Respondents were considered to have bridging social capital if they responded "yes" to having received an unconditional gift of money (not remittances), without asking, from family, friends, church/mosque, or other group outside the community.

Aspirations. The aspirations index was calculated using four questions from Module 7 described above. The index was created by summing the Likert-scale responses from the first two questions and subtracting the sum of questions three and four from the scale. Index scores range from -8 to 8. Higher scores indicate higher aspiration and locus of control.

Social network index. This variable sought to measure respondents' membership in groups capable of providing social support and assistance. Possible options included village savings and loan associations, religious groups, tontines, women's associations, men's associations, parents' associations, community garden groups, farmer's' trade groups/women's economic groups,

workplace associations, ethnic group associations, neighborhood social gathering groups, extended family groups, alma mater associations, farmers' cooperatives, and illness or burial societies.

Shared decision-making. A series of questions helped to elucidate household decision-making dynamics, including those influenced by gender norms and roles. Questions were based on Oxfam's "A 'How To' Guide to Measuring Women's Empowerment" (2017). A common set of response options was presented for six questions about who in the household makes decisions on things related to a sick child, health care, diet, contraception, and family size. Respondents were asked to select one of the following options: a) respondent alone; b) husband/partner alone; c) respondent and husband/partner jointly; d) someone else (e.g., mother-in-law, traditional healer); e) respondent and someone else jointly; and f) decision not made/not applicable. A scaled variable representing women's decision-making autonomy was constructed (alpha = .70). This variable has a range of 0–5 (0/low: no involvement; 5/high: complete involvement). Women were coded as a "1" on any single question if they reported having any involvement in household decision-making (i.e., response options a, c, and e). The scores for each of the five variables were then summed for a maximum possible score of 5. The combined score was used to categorize caregivers' involvement in decision-making along a continuum from no involvement (no independent and no shared decision-making) to complete involvement (some role in decision-making for all the scenarios presented).

C. Transformative capacity included:

Formal safety nets. These were respondents that reported "yes" to the following question: "*In the last three months, has your household received any assistance from a non-government organization (NGO)?*"

Government aid. These were respondents that reported "yes" to the following question: "*In the last three months, has your household received any assistance from the government?*"

DATA SYNTHESIS

Three parent variables were created, one to represent each of the resilience capacity domains of absorptive, adaptive, and transformative. This was done by combining the relevant indicators for each capacity domain and then dividing them into low and high capacities based on the median value. The decision to include indicators in a specific capacity domain was made using previous RMS reports including these capacities. The dichotomization threshold was set at the 50th percentile, providing a quantitative demarcation between lower and higher capacities for absorptive, adaptive, and transformative resilience. Table 4 displays the specific indicators used in these calculations and denotes which of the previous Sub-Saharan RMS studies used these same indicators in defining the resilience capacities. MIHR assigned these indicators based on the project's definitions of the capacities.

Table 4. Comparison of Indicators Used to Assess Resilience Capacities in Sub-Saharan Africa

Absorptive Capacity Components	DRC DSFAs[a]	Kenya PREG[b]	Somalia EREGS[c]	DRC MIHR[d]
Asset index (productive, livestock, and/or durable goods)	X	X	X	X

Shock preparedness and mitigation	X	X	X	X
Access to cash savings		X		X*
Bonding social capital		X	X	X
Availability of informal safety nets			X	X
Availability of humanitarian assistance	X	X		X
Life satisfaction				X
Adaptive Capacity Components	**DRC DSFAs[a]**	**Kenya PREG[b]**	**Somalia EREGS[c]**	**DRC MIHR[d]**
Exposure to information		X		X
Bridging social capital		X		X
Education/training		X		X
Aspirations/confidence to adapt		X		X
Social network index	X	X		X
Access to financial institutions		X		X*
Livelihood diversification				X*
Transformative Capacity Components	**DRC DSFAs[a]**	**Kenya PREG[b]**	**Somalia EREGS[c]**	**DRC MIHR[d]**
Availability of formal safety net				X
Local government responsiveness/effective governance	X	X	X	X*
Access to infrastructure		X		X*
Gender index (norms)		X		
Conflict mitigation			X	X*
Access to communal natural resources			X	
Collective action		X		
Participation in local decision making		X		
Access to basic services (e.g., roads, school, health clinic)				X*
Government/NGO assistance				X
Decision-making index				X

[a] DRC DFSAs: Food for Peace-funded Development Food Security Activities (DRC)
[b] Kenya PREG: Partnership for Resilience and Economic Growth (Kenya)
[c] Somalia EREGS: Enhancing Resilience and Economic Growth in Somalia
[d] DRC MIHR: MOMENTUM Integrated Health Resilience (DRC)
*Not included in respective indices but can be found in coping strategy analyses

Ability to Recover (ATR). This is the primary proxy for resilience and is an index that refers to the average recovery from shocks score. Each household was asked how well they recovered from each reported shock and provided answers ranging from 1 (did not recover) to 5 (not affected). The average recovery score across all shocks was calculated to create the index, with scores ranging from 1 to 5. Only households that experienced shocks were evaluated for this measure, which is the primary proxy for resilient households. Three versions of ATR (i.e., three separate dependent variables) were created:

1) ATR from non-health shocks, 2) ATR from health shocks, and 3) ATR from all shocks (Smith et al. 2015).

Perceived Impact of Shock Exposure. This index measures the perceived impact of the shocks that each household experienced. Higher scores indicate a higher perceived impact of shocks. The shock exposure index is the weighted average of the incidence of each shock and its perceived severity using a five-point scale. The incidence of each shock (0 or 1) is multiplied by its perceived severity (1, 2, 3, 4, or 5), and the resulting values are summed across the shocks. Thus, the intention is to show both the severity and the number of shocks in a combined measure. Note: the potential maximum values for these constructed indices are different. Readers should use caution when interpreting results for regression coefficients in the multivariate analyses since health, non-health, and all shocks (health + non-health shocks) cannot be compared directly.

Child and Caregiver Nutrition Indicators. These questions about child nutrition were used to calculate MDD, MMF, and MAD. WHO/UNICEF guidelines were used to calculate these variables. Similar questions asked about the primary caregiver's diet were used to create an indicator of MDD for women.

DATA ANALYSIS

Descriptive and multivariate analyses were completed using STATA version 17 (College Station, TX, USA). Descriptive analyses included frequencies for basic demographics, trends in shock frequency and severity, resilience capacities such as household attributes and resources, frequencies of common coping strategies, and frequencies of key health practices and outcomes. Multivariate analyses were used to identify and/or examine 1) which coping strategies were most often used by health-resilient households; 2) if household resilience capacity (separate from coping strategies) was associated with health-resilient households; and 3) the relationship between each of the three types of resilience capacity (absorptive, adaptive, and transformative) and ability to recover (from all shocks, health shocks, and non-health shocks).

Linear regression models were calculated to explore factors associated with high perceived impact from shocks. Unadjusted and adjusted models were computed. Adjusted models controlled for mothers' age and education. Separate logistic regression models were constructed to examine the relationship between each coping strategy and resilience. ATR was used as a proxy for household resilience. Each coping strategy was examined separately in a logistic regression model predicting resilience. Two sets of models are reported. The first set of models examines the relationship between general coping strategies and resilience as measured by ATR from non-health shocks. The second provides results for the association between health coping strategies and health shocks.

III. RESULTS

This section reports demographic information and results addressing the five primary research questions. Additional results from each module of the study questionnaire are included in the Appendix.

Demographics. Approximately half (51.0 percent) of respondents were under the age of 26 years, and the majority were married and living with a spouse (88.8 percent). Forty percent of respondents had no formal schooling and 43 percent reported they could not read or write. Nearly all identified as Christian (98.6 percent). Demographic variables (unweighted) are presented in Table 5.

Table 5. Sample Demographics

	N (percent)
What is your marital status?	
Married or living together	1,406 (88.8)
Never married and never living together	107 (5.8)
Divorced or separated	88 (4.6)
Widowed	15 (0.8)
Can you read and write?	
Yes	532 (43.8)
No	1,084 (56.2)
What is the highest level of school you have achieved/completed?	
None	419 (40.3)
Less than primary	225 (13.7)
Primary	613 (29.2)
Secondary	315 (15.1)
University	43 (1.7)
Other	1 (0.0)
What is the religion of (head of household)?	
Christian	1,587 (98.7)
Muslim	16 (0.8)
Animist	5 (0.3)
Atheist	3 (0.1)
Kimbanguist	4 (0.2)
Other	1 (0.0)
What is your age? (Mother)	
Under 18	32 (1.9)
18-25	792 (49.1)
26-35	540 (32.4)
35+	252 (16.6)

Research Question #1: What are the most frequent shocks experienced by households at baseline?

Shocks. Table 6 provides results for all shocks occurring in the three months prior to the survey. The most common shocks were food insecurity (58.6 percent), illness of a child (56.6 percent), increased food prices (56.3 percent), illness of spouse (33.4 percent), personal illness (27.7 percent), supply chain issues around agricultural/livestock inputs (22.9 percent), insufficient rain/drought (21.9

percent), death of a family member who does not live with them (15.0 percent), epidemic of human disease (14.5 percent), and theft of crops (14.1 percent).

