

Identifying the Burden of Pediatric Surgical Disease in Somaliland

by

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Thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science in the Duke Global Health Institute
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ABSTRACT

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Abstract

Background: A staggering 5 billion people worldwide lack access to safe and affordable surgery, and surgical conditions contribute to up to 32% of the global disease burden. However, precise data on the burden of surgical conditions is lacking, particularly for children. This study aims to measure the burden of pediatric surgical conditions in Somaliland using a community-based, household, nationwide survey as well as a national hospital survey to identify the types and volume of pediatric surgical care.

Methods: We surveyed 1450 children, from 839 families, through national community-based sampling using the Surgeons Overseas Assessment of Surgical Need (SOSAS) survey to identify the prevalence of surgical conditions. We also performed a hospital capacity survey at 15 hospitals in Somaliland, with surgical records reviewed over a 1-year time frame to identify pediatric surgical procedures performed.

Results: Using a community survey, we identified 226 surgical conditions in 191 children, yielding a surgical condition prevalence of 13.7% in the pediatric population. Only 55 of 226 conditions were treated with a surgical procedure. The most common conditions reported were congenital deformities (34.4%) and wound related injuries (23.8%). Using a hospital survey, we identified 1255 pediatric surgical procedures performed nationally over 1 year. We found that 56.7% procedures were in performed in boys and 79.8% were done at private hospitals. The most common surgical diagnoses were tonsillitis, trauma/wound/snake bite, and hydrocephalus.

Conclusions: Between 91,500 – 209,000 children in Somaliland have an unmet need for pediatric surgery, highlighting the high burden of surgical disease in the country. The estimated number of performed surgical procedures represents a small fraction of the burden of pediatric surgical

conditions, highlighting the need for expansion of infrastructure, resources, and workforce to provide needed surgical care.

Dedication

To Mom, for telling me I can

To Dad, for telling me I should

To Evan, for telling me I will

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List of Acronyms

AH	Alaale Hospital	NSU	Neurology
AHH	Al Hayat Teaching Hospital	OBS	Obstetrics
BerRH	Berbera Regional Hospital	OPTHO	Ophthalmology
BorRH	Boroma Regional Hospital	OReCS	Optimal Resources for Children's Surgery
BurRH	Burao Regional Hospital	ORT	Orthopedics
DHS	Demographic Health Survey	PED	General surgery
DXH	Daaru Xanaan Hospital	PSU	Plastic surgery
EAUH	Edna Adan University Hospital	SAO	Surgical, anesthesia, and obstetric
ENT	Otolaryngology	SDH	Sheikh District Hospital
ERH	Erigavo Regional Hospital	SE	Standard error
GAPS	Global Assessment of Pediatric Surgery	SOSAS	Surgeons OverSeas Assessment of Surgical need
GDP	Gross Domestic Product	URO	Urology
GI	Gastro-intestinal	USD	United States Dollar
GICS	Global Initiative for Children's Surgery	WHO	World Health Organization
GMH	Gargaar Multispecialty Hospital		
GRH	Gabiley Regional Hospital		
HGH	Hargeisa Group Hospital		
HH	Household		
HIC	High-income country		
HNH	Hargeisa Neurology Hospital		
I&D	Incision and drainage		
IQR	Interquartile range		
LARH	Las Anod Regional Hospital		
LCoGS	Lancet Commission of Global Surgery		
LMIC	Low- and middle-income country		
MoH	Ministry of Health		
MSH	Manhal Specialty Hospital		

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1. Introduction

1.1. SURGICAL BURDEN OF DISEASE

Recent estimates indicate that 5 billion people worldwide lack access to safe and affordable surgery¹ and surgical conditions contribute to up to 32% of the global disease burden.² This burden is largely concentrated in low- and middle-income countries (LMICs).¹ Western, eastern, and central sub-Saharan Africa have some of the highest rates of unmet surgical care in the world.¹ Surgery and anesthesia are increasingly recognized as an essential component of a strong and functional health system.³ The majority of existing data on surgical conditions reflects care delivered at a hospital level, which does not capture the large number of people who cannot access surgical care. To inform policy and guide health system strengthening, it is essential to identify the burden of surgical conditions at the community-level, rather than facility-level, in order to accurately determine the burden of disease in a population.^{1,4-7}