Table 6. Frequency of All Shocks Occurring in the Previous Three Months (n=1,615)

	Yes N (percent)	No N (percent)
Environmental Shocks		
Insufficient rain or drought	339 (21.9)	1,276 (78.1)
Excessive rain or flooding	160 (10.1)	1,455 (90.0)
Earthquake	154 (7.0)	1,461 (93.0)
Hail or Frost	57 (3.9)	1,558(96.1)
Landslide or erosion	49 (3.9)	1,566 (96.1)
Fires	29 (3.4)	1,586 (96.7)
Volcanic eruption	4 (0.2)	1,611 (99.8)
Biological Shocks		
Crop pests	123 (13.9)	1,492 (86.1)
Crop disease	109 (9.0)	1,506 (91.0)
Livestock disease	46 (2.7)	1,569 (97.3)
Conflict/Crime Shocks		
Theft of crops	167 (14.1)	1,448 (85.9)
Theft of money	127 (8.6)	1,488 (91.4)
Theft or destruction of assets	91 (6.0)	1,524 (94.0)
Insecurity or violence	76 (5.4)	1,539 (94.6)
Violence against household members	46 (4.7)	1,569 (95.3)
Violence against community	60 (4.6)	1,555 (95.4)
Theft of livestock	72 (4.5)	1,543 (95.5)
Forced relocation	39 (2.7)	1,576 (97.3)
Sexual violence or rape	8 (0.4)	1,607 (99.6)
Conflict over access to fodder for animals	14 (1.0)	1,601 (99.6)
Conflict over access to water for animals	11 (0.7)	1,604 (99.3)
Economic Shocks		
Increased food prices	946 (56.3)	669 (43.7)
Supply chain issues for agricultural/livestock inputs	268 (22.9)	1,347 (77.1)
Unemployment for youth	77 (5.8)	1,538 (94.2)
Work-related accident	58 (5.1)	1,557 (94.9)
Loss of land or rental property	62 (4.6)	1,553 (95.4)
Loss of job	72 (3.7)	1,543 (96.3)
Decreased demand for agricultural/livestock products sold	47 (3.5)	1,568 (96.5)
Separation or divorce from spouse	49 (3.0)	1,566 (97.0)

Decreased prices for sale of agricultural/livestock products	46 (2.7)	1,569 (97.3)
Emigration of household members	33 (2.3)	1,582 (97.7)
Health Shocks		
Food insecurity	981 (58.6)	635 (41.4)
Illness of child	824 (56.6)	792 (43.4)
Illness of spouse	459 (33.4)	1,157 (66.7)
Personal illness	385 (27.7)	1,231 (72.3)
Death of family member who does not live with them	278 (15.0)	1,337 (85.0)
Epidemic of human disease	228 (14.5)	1,387 (85.5)
Illness of another household member	175 (11.4)	1,441 (88.6)
Death of someone else who helps support the family	148 (10.3)	1,467 (89.7)
Injury to child	113 (7.1)	1,503 (92.9)
Illness of other outside of the household	46 (3.7)	1,570 (96.3)
Injury to another household member	43 (2.7)	1,573 (98.0)
Death of household member	43 (2.4)	1,572 (97.6)
Unintended pregnancy	31 (2.0)	1,612 (98.7)
Death of child	19 (1.1)	1,596 (98.9)
Gender-Based Violence	19 (1.4)	1,597 (98.7)
Death of spouse	15 (0.9)	1,600 (99.1)
Loss of a pregnancy	4 (0.2)	1,612 (99.8)
Other	46 (2.0)	1,570 (98.0)

Research Question #2: What coping strategies, both positive and negative, do individuals and households use in response to all shocks and health-specific shocks?

Shock Coping Strategies. Table 7 provides results for 29 potential coping strategies for dealing with household shocks in the past three months. The most common coping strategies used by the 1,246 households who reported having any shocks in the previous three months were: reduced food consumption (44.9 percent), reduced non-essential expenses (42.7 percent), made purchases on credit (33.8 percent), borrowed money from family, friends (28.3 percent), used personal or household savings (24.9 percent), got food on credit (22.3 percent), received unconditional gift from someone inside community (20.0 percent), avoided taking sick person for treatment (19.4 percent), went to a less expensive health facility (19.2 percent), and sold grain (18.2 percent).

Table 7. Frequency of General Shock Coping Strategies Used in Previous Three Months (n=1,246)

	Yes N (percent)	No N (percent)
Management of livestock/agriculture		
Sold grain	183 (18.2)	1,063 (81.8)
Sold small livestock	91 (8.2)	1,155 (91.8)
Sold large livestock	36 (4.1)	1,210 (95.9)

Strategies to get more food or money		
Made purchases on credit	326 (33.8)	920 (66.2)
Borrowed money from family or friends	369 (28.3)	877 (71.7)
Used personal household savings	340 (24.9)	906 (75.1)
Got food on credit	251 (22.3)	995 (77.7)
Received unconditional gift from someone in community	255 (20.0)	991 (80.0)
Borrowed money from savings	186 (12.3)	1,060 (87.7)
Sold household items	92 (8.7)	1,154 (91.3)
Delayed payment of obligations	65 (6.9)	1,181 (93.1)
Received unconditional gift from someone outside community	56 (4.6)	1,190 (95.4)
Sold productive assets	51 (4.4)	1,195 (95.6)
Took children out of school	40 (3.5)	1,206 (96.5)
Migrated (some family members)	34 (3.5)	1,212 (96.5)
Borrowed money from financial institution	33 (3.0)	1,213 (97.0)
Worked additional hours	51 (2.9)	1,195 (97.1)
Took up new work	30 (2.7)	1,216 (97.3)
Sent children to work	23 (2.3)	1,223 (97.7)
Migrated (whole family)	19 (2.0)	1,227 (98.0)
Took out a loan from bank	30 (1.7)	1,216 (98.3)
Received a cash transfer	4 (0.2)	1,242 (99.8)
Strategies to reduce current expenditures		
Reduced food consumption	563 (44.9)	683 (55.1)
Reduced non-essential expenses	564 (42.7)	682 (57.3)
Avoided taking a sick person for treatment	231 (19.4)	1,015 (78.7)
Went to a less expensive health facility	201 (19.2)	1,045 (81.2)
Used non-medical treatment for care	74 (7.1)	1,172 (92.8)
Sent children or an adult to stay with relatives	50 (5.4)	1,196 (94.6)
Moved to less expensive housing	46 (3.8)	1,200 (96.2)
All Other	275 (20.8)	971 (77.8)

Health Shock Coping Strategies. Table 8 provides results for 35 potential coping strategies for dealing with health-related shocks by the 1,361 households that experienced at least one health-related shock in the past three months. The most common coping strategies reported were: reduced the number of meals eaten in a day (51.3 percent), contacted or visited a medical clinic (47.2 percent), self-medicated with product from pharmacy (40.3 percent), limited portion size at mealtimes (35.0 percent), restricted food consumption by adults so children could eat (31.6 percent), purchased food on credit (27.2 percent), skipped entire days without eating (23.6 percent), engaged in spiritual efforts (e.g., prayed, offered sacrifices) (15.0 percent), used a home remedy (14.7 percent), and borrowed food or relied on help from a friend or relative (13.0 percent).

Table 8. Frequency of Health Shock Coping Strategies Used in the Previous Three Months (n=1,361)

	Yes N (percent)	No N (percent)
Reduced the number of meals eaten in a day	649 (51.3)	712 (48.7)

Contacted or visited a medical clinic	641 (47.2)	720 (52.8)
Self-medicated with product from pharmacy	559 (40.3)	802 (59.7)
Limited portion size at mealtimes	478 (35.0)	883 (65.0)
Restricted food consumption by adults so children could eat	316 (31.6)	1,045 (68.4)
Purchased food on credit	357 (27.2)	1,004 (72.8)
Skipped entire days without eating	228 (23.6)	1,133 (76.4)
Engaged in spiritual efforts	163 (15.0)	1,198 (85.0)
Used a home remedy	181 (14.7)	1,180 (85.3)
Borrowed food or relied on help from a friend or relative	187 (13.0)	1,174 (87.0)
Visited a spiritual healer	109 (11.2)	1,252 (88.8)
Consumed seed stock for next season	94 (8.2)	1,267 (91.8)
Self-medicated with herbs	92 (7.6)	1,269 (92.4)
Sent household members to eat elsewhere	58 (5.8)	1,303 (94.2)
Gathered wild food, hunted, or harvested early	68 (5.5)	1,293 (94.5)
Purchased medication from a street vendor	62 (5.5)	1,299 (94.5)
Received care or assistance from a CHW	57 (5.5)	1,304 (94.5)
Stopped visiting a health clinic	51 (5.4)	1,310 (94.6)
Sent household members to beg	33 (4.3)	1,328 (95.7)
Sought medical advice from a health professional	49 (3.6)	1,312 (96.4)
Requested medication or care on credit	23 (1.7)	1,338 (98.3)
Sought medical advice from family or friends	21 (1.6)	1,340 (98.4)
Sought medical advice from a spiritual leader	8 (0.5)	1,353 (99.5)
Changed ANC practices (if she or someone is pregnant)	2 (0.3)	1,359 (99.7)
Switched to contraceptive methods that do not require assistance	4 (0.3)	1,357 (99.7)
Switched from using modern contraception to traditional	2 (0.2)	1,359 (99.8)
Received modern contraception on credit	3 (0.2)	1,358 (99.8)
Received multiple packs of modern contraceptive	1 (0.1)	1,360 (99.9)
Switched to contraceptive methods which do not require resupply	1 (0.1)	1,360 (99.9)
Engaged in sauna	1(0.1)	1,360 (99.8)
Used an emergency contraceptive	1 (0.1)	1,360 (99.9)
Used savings to buy modern contraception	2 (0.1)	1,359 (99.9)
Discontinued ANC practices (if she or someone else is pregnant)	0 (0.0)	1,361 (100.0)
Terminated an unintended pregnancy	1 (0.0)	1,360 (100.0)
Received modern contraception from government or NGO	0 (0.0)	1,361 (100.0)

Frequency of Capacity Indicators. Table 9 describes levels of resilience capacity at baseline for indicator domains defined and presented in Table 4. Just under half of households had high absorptive capacity (44.2 percent). Just over half (52.0 percent) of respondents had high adaptive capacity. A little more than one-third of households had high transformative capacity (34.3 percent).

Table 9. Frequency of Capacity Indicators

Capacity Indicator	N	Percent
Absorptive		
Low	902	55.8
High	714	44.2
Adaptive		
Low	776	48.0
High	840	52.0
Transformative		
Low	1,062	65.7
High	554	34.3

Capacities by Health Zone. Table 10 details levels of resilience capacity at baseline by health zone. Per the "Total" row, across health zones, adaptive capacity is the greatest (52.0 percent), followed by absorptive (44.2 percent), and transformative (34.3 percent).

Table 10. Percent of Respondents with High Resilience Capacities, by Health Zone (n=1,616)

Health Zone	Absorptive (Percent)	Adaptive (Percent)	Transformative (Percent)
Beni	46.5	61.8	37.1
Butembo	82.0	46.0	50.0
Kalunguta	48.0	45.0	29.0
Katwa	73.3	64.0	50.3
Nyirongongo	26.0	53.0	21.0
Mabalako	28.8	44.1	34.8
Rutshuru	18.7	39.6	19.6
Rwanguba	5.6	17.6	14.4
Total	**44.2**	**52.0**	**34.3**

Note: High resilience refers to having a resilience score above the median in the analysis sample.

***Research Question #4:** Which coping strategies are associated with household resilience as measured by ability to recover from shocks (at baseline)?*

To understand coping strategies used by resilient households, findings are first organized by measures of household resilience followed by an analysis of which coping strategies were used by resilient households.

Measures of Household Resilience. Table 11 provides estimates for two different measures of household resilience broken down by three different groups of shocks. These measures are perceived (self-reported) ability to recover from shocks. While the *ability to recover from shocks* is based on a 5-point scale, the number of items included in each measure differs. The average ATR varied from 2.7 for general (non-health) shocks to 2.4 for health shocks (range 1-5). Shock exposure, which measures the

perceived impact of shocks, was higher for health shocks (9.8) than general (non-health) shocks (7.3), similarly indicating that health shocks had a larger impact on households.

Table 11. Measures of Household Resilience: Average Index Scores for Self-Reported Ability to Recover and Perceived Severity of Shocks

	Mean (N)
Resilience (range 1-5)	
Ability to recover from non-health shocks index[a]	2.7 (1009)
Ability to recover from health shocks index[a]	2.4 (1384)
Ability to recover from all shocks index[a]	2.5 (1436)
Shock exposure	
Perceptions-based non-health shock exposure index[b]	7.3 (1616)
Perceptions-based health shock exposure index[b]	9.8 (1616)
Perceptions-based all shock exposure index[b] (range 1-255)	17.1 (1616)

[a] Ability to recover index is the average recovery per household across shocks experienced (range: 1-5 with 1 indicating no recovery and 5 indicating not impacted by shock)—only includes households that experience at least one shock.
[b] Shock exposure index is the weighted average of the incidence of each shock and its perceived severity using a 5-point scale. The incidence of each shock (0 or 1) is multiplied by its perceived severity (1, 2, 3, 4 or 5), and the resulting values are summed up across the shocks. The possible range for all shocks is 0-255.

Coping Strategies and Household Resilience. Results from linear regression models predicting what coping strategies were significantly associated with ATR are presented in Tables 12 and 13. It should be noted that regression coefficients for health, non-health, and all shocks cannot be compared directly, given the differing number of shocks in each construct. Table 12 includes general coping strategies and ATR from general shocks. In the regression models, selling large livestock, selling grain, selling household items, reducing food consumption, making purchases on credit, delaying payment obligations, sending children to work, getting food on credit, whole family migration, avoiding taking a sick person for treatment, and going to a cheaper health facility were significantly associated with decreased household resilience. Reducing non-essential expenses was associated with increased household resilience.

Table 12. Coefficients for Self-Reported Ability to Recover from Non-Health Shocks by Use of Each Coping Strategy, Using Multivariate Linear Regression Analysis among Households that Experienced Non-Health Shocks (n=1,048)

	Coefficient	95% CI
Avoided taking sick person for treatment	-.37***	(-.52, -.22)
Borrowed money from family or friends	.12	(-.02, .26)
Borrowed money from financial institution	.23	(-.14, .59)
Borrowed money from savings group	.18	(-.02, .37)
Delayed payment obligations	-.34**	(-.57, -.11)
Got food on credit	-.21**	(-.35, -.06)
Made purchases on credit	-.26***	(-.39, -.13)
Migrated some family members	.26	(-.07, .58)

Migrated whole family	-.57*	(-1.105, -.04)
Moved to less expensive housing	-.05	(-.36, .26)
Received cash transfer	.36	(-.93, 1.66)
Received unconditional gift from someone inside community	-.15	(-.30, .01)
Received unconditional gift from someone outside community	-.17	(-.46, .12)
Reduced food consumption	-.25***	(-.37, -.12)
Reduced non-essential expenses	.13*	(-.25, -.00)
Sent children or an adult to stay with relatives	-.17	(-.43, .10)
Sent children to work	-.46*	(-.85, -.06)
Sold grain	-.34***	(-.49, -.19)
Sold household items	-.37***	(-.58, -.15)
Sold large livestock	-.31*	(-.60, -.02)
Sold productive assets	-.02	(-.32, .27)
Sold small livestock	.18	(-.05, .41)
Took children out of school	-.26	(-.59, .07)
Took out a loan from bank	.36	(-.10, .83)
Took up new work	-.10	(-.45, .26)
Used non-medical treatment for care	-.16	(-.38, .07)
Used personal or household savings	.06	(-.08, .20)
Went to cheaper health facility	-.30***	(-.45, -.15)
Worked additional hours	.26	(-.14, .66)

Each row presents results from a distinct analysis with the indicated coping mechanism (used vs. not used) and the outcome, self-reported ability to recover (range: 1-5). Linear regression models controlled for age, wealth (for the adaptive and transformative models only because wealth was part of the absorptive variable), and level of education. All analyses were adjusted for sample design (PPS cluster sampling for villages).
*p<.05; **p<.01; ***p<.001

Results from linear regression models predicting what coping strategies were significantly associated with ATR from health shocks are presented in Table 13. In regression models, contacting or visiting a medical clinic and seeking medical advice from a health professional were significantly associated with higher health resilience. Engaging in spiritual efforts, visiting a spiritual leader, discontinuing visits to a medical clinic, using a home remedy, self-medicating with herbs, changing ANC practices, purchasing food on credit, sending household members to beg, limiting portion sizes at mealtimes, restricting food consumption by adults so children can eat, reducing the number of meals eaten in a day, and skipping entire days without eating were all significantly associated with decreased health resilience.

Table 13. Associations between Health Shock Coping Strategies and Household Health Resilience (n=1,374)

	Coefficient	95% CI
Borrowed food or relied on help from friends or relatives	-.01	(-.14, .12)
Changed ANC practices (if she or someone else was pregnant)	-1.04**[a]	(-1.82, -.26)

Consumed seed stock for next season	-.10	(-.25, .07)
Contacted or visited medical clinic	.09*	(.00, .18)
Engaged in sauna	.08	(-1.05, 1.20)
Engaged in spiritual efforts	-.13*	(-.25, -.01)
Gathered wild food, hunted, or harvested early	-.11	(-.30, .08)
Limited portion sizes at mealtimes	-.39***	(-.48, -.30)
Purchased food on credit	-.16***	(-.26, -.06)
Purchased medication from street vendor	-.04	(-.23, .15)
Received care or assistance from a CHW	-.11	(-.30, .08)
Received modern contraception on credit from clinic	.22	(-.71, 1.16)
Received multiple packs of modern contraceptive	-.43	(-2.10, 1.24)
Reduced the number of meals eaten in a day	-.33***	(-.42, -.25)
Requested medication on credit	-.10	(-.43, .24)
Restricted consumption by adults so children could eat	-.46***	(-.55, -.37)
Self-medicated with herbs	-.33***	(-.49, -.16)
Self-medicated with product from pharmacy	.05	(-.04, .14)
Sent household members to beg	-.33**	(-.54, -.12)
Sent household members to eat elsewhere	-.13	(-.31, .06)
Skipped entire days without eating	-.33***	(-.43, -.23)
Sought medical advice from family or friends	.10	(-.25, .45)
Sought medical advice from health professional	.68***	(.45, .91)
Sought medical advice from spiritual leader	.27	(-.37, .91)
Stopped visiting a health clinic	-.24*	(-.43, -.05)
Switched from using modern contraception to traditional	.41	(-.64, 1.46)
Switched to contraceptive methods that do not require assistance	.40	(-.45, 1.25)
Switched to contraceptive methods that do require resupply	1.24[a]	(-.17, 2.66)
Terminated an unintended pregnancy	-.03	(-2.73, 2.68)
Used a home remedy	-.20**	(-.32, -.08)
Used an emergency contraceptive	.45	(-.71, 1.62)
Used saving to buy modern contraception	.47	(-.93, 1.87)
Visited a spiritual healer	-.23***	(-.36, -.09)

*p<.05; **p<.01; ***p<.001

a: Note small number of respondents reporting this practice (2 out of 1,341)

Q5: How is resilience capacity (absorptive, adaptive, and transformative) associated with perceived impact from shocks and the ability to maintain health resilience in the face of shocks?

Perceived Impact of Shock Exposure. The relationship between experiencing all shocks, including environmental, biological, conflict/crime, economic shocks, and health shocks, and key variables are presented in Tables 14-16. In each of these tables, the findings include the results from distinct models where each capacity index variable was compared against the dependent variable,

independent of the other independent variables presented in the table. Adjusted results control for respondents' age, household wealth, and education level.

Table 14 presents relationships between the perceived impact of shocks, including general and non-health shocks. Absorptive and adaptive capacities were both negatively associated with perceived impact of exposure to all shocks. Thus, households with high absorptive and adaptive capacity were associated with lower perceived impact from non-health shocks. Inversely, households with high transformative capacity were associated with higher perceived impact from non-health shocks.

Table 14. Coefficients for Perceived Impact of Non-Health Shocks by Resilience Capacities (High vs. Low), Using Multivariate Linear Regression Analysis among Households that Experienced Non-Health Shocks (n=1,048)

	Unadjusted		Adjusted	
	β	95% CI	β	95% CI
Absorptive	-3.42***	(-4.14, -2.70)	-3.91***	(-5.28, -2.53)
Adaptive	-1.93***	(-4.14, -2.70)	-1.48*	(-2.83, -0.14)
Transformative	1.57***	(0.81, 2.35)	3.10***	(1.47, 4.74)

Each row presents results from a distinct analysis with the indicated resilience capacity (high vs. low) and the outcome, perceived impact index from non-health shocks (range: 1-X). Multivariate regression models were controlled for age, wealth (for the adaptive and transformative models only because wealth was part of the absorptive variable), and level of education. All analyses were adjusted for sample design and clustering at the village level.
*p<.05; **p<.01; ***p<.001

Table 15 presents the perceived impact of shock exposure for health shocks. Similar to the directionality for general and non-health shocks, as absorptive and adaptive capacities decrease and transformative capacities increase, there is an increase in the probability of high perceived impact from health shocks. This may suggest that when shocks are perceived to have dramatic impacts, the capacities to deal with those shocks are also greater. More research is needed to explore this association.

Table 15. The Association Between Capacity Domains and the Perceived Impact of Exposure to Health Shocks Using Multivariate Linear Regression

	Unadjusted		Adjusted	
	β	95% CI	β	95% CI
Absorptive	-3.69***	(-4.36, -3.02)	-3.79***	(-4.83, -2.77)
Adaptive	-1.72***	(-2.40, -1.03)	-2.09***	(-3.13, -1.05)
Transformative	1.11***	(0.39, 1.83)	1.84***	(0.79, 2.88)

Note: Adjusted models controlled for age, wealth (for the adaptive and transformative models only because wealth was part of the absorptive variable), and level of education; *p<.05; **p<.01; ***p<.001

Table 16 presents the association between capacity domains and the perceived impact of shock exposure for all shocks, both general and health shocks. Absorptive and adaptive capacities were both negatively associated with perceived impact of exposure to all shocks. Thus, households with high absorptive and adaptive capacity were associated with lower perceived impact from shocks.