1.2. PEDIATRIC SURGICAL DISEASE BURDEN

Although the global health agenda is increasingly recognizing the importance of surgical care, there is still a lack of research focusing on surgical care for children. Existing data suggests a large burden of pediatric surgical conditions in many LMICs, with up to 85% of children in Sub-Saharan Africa requiring a surgical procedure before the age of 15.^{8,9} However, precise data on the burden of surgical conditions and delivery of care remains limited due to lack of high-quality data, reliance on small cohort studies, and focus on urban areas.⁹ Children, who represent up to 50% of the population in many LMICs,¹⁰ have been largely left out of these health assessments, limiting the ability to develop effective health care policies.¹¹

Children have surgical needs that are different from adult surgical care.^{11,12} Congenital anomalies and injuries contribute to the overall surgical burden and disproportionately affect

children.^{8,13-16} Additionally, pediatric surgical care requires specific infrastructure, workforce, and resource requirements from adult care. Complicating the surgical care of children are shortages in pediatric-trained personnel, infrastructure, equipment, and supplies.¹⁷⁻¹⁹ Essential pediatric surgical care is particularly limited in rural areas in LMICs due to infrastructure, workforce, or economic barriers.²⁰⁻²² Many children who require surgical care often do not receive it after admission to a hospital, often due to lack of resources to optimally care for children in LMICs.²³ In previous studies, an estimated 62% of children with identified surgical needs did not receive surgical care.²⁴ Incorporating pediatric surgical care into health system planning is imperative to improve child health.²⁵

1.3. DELAYS IN SURGICAL CARE

Barriers to surgical care are often described using a “Three Delay” model. In this model, barriers to care are related to a series of barriers. Limited surgical infrastructure, workforce, and resources can delay access to receiving surgery for those who seek treatment. Additional delays in receiving surgical care include delays in seeking care and delays in reaching care.¹ When left untreated, diseases which generally don’t require surgery may end up requiring surgical intervention.¹ The reasons for these delays need to be better understood in order to improve access and surgical outcomes for those with surgical need. Healthcare seeking and receiving is especially limited in rural settings, in part due to workforce and physical infrastructural deficiencies.²² In low-income countries, families who seek healthcare are often delayed in receiving surgical care based on limited capacity of the local hospital or health facility.^{1,20,22,26} Studies on the delivery of surgical procedures in children have identified several common barriers across LMICs in regards to high costs of care and acceptability of surgical care.^{27,28} Reasons for not seeking surgical care in population-based studies included limited financial resources, lack of healthcare facilities, and a lack of trust in healthcare.²⁹ There are an estimated

33 million individuals every year that face catastrophic health expenditure from lack of surgical and anesthesia care.³⁰ Equally important to consider are the non-medical (indirect) costs of surgery, such as food, lodging, and loss of economic productivity,^{1,27,28,30} of which impact an additional 48 million individuals who face catastrophic expenditure every year.³⁰ Although the risk of catastrophic expenditures is particularly high in LMICs, the impact of these costs on the rate and drivers poverty have not been well studied, and represent a much needed area of research.³¹

1.4. GAPS IN KNOWLEDGE

Although several recent studies have estimated the prevalence of surgical conditions in different LMICs, these studies lack pediatric specific indicators and have limited indicators for poverty assessment.^{31–36} Similarly, most studies analyzing pediatric surgical procedure delivery have reported the data from either a single or limited number of hospitals, typically those with high surgical capacity and located in urban centers,^{15,18,23,26,34,35,37} limiting the generalizability to nationwide surgical profiles. Studies which focus on government health facilities miss an opportunity to analyze the large portion of surgical care which is provided at private facilities in many LMICs.^{15,18,38–40}

Somaliland is a country in East Africa, an area known for high unmet need for surgery.¹ Somaliland has been a fully functioning autonomous region of Somalia since 1991.^{41–43} Although the country is not recognized as an independent state, it has achieved relative stability since separation. There has been limited health system research activity in Somaliland,⁴⁴ largely in part to the perceived instability of the region by foreign institutions.^{42,43} In particular, there have been no published studies to assess the burden of surgical disease in children or adults in Somaliland.

1.5. OBJECTIVE

Our objective was twofold: first, to estimate the burden of surgical disease in children in Somaliland using a community-based, household, nationwide survey, and second, to identify the types and volume of pediatric surgical care performed in Somaliland hospitals. The long-term goal of the study is to provide a foundation for scale up modeling and capacity building research to support pediatric surgical care in Somaliland.

2. Methods

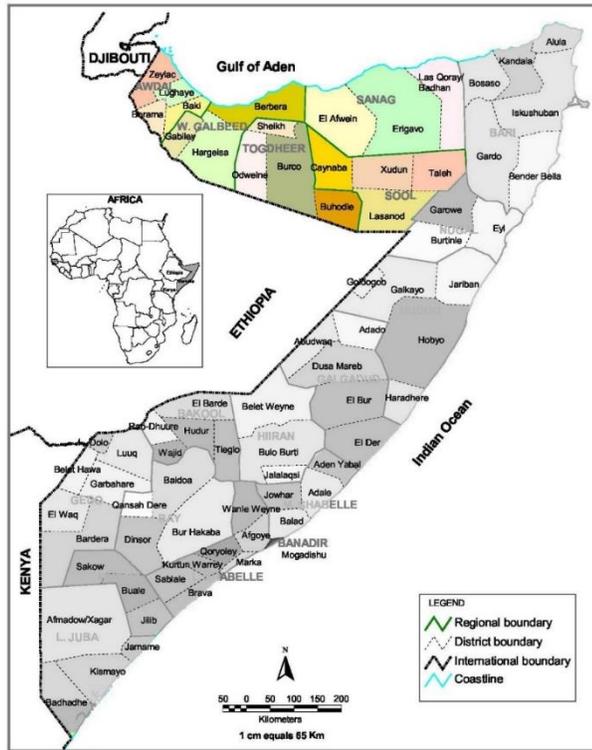
This study used two approaches to assess pediatric surgical care in Somaliland. First, we estimated the burden of pediatric surgical conditions across Somaliland at the community level. We measured the burden of disease using the Surgeons OverSeas Assessment of Surgical Need (SOSAS), a validated national cluster-based, cross-sectional survey designed to determine the burden of surgical conditions within a community. Second, we measured the volume of pediatric surgical procedures performed nationally using a retrospective surgical record review of Somaliland hospitals, and used this data to estimate the amount of pediatric surgical care that is provided in the country.

2.1. SETTING

The study took place in Somaliland, an autonomous region of Somalia since 1991 (**Figure 1**). Although the country is not recognized as an independent state, it has achieved relative stability since separation, issued a separate currency, and set up an autonomous government with two fair democratic elections since 1991.⁴¹ The country has a gross domestic product (GDP) of \$1.4

billion United States dollars (USD) (2012) and a GDP per capita of \$347, classifying it as a low income country and the fourth poorest in the world.⁴⁵ Poverty levels are nearly 30% in urban areas and 40% in rural areas.⁴⁵ Approximately 53% of the population lives in urban centers, 11% in rural areas, 34% is nomadic or semi-nomadic.⁴⁵ Inequality between urban and rural households is high and health outcomes are worse than neighboring countries.⁴⁵ Infant and under-5 mortality rates are 109 and 180 per 100,000 respectively⁴⁶, compared to 55 and 83 per 100,000 as the average of Sub Saharan Africa.^{47,48} The employment-to-population ratio is about 28% for males and 17% for females.⁴⁵ The