Inversely, households with high transformative capacity were associated with higher perceived impact from all shocks.

Table 16. The Association Between Capacity Domains and the Perceived Impact of Exposure to All Shocks, Both General and Health Shocks Using Multivariate Linear Regression

	Unadjusted		Adjusted	
	β	95% CI	β	95% CI
Absorptive	-7.11***	(-8.33, -5.89)	-7.71***	(-9.88, -5.53)
Adaptive	-3.65***	(-4.89, -2.40)	-3.57***	(-5.69, -1.45)
Transformative	2.69***	(1.37, 4.01)	4.94***	(2.51, 7.37)

Note: Adjusted models controlled for age, wealth (for the adaptive and transformative models only because wealth was part of the absorptive variable), and level of education; *p<.05; **p<.01; ***p<.001

Ability to Recover. The ATR index scores are presented in Tables 17-19. It should be noted that coefficients cannot be compared directly since the number of items used to construct absorptive, adaptive, and transformative capacities differs. Even so, the direction of coefficients is useful. For example, are individuals with high perceived absorptive capacity more or less likely to feel that they can recover from non-health shocks? The positive coefficient in Table 17 (0.771) indicates that they do feel more capable than those with low absorptive capacity to recover from non-health shocks. In short, Tables 17-19 answer the question: as individuals' resilience capacities improve, does their perceived ability to recover from non-health, health, and all shocks go up?

The ATR from non-health shocks is presented in Table 17. As absorptive, adaptive, and transformative capacities increase, there is a perceived increase in the ATR from non-health shocks. Or said another way, increased capacity is associated with an increase in ATR from non-health shocks.

Table 17. Coefficients for Self-Reported Ability to Recover from Non-Health Shocks by Resilience Capacities (High vs. Low), Using Multivariate Linear Regression Analysis among Households that Experienced Non-Health Shocks (n=1,048)

	Unadjusted		Adjusted	
	β	95% CI	β	95% CI
Absorptive	0.71***	(0.58, 0.85)	0.74***	(0.59, 0.89)
Adaptive	0.33***	(0.17, 0.44)	0.33***	(0.16, 0.49)
Transformative	0.23***	(0.13, 0.32)	0.22***	(0.09, 0.33)

Each row presents results from a distinct analysis with the indicated resilience capacity (high vs. low) and the outcome, self-reported ability to recover from non-health shocks (range: 1-5). Multivariate regression models were controlled for age, wealth (for the adaptive and transformative models only because wealth was part of the absorptive variable), and level of education. All analyses were adjusted for sample design and clustering at the village level.
*p<.05; **p<.01; ***p<.001

The association between capacity domains and the perceived ATR from health shocks is presented in Table 18. As absorptive, adaptive, and transformative capacities increase, there is an increase in the perceived ATR from health shocks.

Table 18. The Association Between Capacity Domains and the Perceived Ability to Recover from Health Shocks Using Multivariate Linear Regression

	Unadjusted		Adjusted	
	β	95% CI	β	95% CI
Absorptive	0.43***	(0.34, 0.52)	0.47***	(0.34, 0.59)
Adaptive	0.24***	(0.15, 0.33)	0.26***	(0.13, 0.39)
Transformative	0.12***	(0.02, 0.22)	0.14*	(0.02, 0.26)

Note: Adjusted models controlled for age, wealth (for the adaptive and transformative models only because wealth was part of the absorptive variable), and level of education; *p<.05; **p<.01; ***p<.001

The ATR from all shocks, including both general shocks and health shocks, is presented in Table 19. As absorptive, adaptive, and transformative capacities increase, there is an increase in the perceived likelihood of recovering from all shocks.

Table 19. The Association Between Capacity Domains and the Perceived Ability to Recover from All Shocks, Both General and Health Shocks Using Multivariate Linear Regression

	Unadjusted		Adjusted	
	β	95% CI	β	95% CI
Absorptive	0.52***	(0.43, 0.61)	0.53***	(0.42, 0.65)
Adaptive	0.26***	(0.17, 0.35)	0.26***	(0.14, 0.37)
Transformative	0.36***	(0.22, 0.50)	0.25**	(0.09, 0.41)

Note: Adjusted models controlled for age, wealth (for the adaptive and transformative models only because wealth was part of the absorptive variable), and level of education; *p<.05; **p<.01; ***p<.001

IV. SUMMARY OF FINDINGS

This study sought to improve the understanding of the frequency, nature, effects, and context of shocks and stresses in North Kivu, DRC. The study questionnaire was extensive, gathering a vast amount of information on participating households. This baseline report has focused on that data best suited to answer five specific research questions. Planned follow-up rounds will help to better answer these and additional questions while providing significant insights into health resilience.

Research Question #1: What are the most frequent shocks experienced by households at baseline?

DRC households experience frequent and diverse shocks that can negatively impact health outcomes. Shocks measured in the current study were categorized as either environmental, biological, conflict/crime, economic, or health-related. Each category of shock was represented in the study sample with the 10 most frequent shocks of any sort experienced by households during the previous three months being: 1) food insecurity (health); 2) illness of a child (health); 3) increased food prices (economic); 4) illness of spouse (health); 5) personal illness (health); 6) unavailability of agricultural/livestock inputs (economic); 7) insufficient rain or drought (environmental); 8) death of a family member who does not live with them (health); 9) epidemic of human disease (health); and 10) theft of crops (conflict/crime). These findings demonstrate the frequency of health-related shocks

experienced by households in North Kivu, with six of the top 10 most frequently experienced shocks being health-related. It should be noted that frequently reported shocks at baseline such as food insecurity, personal illness or illness of a family member, food prices, and drought have been found to be interdependent (Ansah et al., 2021). For example, drought reduces crop yields resulting in increased food prices leading to decreased purchasing power. Furthermore, health shocks, such as personal illness or illness of a spouse, impact the ability to raise crops for household use or labor for money used to purchase food (Ansah et al., 2021). Thus, shock exposure has consistently had a significant negative effect on food security, and food insecurity is itself a significant household shock (Smith & Frankenberger, 2020). It is also important to note that many shocks, particularly climate shocks, are seasonal. The baseline questionnaire, conducted in August 2023 (the dry season), asked households about shocks experienced in the past three months rather than the past year. It is possible that reports of various shocks, including climatic shocks, would have been more or less commonly reported if the time period were extended to a full year.

Research Question #2: What coping strategies, both positive and negative, do individuals and households use in response to both general shocks and health-specific shocks?

Coping strategies, both positive and negative, are specific actions that individuals and households take in response to shocks. To add specificity, this report separated coping strategies for general shocks from health-related shocks. Baseline results indicate the most commonly reported coping strategies for general shocks at baseline were: 1) reduced food consumption; 2) reduced non-essential expenses; 3) borrowed money from family or friends; 4) made purchases on credit; and 5) used personal household savings. The five most often used coping strategies for health-related shocks at baseline were: 1) reduced the number of meals eaten in a day; 2) contacted or visited a medical clinic; 3) self-medicated with product from pharmacy; 4) limited portion size at mealtimes; and 5) restricted food consumption by adults so children could eat. Reducing food consumption, skipping meals, eating less preferred or less nutritious food are common approaches for dealing with food insecurity, but are generally considered negative coping strategies given the accompanying high risk for undernourishment, malnutrition, and increased susceptibility to disease (Ansah et al., 2021; Tsegaye et al., 2018). Reducing non-essential expenses, borrowing money, making purchases on credit, and using personal household savings are each considered positive coping strategies. It should be noted that context matters. For example, the duration of exposure to a particular shock or exposure to multiple shocks during the same time period may render a particular coping strategy as more appropriate (positive) or less appropriate (negative). Data from follow-up rounds will be helpful in evaluating the coping strategies and answering this research question.

Perhaps more helpful than subjectively labeling coping strategies as positive and negative, data analysis can reveal which strategies are associated with measures of resilience. Such analyses demonstrate that two coping strategies were significantly associated with higher resilience, as measured by ATR, at baseline: seeking medical advice from a health professional and contacting/ visiting a medical clinic. Similarly, 11 coping strategies were significantly associated with a decrease in resilience at baseline, including engaging in spiritual efforts (e.g., praying), visiting a spiritual leader, discontinuing visits to a medical clinic, self-medicating with herbs, changing ANC practices, receiving multiple packs of modern contraceptives, sending a household member to beg, limiting portion sizes at mealtimes, restricting food consumption by adults so children can eat, reducing the number of

meals eaten in a day, and skipping entire days without eating. These findings suggest that resilient households are more likely to engage in "modern practices" (e.g., seeking medical advice from a health professional) compared to less resilient households, which appear to be more likely to adhere to traditional practices (e.g., visiting a spiritual leader) in response to health shocks. However, factors such as poverty and education likely influence adoption of modern health practices.

Research Question #3: What is the extent of resilience capacity among households in North Kivu, particularly in areas affected by multiple shocks and stresses?

This study comprised eight MIHR-supported health zones in North Kivu, including the communities of Beni, Mabalako, Butembo, Kalunguta, Katwa, Nyirangongo, Rutshuru, and Rwanguba. Furthermore, this study utilized the absorptive, adaptive, and transformative framework for measuring resilience capacity. Absorptive capacities are largely preventative and avoid long-term negative impacts. Adaptive capacities are responsive to shocks and allow households to make adjustments in their lives in anticipation of or in response to long-term changes. Transformative capacities provide for fundamental change to existing structures and/or systems. Taken in aggregate, a substantial portion of households in North Kivu display some resilience capacities, with adaptive capacity being the most prevalent (52 percent), followed by absorptive capacity (44 percent) and transformative capacity (33.4 percent). This distribution suggests that the majority of households are somewhat prepared to adjust and respond to shocks, but fewer possess absorptive capacity to avoid long term impacts or the transformative capacity to fundamentally change their situation.

Resilience capacities varied between the eight health zones, with Katwa, Butembo, and Beni the highest in resilience capacities, and Rwanguba and Rutshuru the lowest. This variance indicates a diverse landscape of resilience within North Kivu. Disparities between health zones underscore the importance of localized, context specific strategies that address the unique challenges and leverage the strengths of each community. Data from follow-up rounds will help interpret these results. Based upon this initial analysis, programming efforts designed to increase each level of resilience capacity should be targeted at Rwanguba and Rutshuru. For example, activities around nutrition (such as kitchen gardens to increase MDD among women) are being designed or adapted for the coming project year to address the findings of the baseline. Additional rounds of RMS will provide greater insight into coping strategies to emphasize or intervene in future programming, as MIHR gains a better understanding of their relationship to resilience over time.

Research Question #4: Which coping strategies are associated with health resilience?

Health resilience is the ability to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces acute and chronic vulnerabilities. The coping strategies most associated with higher health resilience of households in this study included contacting or visiting a medical clinic and seeking medical advice from a health professional. Conversely, engaging in spiritual efforts, visiting a spiritual leader, discontinuing visits to a medical clinic, using a home remedy, self-medicating with herbs, changing ANC practices, purchasing food on credit, sending household members to beg, limiting portion sizes at mealtimes, restricting food consumption by adults so children can eat, reducing the number of meals eaten in a day, and skipping entire days without eating were all significantly associated with decreased health resilience. In addition, findings from the baseline data analysis indicate that households are less able to recover from health-related shocks compared to

non-health shocks. Furthermore, the perceived impact of health-related shocks is greater than that of non-health-related shocks. These findings clearly demonstrate the tremendous impact of health-related shocks on households in North Kivu and the need to both increase household resilience capacities and prevent, or at least mitigate, shocks in the area through health systems strengthening.

Research Question #5: How is resilience capacity (absorptive, adaptive, and transformative) associated with the ability to maintain health resilience in the face of shocks?

The association between resilience capacities and perceived ability to maintain health resilience in the face of shocks is similar for both non-health and health-specific shocks. When absorptive and adaptive resilience capacities decrease and transformative capacities increase, there is an increase in the probability of high perceived impact of health shocks. Likewise, increased absorptive, adaptive, and transformative resilience capacities are associated with an increase in a household's perceived ATR from general shocks, health-related shocks, and all shocks.

These findings may at first seem counterintuitive. However, given that transformative capacities—rooted in fundamental, structural, and systemic change—are experienced when and where the needs are greatest, it makes sense that they are associated with higher perceived impacts from shocks. Conversely, when absorptive and adaptive capacities are higher, then the perceived impact from shocks is lower because a household believes that it can absorb or adapt to the shock. Thus, greater absorptive and adaptive capacities are associated with an ability to maintain health resilience in the face of shocks. Transformative capacities, though essential for long-term resilience, are negatively associated with an ability to maintain health resilience in the face of shocks.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211.

Agrawal, P., et al. (2023). The interrelationship between food security, climate change, and gender-based violence: A scoping review with system dynamics modeling. PLOS Global Public Health, 3(2): e0000300.

Alam, K., & Mahal, A. (2014). Economic impacts of health shocks on households in low and middle income countries: a review of the literature. *Globalization and Health*, *10*, 1-18.

Alam, S. A., & Pörtner, C. C. (2018). Income shocks, contraceptive use, and timing of fertility. *Journal of Development Economics*, *131*, 96-103.

Ansah, I. G. K., Gardebroek, C., & Ihle, R. (2021). Shock interactions, coping strategy choices and household food security. *Climate and Development*, *13*(5), 414-426.

Asmamaw, M., Mereta, S. T., & Ambelu, A. (2019). Exploring households' resilience to climate change-induced shocks using Climate Resilience Index in Dinki watershed, central highlands of Ethiopia. *PloS one*, *14*(7), e0219393.

Assefa, N., Sié, A., Wang, D., et al. (2021). Reported barriers to healthcare access and service disruptions caused by COVID-19 in Burkina Faso, Ethiopia, and Nigeria: a telephone survey. *The American Journal of Tropical Medicine and Hygiene*, *105*(2), 323.

Atara, A., Tolossa, D., & Denu, B. (2020). Analysis of rural households' resilience to food insecurity: Does livelihood systems/choice/matter? The case of Boricha woreda of sidama zone in southern Ethiopia. *Environmental Development*, *35*, 100530.

Bayer, C., Luetticke, R., Pham-Dao, L., & Tjaden, V. (2019). Precautionary savings, illiquid assets, and the aggregate consequences of shocks to household income risk. *Econometrica*, *87*(1), 255-290.

Behrman, J. A., & Weitzman, A. (2016). Effects of the 2010 Haiti earthquake on women's reproductive health. *Studies in Family Planning*, *47*(1), 3-17.

Béné, C., Wood, R. G., Newsham, A., & Davies, M. (2012). Resilience: new utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes. *IDS Working Papers*, *2012*(405), 1-61.

Bharadwaj, P., Jack, W., & Suri, T. (2019). *Fintech and household resilience to shocks: Evidence from digital loans in Kenya* (No. w25604). National Bureau of Economic Research.

Bower, T., Mueller, M., Downen, J., Finan, P., & Langworthy, M. (2022). *PREG II Impact Evaluation Report of Recurrent Monitoring Survey 2019-2020. Washington, DC: Resilience, Evaluation, Analysis, and Learning (REAL) Associate Award.*

Carballo, M., & Mboup, M. (2005). International migration and health. *Paper submitted to the Global Commission on International Migration*.

Clark-Ginsberg, A. (2020). A complexity approach for reducing disaster risks for marginalized urban populations: Comparing DRR interventions across four cities. *External Interventions for Disaster Risk Reduction: Impacts on Local Communities*, 171-192.

Coates, J., Swindale, A., & Bilinsky, P. (2007). Household Food Insecurity Access Scale (HFIAS) for measurement of food access: Indicator guide; Version 3.

Crookston BT, Gray B, Gash M, Aleotti V, Payne HE, Galbraith N. (2018) How do you know 'Resilience' when you see it? Characteristics of self-perceived household resilience among rural households in Burkina Faso. *Journal of International Development*. 30, 917-933.

Darnton-Hill, I., & Cogill, B. (2010). Maternal and young child nutrition adversely affected by external shocks such as increasing global food prices. *The Journal of Nutrition*, *140*(1), 162S-169S.

Ebi, K. L., Hasegawa, T., Hayes, K., Monaghan, A., Paz, S., & Berry, P. (2018). Health risks of warming of 1.5 C, 2 C, and higher, above pre-industrial temperatures. *Environmental Research Letters*, *13*(6), 063007.

FAO. (2020). Comparison of FAO and TANGO measures of household resilience and resilience capacity. Available at: www.fsinplatform.org/sites/default/files/paragraphs/documents/FAO_TANGO_Resilience_Measurement_Comparison_Paper.pdf

Feed the Future. (2019). Ethiopia Livelihoods for Resilience Learning Activity. Prepared for the U.S. Agency for International Development, Feed the Future FEEDBACK project. TANGO, International, Tucson AZ. Available at: https://pdf.usaid.gov/pdf_docs/PA00TS28.pdf

Frankenberger, T. R., Constas, M. A., Nelson, S., & Starr, L. (2014). "How NGOs approach resilience programming." *Resilience for Food and Nutrition Security*, *177*.

Freudenreich, H., Aladysheva, A., & Brück, T. (2022). Weather shocks across seasons and child health: Evidence from a panel study in the Kyrgyz Republic. *World Development*, *155*, 105801.

Friedman, J., & Schady, N. (2009). "How many more infants are likely to die in Africa as a result of the global financial crisis?" *World Bank Policy Research Working Paper* (5023).

Kabir, A., Datta, R., Raza, S. H., & Maitrot, M. R. L. (2019). "Health shocks, care-seeking behaviour and coping strategies of extreme poor households in Bangladesh's Chittagong Hill tracts." *BMC Public Health*, *19*, 1-12.

Khan, J. A., Ahmed, S., & Evans, T. G. (2017). "Catastrophic healthcare expenditure and poverty related to out-of-pocket payments for healthcare in Bangladesh—an estimation of financial risk protection of universal health coverage." *Health Policy and Planning*, *32*(8):1102-1110.

Knippenberg, E., Jensen, N., & Constas, M. (2019). "Quantifying household resilience with high frequency data: Temporal dynamics and methodological options." *World Development* 121:1-15.

Kruk, M. E., Ling, E. J., Bitton, A., Cammett, M., Cavanaugh, K., Chopra, M., & Warnken, H. (2017). "Building resilient health systems: a proposal for a resilience index." *BMJ*, *357*.

Kruk, M. E., Myers, M., Varpilah, S. T., & Dahn, B. T. (2015). "What is a resilient health system? Lessons from Ebola." *The Lancet 385*(9980):1910-1912.

Lauzon, A. (2017). "Building adaptive community capacity to meet the challenges of global climate change: Challenges for community leadership." In *Encyclopedia of Strategic Leadership and Management* (pp. 1326-1336). IGI Global.

Le, K., & Nguyen, M. (2021). "The impacts of temperature shocks on birth weight in Vietnam." *Population and Development Review 47*(4):1025-1047.

Leive, A., & Xu, K. (2008). "Coping with out-of-pocket health payments: empirical evidence from 15 African countries." *Bulletin of the World Health Organization 86*(11):849-856C.

Lombardini, S., Bowman, K., & Garwood, R. (2017). *A 'how to' guide to measuring women's empowerment: Sharing experience from Oxfam's impact evaluations.* UK: Oxfam.

Martin, S. (2019). *Somalia Resilience Recurrent Monitoring Survey (RMS) Report.* Washington, DC: The Resilience Evaluation, Analysis and Learning (REAL) Associate Award.

MIHR. (2023). *Knowledge, Attitudes, and Practices, North Kivu, Democratic Republic of the Congo*. Washington, DC: USAID/MOMENTUM Integrated Health Resilience.

Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). "Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness." *American Journal of Community Psychology* 41:127-150.

Salako, S. E. (2006). "The declaration of Helsinki 2000: ethical principles and the dignity of difference." *Medicine & Law*, *25:*341.

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). "The brief resilience scale: assessing the ability to bounce back." *International Journal of Behavioral Medicine*, *15:*194-200.

Smith, L. C., Frankenberger, T., Nelson, S., & Presnall, C. (2018). *Resilience in the Sahel-Enhanced (RISE) project impact evaluation. Midline Survey Resilience Analysis. 2016.* Prepared for the U.S. Agency for International Development, Feed the Future FEEDBACK project. TANGO International, Tucson, AZ.

Smith, L. C., & Frankenberger, T. (2020). *Resilience in the Sahel-Enhanced (RISE) program impact evaluation: Report of recurring monitoring survey*. Produced by TANGO International and Save the Children as part of the Resilience Evaluation, Analysis and Learning (REAL) Associate Award.

Tsegaye, A. T., Tariku, A., Worku, A. G., et al. (2018). 'Reducing amount and frequency of meal as a major coping strategy for food insecurity." *Archives of Public Health*, 76, 1-9.

Thai, T. Q., & Falaris, E. M. (2014). “Child schooling, child health, and rainfall shocks: Evidence from rural Vietnam.” *Journal of Development Studies*, *50*(7):1025-1037.

United States Agency for International Development. (2021). *Blueprint for Global Health Resilience*. Washington, DC.

Wagstaff, A. (2002). “Poverty and health sector inequalities.” *Bulletin of the World Health Organization*, 80:97-105.

Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). “Resilience, adaptability and transformability in social–ecological systems.” *Ecology and Society*, *9*(2).

World Health Organization. (2021). *Scoping review of interventions to maintain essential services for maternal, newborn, child and adolescent health and older people during disruptive events*. World Health Organization.

Zarocostas, J. (2023). “Humanitarian needs in DR Congo escalating.” *The Lancet*, *402*(10395):15.

APPENDIX

This appendix includes the results from questionnaire modules important to the RMS, yet not directly used in answering the five research questions addressed in the body of this baseline report. The findings from several modules were not directly reported on in the main document but were used in creating composite variables. Other modules addressed a variety of psychosocial indicators that may be informative in designing and directing future MIHR programming as well as peer-reviewed publication.

Handwashing. Handwashing results are presented in Table 20. Respondents' knowledge of handwashing varied across items, as more than 50 percent of respondents knew of the need to wash hands after defecating, while just 15.6 percent of respondents were knowledgeable of the need to wash hands after touching animals. The majority (87.6 percent) correctly noted that handwashing with water alone does not clean hands. However, only 11.9 percent indicated that they could afford to buy soap for handwashing. The composited handwashing variable had a mean of 4.15 (SD = 1.74).

Table 20. Handwashing

Knows when to wash hands…?	**Yes** **N (%)**	**No** **N (%)**
Before eating food	1,408 (86.0)	208 (14.0)
After using the latrine	1,350 (77.5)	266 (22.4)
Before feeding child	1,128 (63.2)	488 (36.8)
Before preparing food	1,021 (57.1)	595 (42.9)
After defecating	948 (53.9)	668 (46.1)
After touching animals	287 (15.6)	1,329 (84.4)
Does hand washing with water alone make your hands clean?	220 (12.4)	1,379 (87.6)
Can you afford to buy soap for handwashing when you need it?	227 (11.9)	1,389 (88.1)

Individual Resilience. Just over half of respondents (53.7 percent) strongly agreed or agreed that they bounce back after hard times, but a similar percentage (52.5 percent) strongly agreed or agreed that they had a hard time making it through stressful events. A greater percentage of respondents (45.3 percent) strongly disagreed or disagreed that it does not take a long time to recover from a stressful event than responded with neutral or agreed and strongly agreed (54.7 percent). Fifty-four percent strongly agreed or agreed that it was hard to snap back after a bad event and most (55.6 percent) strongly agreed or agreed that it takes a long time to get over setbacks. A minority of respondents (39.1 percent) strongly agreed or agreed that they usually come through hard times with little trouble. The composite individual resilience index had a mean of 2.92 (SD = 0.70; Range = 5.0). The full range of resilience indicator responses is presented in Table 21.

Table 21. Individual Resilience Scale Indicators

	N (percent)
I tend to bounce back quickly after hard times	
Strongly agree	105 (6.8)
Agree	807 (46.9)
Neutral	93 (7.5)
Disagree	530 (34.2)
Strongly disagree	81 (4.6)
I have a hard time making it through stressful events	
Strongly agree	130 (7.7)
Agree	778 (44.8)
Neutral	142 (12.8)
Disagree	529 (32.5)
Strongly disagree	37 (2.2)
It does not take me long to recover from a stressful event	
Strongly agree	106 (6.7)
Agree	698 (37.7)
Neutral	138 (10.2)
Disagree	612 (40.3)
Strongly disagree	62 (5.0)
It is hard for me to snap back when something wrong happens	
Strongly agree	122 (7.1)
Agree	773 (46.9)
Neutral	143 (10.6)
Disagree	534 (32.1)
Strongly disagree	44 (3.4)
I usually come through difficult times with little trouble	
Strongly agree	78 (5.0)
Agree	639 (34.1)
Neutral	144 (10.8)
Disagree	672 (43.0)
Strongly disagree	83 (7.1)
I tend to take a long time to get over setbacks in my life	
Strongly agree	136 (8.4)
Agree	774 (47.2)
Neutral	128 (8.7)
Disagree	531 (32.0)
Strongly disagree	47 (3.7)

Aspirations. Results of items designed to measure aspirations were mixed with two indicators pointing toward respondents having an internal locus of control and two toward an external locus. A greater percentage of respondents (44.9 percent) strongly disagreed or disagreed that what happens in life is mostly controlled by powerful people than responded with neutral (15.3 percent) or agreed and strongly agreed (39.7 percent). Most respondents (53.4 percent) strongly agreed or agreed that they work hard for what they get. By contrast 54.2 percent of respondents strongly disagreed or disagreed that they can mostly determine what will happen in life. More respondents strongly agreed or agreed (48.7 percent) than strongly disagreed or disagreed (38.6 percent) that it is not wise to make plans, both of which point toward an external locus of control. The composite aspirations index variable had a mean of 12.07 (SD = 2.32). Aspiration measures are reported in Table 22.

Table 22. Aspirations Indicators

	N (percent)
I feel like what happens in my life is mostly determined by powerful people	
Strongly agree	85 (6.3)
Agree	542 (33.4)
Neutral	230 (15.3)
Disagree	676 (38.5)
Strongly disagree	83 (6.4)
It is not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune	
Strongly agree	129 (10.8)
Agree	640 (37.9)
Neutral	182 (12.7)
Disagree	579 (33.3)
Strongly disagree	86 (5.3)
I can mostly determine what will happen in my life	
Strongly agree	46 (2.2)
Agree	551 (31.6)
Neutral	180 (12.1)
Disagree	762 (47.9)
Strongly disagree	77 (6.3)
When I get what I want, it is usually because I worked hard for it	
Strongly agree	191 (10.5)
Agree	719 (42.9)
Neutral	127 (9.0)
Disagree	463 (29.9)
Strongly disagree	116 (7.7)

Decision-Making. Results for decision-making are reported in Table 23. Joint respondent and husband/partner decision-making was the most common response for decision-making related to a sick child (37.2 percent) and health care for children (38.2 percent). Decisions about the respondent's health care are most often made by the husband/partner alone (38.0 percent). Decisions related to how much food each person in the household gets are most often made by the respondent alone (50.0 percent). "Decision not made" was the most common response for decision-making related to the use of modern contraception (52.7 percent) and whether to have more children (36.5 percent).

Table 23. Decision-Making Indicators

Who in your household makes…	**N (percent)**
The decision of what to do if a child falls sick?	
Respondent alone	429 (26.8)
Husband/partner alone	420 (32.0)
Respondent and husband/partner jointly	685 (37.2)
Someone else alone	61 (3.1)
Respondent and someone else	12 (0.6)
Decision not made	9 (0.4)
Decisions on your own healthcare?	
Respondent alone	397 (23.7)
Husband/partner alone	496 (38.0)
Respondent and husband/partner jointly	639 (34.3)
Someone else alone	72 (3.4)
Respondent and someone else	7 (0.5)
Decision not made	5 (0.1)
Decisions about the healthcare of children?	
Respondent alone	381 (23.7)
Husband/partner alone	435 (33.1)
Respondent and husband/partner jointly	699 (38.2)
Someone else alone	78 (3.7)
Respondent and someone else	10 (0.8)
Decision not made	13 (0.6)
The decision of how much of each type of food each person in the household gets?	
Respondent alone	828 (50.0)
Husband/partner alone	224 (19.1)
Respondent and husband/partner jointly	395 (22.9)
Someone else alone	105 (5.0)
Respondent and someone else	22 (1.2)
Decision not made	42 (1.8)

The decision of whether or not to use a modern contraception method?	
Respondent alone	189 (12.1)
Husband/partner alone	150 (10.2)
Respondent and husband/partner jointly	401 (24.9)
Someone else alone	2 (0.1)
Respondent and someone else	1 (0.0)
Decision not made	873 (52.7)
The decision of whether to have another child?	
Respondent alone	170 (10.6)
Husband/partner alone	248 (16.8)
Respondent and husband/partner jointly	577 (34.9)
Someone else alone	22 (1.1)
Respondent and someone else	1 (0.0)
Decision not made	598 (36.5)

Life Satisfaction. Respondents were evenly split on measures of current happiness with 35.1 percent reporting either very happy or somewhat happy and 35.4 percent reporting very unhappy or somewhat unhappy. More respondents indicated that their life is worse now compared to one year ago (41.8 percent) than reported that life was more or less the same (36.0 percent) or improved (22.2 percent). The percentage of respondents anticipating that life will be better one year from now (39.5 percent) was similar to the percentage anticipating it will be more or less the same (40.5 percent). Results for life satisfaction indicators are reported in Table 24.

Table 24. Life Satisfaction Indicators

	N (percent)
How happy are you?	
Very happy	142 (9.1)
Somewhat happy	443 (26.0)
Neither happy nor unhappy	556 (29.4)
Somewhat unhappy	355 (26.7)
Very unhappy	120 (8.7)
Compared to 1-year ago, how is your life?	
Improved	390 (22.2)
More or less the same	596 (36.0)
Worsened	630 (41.8)
One year from now, how will your life be?	
Improved	720 (39.5)
More or less the same	648 (40.5)
Worsened	248 (20.1)

Diarrhea Knowledge, Attitudes, and Practices. Knowledge, attitudes, and practices (KAP) related to childhood diarrhea are reported in Table 25. Knowledge scores are lower than attitudes and practices generally, with 54.0 percent of respondents strongly agreeing or agreeing they know how to treat diarrhea and 54.5 percent strongly disagreeing or disagreeing that they feel confident overcoming barriers to treat diarrhea. Attitudes and practices are comparatively high with more than 8 out of 10 respondents strongly agreeing or agreeing that they intend to quickly treat diarrhea (81.0 percent), that diarrhea can harm their child (86.9 percent), and that they normally get care for a child with diarrhea (80.5 percent).

Table 25. Knowledge, Attitudes, and Practices Related to Diarrhea

	N (percent)
Knowledgeable about diarrhea and how to treat it	
Strongly agree	168 (9.0)
Agree	770 (45.0)
Disagree	594 (41.3)
Strongly disagree	84 (4.8)
Feel confident overcoming barriers to treat diarrhea	
Strongly agree	127 (5.7)
Agree	675 (39.7)
Disagree	716 (48.7)
Strongly disagree	98 (5.8)
I intend to quickly treat diarrhea	
Strongly agree	307 (17.1)
Agree	1,040 (63.9)
Disagree	245 (17.7)
Strongly disagree	24 (1.3)
Untreated diarrhea can harm my child	
Strongly agree	567 (35.4)
Agree	889 (51.5)
Disagree	150 (12.3)
Strongly disagree	10 (0.9)
I normally get care for my child if sick with diarrhea	
Strongly agree	347 (18.8)
Agree	967 (61.7)
Disagree	271 (17.8)
Strongly disagree	31 (1.7)

Modern Contraceptives Knowledge, Attitudes, and Practices. Respondents reported low KAP for modern contraception. Three out of four (74.6 percent) respondents strongly disagreed or disagreed with the statement that they were knowledgeable about modern contraceptives. Respondents also indicated low confidence for overcoming barriers related to obtaining modern contraception with

78.5 percent either strongly disagreeing or disagreeing on this indicator. Intention to use modern contraceptives (30.1 percent) and partner support for their use (24.1 percent) were both low. Use of modern contraception was also low among this sample with only 16.9 percent reporting strong agreement or agreement that they normally use contraceptive when wanted or needed. All KAPs related to the use of modern contraception are reported in Table 26.

Table 26. Knowledge, Attitudes, and Practices Related to Modern Contraceptives

	N (percent)
Knowledgeable about modern contraceptives	
Strongly agree	67 (2.8)
Agree	415 (22.6)
Disagree	731 (49.2)
Strongly disagree	403 (25.4)
Feel confident overcoming barriers to obtaining and using	
Strongly agree	58 (3.2)
Agree	317 (18.3)
Disagree	874 (55.7)
Strongly disagree	367 (22.8)
I intend to use contraceptives when I want in the future	
Strongly agree	85 (5.0)
Agree	433 (25.1)
Disagree	773 (50.8)
Strongly disagree	325 (19.0)
My partner supports me in accessing and using contraceptives	
Strongly agree	82 (5.0)
Agree	329 (19.1)
Disagree	817 (53.1)
Strongly disagree	388 (22.9)
I normally use contraceptives when I want or need to	
Strongly agree	40 (1.8)
Agree	250 (15.1)
Disagree	909 (58.5)
Strongly disagree	417 (24.7)

Caregivers' Knowledge, Attitudes, and Practices related to Nutrition. KAPs related to child nutrition are reported in Table 27. Agreement with the statement that respondents are knowledgeable about the types of food a child needs to be healthy was split with 52.7 percent reporting strong agreement or agreement with this statement, and 47.3 percent reporting either strong disagreement or disagreement. Confidence for overcoming barriers to feeding my child healthy foods was lower with 62.2 percent reporting strong disagreement or disagreement with the statement. Respondents' intention for feeding their child both the amount and types of foods needed to be healthy was high

with 73.1 percent reporting strong agreement or agreement. Most respondents strongly agreed or agreed (78.8 percent) with the statement that failing to feed their child the right types and amounts of food could harm their health. Agreement with the behavioral practice of normally providing their child with the types of foods and the amount of food they need was low with 60.7 percent strongly disagreeing or disagreeing with the statement.

Table 27. Frequencies for Self-Reported Knowledge, Attitudes, and Practices on Child Nutrition

	N (percent)
Knowledgeable about types of food child needs to be healthy	
Strongly agree	154 (7.8)
Agree	794 (44.9)
Disagree	577 (40.6)
Strongly disagree	91 (6.7)
Feel confident overcoming barriers to feeding my child healthy foods	
Strongly agree	83 (4.9)
Agree	636 (32.9)
Disagree	792 (54.6)
Strongly disagree	105 (7.6)
I intend to feed my child the types and amounts of food they need	
Strongly agree	198 (11.2)
Agree	1,022 (61.9)
Disagree	345 (23.3)
Strongly disagree	51 (3.7)
Failing to feed my child the right types and amounts of food could harm their health	
Strongly agree	416 (27.3)
Agree	905 (51.5)
Disagree	269 (19.2)
Strongly disagree	26 (2.1)
I normally provide my child with the types of foods and amount of food they need	
Strongly agree	78 (3.7)
Agree	654 (35.6)
Disagree	750 (49.9)
Strongly disagree	134 (10.8)

Behavioral Determinants of Nutrition Practices. Respondents' knowledge about the types of food they need personally to be healthy was mixed with 58.7 percent strongly agreeing or agreeing with the knowledge statement. Confidence for overcoming barriers to eat the types of food respondents need

to be healthy was lower with 61.6 percent strongly disagreeing or disagreeing with the confidence statement. Behavioral intentions for eating the types and amounts of food respondents need to be healthy was high with 74.3 percent strongly agreeing or agreeing with the intention statement. There was strong agreement or agreement (82.4 percent) among respondents that failing to eat the right types and amounts of food could harm their health, yet only 37.2 percent strongly agreed or agreed that they normally eat the types of foods needed to be healthy. All results related to nutrition for women are reported in Table 28.

Table 28. Frequencies for Knowledge, Attitudes, and Practices Related to Nutrition for Women

	N (percent)
Knowledgeable about the types of food I need to be healthy	
Strongly agree	165 (8.6)
Agree	882 (50.1)
Disagree	501 (35.7)
Strongly disagree	641 (5.6)
Feel confident overcoming barriers to eat the types of food I need	
Strongly agree	91 (4.9)
Agree	641 (33.5)
Disagree	789 (54.2)
Strongly disagree	95 (7.4)
I intend to eat the types and amounts of food I need to be healthy	
Strongly agree	224 (11.2)
Agree	1,023 (63.1)
Disagree	317 (22.8)
Strongly disagree	52 (2.9)
Failing to eat the right types and amounts of food could harm my health	
Strongly agree	390 (23.5)
Agree	976 (58.9)
Disagree	231 (16.3)
Strongly disagree	19 (1.3)
I normally eat the types of foods I need to be healthy	
Strongly agree	88 (4.4)
Agree	616 (32.8)
Disagree	755 (50.8)
Strongly disagree	157 (12.0)

Perceived Impact of Potential Shocks. Table 29 includes results related to the perceived impact of shocks. Respondents consistently perceived that these shocks would very likely or likely impact their

household. Economic shocks were perceived to be the most likely to impact the household (75.1 percent reporting either very likely or likely) while other shocks were estimated to have slightly less impact on households as approximately 62 percent of respondents reported that environmental, biological, and conflict-related shocks would very likely or likely have an impact.

Table 29. Frequencies for Perceived Impact of Potential Shocks

	N (percent)
If an environmental shock occurred, how likely is my household to be severely affected	
Very likely	420 (26.2)
Likely	583 (37.3)
Unlikely	536 (32.4)
Very unlikely	77 (4.1)
If a biological shock occurred, how likely is my household to be severely affected	
Very likely	393 (24.2)
Likely	603 (39.0)
Unlikely	526 (31.8)
Very unlikely	94 (5.0
If a conflict shock occurred, how likely is my household to be severely affected	
Very likely	416 (27.9)
Likely	556 (35.3)
Unlikely	554 (32.2)
Very unlikely	90 (4.5)
If an economic shock occurred, how likely is my household to be severely affected	
Very likely	685 (43.0)
Likely	553 (32.1)
Unlikely	323 (21.7)
Very unlikely	55 (3.2)

Social Capital and Program Participation. Social group membership is reported in Table 30. The most common group memberships among this study sample were extended family groups (30.8 percent), religious groups (29.9 percent), tontine (group annuity) (18.4 percent), women's association (17.5 percent), and neighborhood social group (16.7 percent).

Table 30. Frequencies for Social Capital and Program Participation

	Yes N (percent)	No N (percent)
Extended family group	551 (30.8)	1,064 (69.2)

Religious group	557 (29.9)	1,058 (70.1)
Tontine (group annuity)	325 (18.4)	1,290 (81.6)
Women's association	362 (17.5)	1,253 (82.5)
Neighborhood social group	318 (16.7)	1,297 (83.3)
Workplace association	301 (13.8)	1,310 (86.2)
Village Savings and Loan Association	212 (11.3)	1,403 (88.7)
Men's association	168 (7.8)	1,447 (92.2)
Farmer trader's group/women's economic group	47 (3.7)	1,568 (96.3)
Illness or burial society	62 (3.0)	1,553 (97.0)
Ethnic group association	61 (3.0)	1,554 (97.0)
Ex-student alma matter association	59 (2.6)	1,556 (97.4)
Parent's association	55 (2.5)	1,560 (97.5)
Farmer's cooperative	28 (1.8)	1,587 (98.2)
Community garden	23 (1.4)	1,592 (98.6)
Other	28 (2.2)	1,587 (97.8)

Help from Group Membership During a Crisis. Respondents also indicated which social groups they would turn to for help during a crisis. Of those who reported going to a social group in a time of crisis, the most common responses were for extended family group (15.8 percent), religious group (14.8 percent), and women's association (9.1 percent). Results for which groups respondents would go to for help during a crisis are displayed in Table 31.

Table 31. Frequencies for Help from Group Membership During a Crisis

	Yes **N (percent)**	**No** **N (percent)**
Would you go for help to a group in a crisis? If yes, where?	786 (41.4)	829 (58.6)
Extended family group	329 (15.8)	1,287 (84.2)
Religious group	279 (14.8)	1,337 (85.2)
Women's association	189 (9.1)	1,427 (91.0)
Tontine	146 (8.1)	1,470 (91.9)
Workplace association	163 (7.0)	1,453 (93.0)
Village Savings and Loan Association	134 (6.3)	1,482 (93.7)
Neighborhood social group	82 (4.0)	1,534 (93.0)
Men's association	82 (3.8)	1,534 (96.2)
Illness or burial society	34 (1.6)	1,586 (97.2)
Farmer trader's group/women's economic group	14 (0.8)	1,602 (99.2)
Ethnic group association	15 (0.8)	1,601 (99.2)
Parent's association	16 (0.6)	1,600 (99.4)
Ex-student alma matter association	18 (0.6)	1,598 (99.5)
Community garden	6 (0.3)	1,610 (99.7)
Farmer's cooperative	2 (.01)	1,614 (99.9)

Other	30 (2.9)	1,586 (97.2)

Health Status and Paying for Care. Table 32 includes results for three items related to changes in health status and ability to pay for health needs. One-third of respondents (33.4 percent) experienced worse health in the past three months, while over 60 percent reported it stayed the same or had improved. Approximately half of respondents (51.9 percent) indicated that paying for health needs was very difficult, while just over one-third (34.5 percent) reported that their ability to pay for health needs had worsened in the past three months.

Table 32. Frequencies for Health Status and Paying for Care

	N (percent)
How has your health changed in the last three months?	
Improved	426 (22.5)
About the same	664 (40.2)
Worsened	456 (33.4)
Don't Know	60 (3.4)
Refused	10 (0.6)
How difficult is it for your household to pay for health needs?	
Very difficult	774 (51.9)
Manageable	637 (33.2)
Easy	174 (12.7)
Don't Know	26 (1.8)
Refused	5 (0.4)
How has your household's ability to pay for health needs changed in the last three months?	
Improved	333 (18.6)
About the same	725 (44.4)
Worsened	509 (34.5)
Don't Know	45 (2.1)

Accessing Care. Table 33 includes results related to accessing care and the ability to access care in the past three months. Three general types of care sought by households are presented: FP services, care for a pregnant or lactating woman, and care for a newborn or child. Respondents most often sought care for a newborn or child (34.8 percent) and care for a pregnant or lactating woman (24.7 percent), followed by FP services (10.5 percent). Health centers, hospitals, and pharmacies were the most common locations for seeking care across each of the three types of care. Nearly half (46.1 percent) of the households seeking FP services (10.5 percent of the total study sample) reported unmet FP needs. The most reported impacts on households' ability to access care were lack of funds (74.8 percent), lack of transportation (20.8 percent), insecurity (18.3 percent), lack of available services (18.0 percent), and long distances to health facilities (17.2 percent).

Table 33. Frequencies for Accessing Care

Has your household sought…?	Yes N (percent)	No N (percent)
Family planning services	162 (10.5)	1,454 (89.5)
Family planning services at a health center	89 (53.6)	73 (46.4)
Family planning services at a hospital	44 (23.8)	118 (76.2)
Sought family planning services at a pharmacy	31 (18.3)	131 (81.7)
Family planning services at a health post	14 (15.2)	148 (84.8)
Sought family planning services from other sources	9 (4.7)	153 (95.3)
Sought family planning services from a CHW	7 (3.8)	155 (96.2)
Does your household have unmet family planning needs?	*77 (46.1)*	*85 (53.9)*
Care for pregnant or lactating woman	359 (24.7)	1,257 (75.3)
Care for pregnant or lactating woman at a health center	195 (58.6)	164 (41.4)
Care for pregnant or lactating woman at a pharmacy	77 (21.4)	282 (78.5)
Care for pregnant or lactating woman at a hospital	77 (17.1)	282 (82.9)
Care for pregnant or lactating woman at a health post	26 (6.6)	333 (93.4)
Care for pregnant or lactating woman from a CHW	5 (3.2)	354 (96.8)
Care for pregnant or lactating woman from other sources	9 (1.3)	350 (98.7)
Care for newborn or child	548 (34.8)	1,068 (65.2)
Care for newborn or child health at a health center	285 (52.6)	263 (47.4
Care for newborn or child health at a pharmacy	171 (30.5)	377 (69.5)
Care for newborn or child health at a hospital	94 (14.8)	454 (85.2)
Care for newborn or child health at a health post	57 (9.7)	491 (90.3)
Care for newborn or child health from a CHW	5 (1.5)	543 (98.5)
Care for newborn or child health from other sources	9 (0.8)	539 (99.2)
Has your household's ability to access care been impacted by…?		
Lack of money	1,218 (74.8)	398 (25.2)
Lack of transportation	206 (20.8)	1,410 (79.2)
Lack of available services	189 (18.0)	1,427 (82.0)
Insecurity	287 (18.3)	1,329 (81.7)
Long distances to health facilities	144 (17.2)	1,472 (82.8)
Absence of health services	184 (16.0)	1,432 (84.0)
Impassable routes*	111 (11.6)	1,505 (88.4)
Stockouts or lack of medicine	103 (10.2)	1,513 (89.2)

* Due to insecurity or damaged road infrastructure

Interrupted Access Due to Shocks. Respondents indicated how shocks interrupted their access to a variety of health services and resources in the past three months. Results for all interruptions to access are reported in Table 34. Nine services and resources saw no interruption for at least half of all respondents. These included: access to latrines (69.1 percent), immunizations (68.3 percent), deworming (63.1 percent), access to safe drinking water (57.4 percent), newborn postnatal care (55.5

percent), childbirth (55.2 percent), maternal postnatal care (55.0 percent), antenatal care (54.3 percent), and treatment for sick children (51.9 percent). The most frequently reported services and resources that were completely interrupted were: FP (25.5 percent), nutrition (18.3 percent), health promotion (17.2 percent), soap for handwashing (16.6 percent), and non-government health services (13.8 percent).

Table 34. Frequencies for Interrupted Access Due to Shocks

Shocks impacted…	No Interruption N (percent)	Partial Interruption N (percent)	Complete Interruption N (percent)
Immunization services	1,122 (68.3)	370 (26.8)	41 (5.0)
Deworming services	957 (63.1)	352 (29.6)	58 (7.3)
Nutrition services	639 (47.0)	379 (34.8)	159 (18.3)
Antenatal care services	724 (54.3)	422 (34.9)	105 (10.7)
Childbirth services	741 (55.2)	423 (34.3)	88 (10.4)
Maternal postnatal services	802 (55.0)	416 (35.5)	119 (9.5)
Newborn postnatal services	804 (55.5)	421 (35.9)	103 (8.6)
Family planning services[a]	301 (37.6)	261 (36.9)	156 (25.5)
Treatment for sick children	816 (51.9)	552 (43.2)	66 (4.9)
Treatment for sick adults	797 (49.2)	565 (44.8)	79 (6.1)
Access to health promotion services	832 (52.6)	384 (30.1)	163 (17.2)
Access to government health services	741 (48.2)	515 (40.4)	129 (11.4)
Access to non-government health services	713 (47.4)	509 (38.8)	134 (13.8)
Access to safe drinking water	907 (57.4)	510 (36.1)	72 (6.6)
Access to soap for handwashing	687 (41.6)	573 (41.8)	175 (16.6)
Access to latrine services	1,121 (69.1)	287 (22.6)	75 (8.3)

[a.] Only includes respondents who had experience with FP services.

Assistance. Table 35 includes household assistance received from government, NGOs, and family or friends. No more than 50 households received any type of government or NGO assistance. The most common assistance came from family or friends (27.1 percent), with the food aid (19.7 percent) and financial support (12.8 percent) being most common.

Table 35. Frequencies for Assistance Received in the Previous Three Months

	Yes N (percent)	No N (percent)
Government		
Any assistance	50 (2.7)	1,566 (97.3)
Medication aid	28 (1.2)	1,588 (98.8)
NGO		
Any assistance	24 (1.9)	1,592 (98.1)

Food aid from NGO	12 (1.2)	1.604 (98.8)
Family or Friends		
Any assistance	524 (27.1)	1,092 (72.9)
Food aid	391 (19.7)	1,225 (80.3)
Financial support from family friends	282 (12.8)	1,334 (87.2)
Food aid for children	237 (11.5)	1,379 (88.5)
Medication aid from	34 (1.7)	1582 (98.3)
Soap aid	38 (1.8)	1,578 (98/2)

Breastfeeding. Table 36 includes results related to breastfeeding (BF). Most respondents reported early initiation of breastfeeding (63.8 percent), but exclusive breastfeeding (EBF), except allowing water (9.4 percent) and both water and other liquids (38.4 percent), were low.

Table 36. Frequencies for Early Initiation of Breastfeeding and Exclusive Breastfeeding

	Yes N (percent)	No N (percent)
Early initiation of breastfeeding	999 (63.8)	617 (36.2)
Complementary BF under 6 months (includes water)	153 (9.4)	1,436 (90.6)
EBF under 6 months (excluding water and all other liquids)	652 (38.4)	964 (61.6)

Nutrition Indicators. Table 37 includes composite nutrition scores for children and women. A quarter of children (25.5 percent) met the MDD definition, while fewer than one-tenth of children met MMF (8.2 percent) and MAD (4.4 percent) requirements. Just over one-tenth of respondents (i.e., primary caregivers) met MDD (10.8 percent) requirements.

Table 37. Frequencies for Nutrition Indicators

	Yes N (percent)	No N (percent)
Child Nutrition		
Minimum dietary diversity [a]	212 (25.5)	550 (74.5)
Minimum meal frequency [b]	79 (8.2)	683 (91.8)
Minimum acceptable diet [c]	46 (4.4)	827 (74.5)
Women's Nutrition		
Minimum dietary diversity [d]	215 (10.8)	1,401 (89.2)

[a] Minimum dietary diversity was having eaten 5+ food groups out of 8 possible (included all children).

[b] Minimum meal frequency was measured for all children 6-<12 months old and per the WHO definition, varies by age of child.

[c] Minimum acceptable diet was measured for all children 6-<12 months old and was defined as having eaten 4+ food groups out of 8 possible groups AND achieving minimum meal frequency.

[d] Minimum dietary diversity for women was having eaten 5+ food group out of 7 possible groups and included all caregivers.

Food Security. Composite food security scores are reported in Table 38. More than half (64.6 percent of households were severely food insecure.

Table 38. Frequencies for Food Security

	N (percent)
Food secure	279 (14.8)
Mildly food insecure	110 (6.5)
Moderately food insecure	288 (14.0)
Severely food insecure	916 (64.6)

Table 39. Demographic Variables: Unweighted and Weighted

	N (percent)	Sample weight N (percent)
What is your marital status?		
Married or living together	1,406 (88.8)	1,435 (88.8)
Divorced or separated	88 (4.6)	73.6 (4.6)
Widowed	15 (0.8)	13.9 (0.9)
Married or living together	107 (5.8)	93.5 (5.8)
Can you read and write?		
Yes	532(43.8)	913.8 (56.6)
No	1,084 (56.2)	702.2 (43.5)
What is the highest level of school you have achieved/completed?		
None	419 (40.3)	638.1 (39.5)
Less than primary	225 (13.7)	226.8 (14.0)
Primary	613 (29.2)	484.0 (30.0)
Secondary	315 (15.1)	240.1 (14.9)
University	43 (1.7)	26.8 (1.7)
Other	1 (0.0)	0.2 (0.0)
What is the religion of (head of household)?		
Animist	5 (0.3)	4.3 (0.3)
Atheist	3 (0.1)	1.8 (0.1)
Christian	1,587 (98.7)	1,590 (98.4)
Kimbanguist	4 (0.2)	3.9 (0.2)
Muslim	16 (0.8)	15.0 (0.9)
Other	1 (0.0)	0.4 (0.0)
What is your age? (Mother)		
Under 18	32 (1.9)	675.6 (41.9)
18-25	792 (49.1)	534.6 (33.1)

26-35	540 (32.4)	1,087.3 (41.86)
35+	252 (16.6)	262.1 (16.3)