FIGURE 1: DISTRICT MAP OF SOMALILAND (COLOR) BASED OFF DISTRICT MAP OF SOMALIA (GRAYSCALE)



six regions included in Somaliland borders are Awdal, Maroodi Jeex, Sahil, Togdheer, Sool, and Sanaag.^{49,50} Total population estimates range from 3.5 million⁵¹ to 4.5 million.^{42,45,52} This study used a population of 4,015,017 based on 2014 Somalia census data and local collaborator consensus.⁴⁹ Approximately 50.18% of the population are children under the age of 16.²⁴ Although there is no registry of public and private hospitals, from conversations with Somaliland medical professionals and experiences on site, a total of 16 hospitals with surgical capacity were identified.

2.2. PARTICIPANTS

2.2.1. Aim 1: Community survey

2.2.1.1. SAMPLE SIZE CALCULATION

To estimate the burden of pediatric surgical conditions nationally, we aimed to use a community-based home survey for 1465 households, with two children assessed per household. The sample size was calculated based on estimated prevalence of pediatric surgical disease in several other LMICs.^{32,34,35}

TABLE 1: EQUATIONS USED TO DETERMINE SAMPLE SIZE

	EQUATION USED	RESULTING ESTIMATION
1	$n = \frac{DEFF * Np(1 - p)}{\frac{d^2}{Z^2 * (N - 1) + p * (1 - p)}_{1 - \frac{\alpha}{2}}}$	$n = \frac{1.445 * 4,015,017 * 0.1868(1 - 0.1868)}{\frac{0.025^2}{1.96^2} * (4,015,017 - 1) + 0.1868 * (1 - 0.1868)} = 1367$
2	$sample\ size = \frac{n}{(response\ rate)(eligible\ rate)}$	$sample\ size = \frac{1367}{(0.95)(0.98)} = 1468\ children$
3	$sample\ size(+)= \frac{\frac{sample\ size}{proportion\ of\ children}}{doubling\ of\ sample\ size}$	$sample\ size(+)= \frac{1468}{\frac{0.5018}{2}} = 1465\ households$

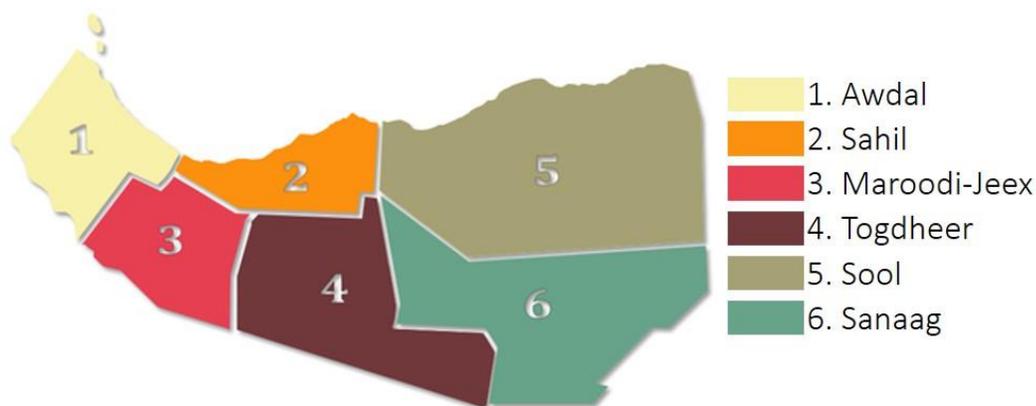
The sample size (n) was designed using a calculation for determining the frequency of surgical conditions in a population.⁵³ (**Table 1: Equation 1**) Sample size was calculated using Microsoft® Excel® 2016. In this equation we used a prevalence of 18.7% as an estimate derived from 3 of the 4 pediatric surgical condition prevalence's reported in previous SOSAS studies.²⁴ Of the four reported country pediatric surgical prevalence's (Sierra Leone – 27.5%, Nepal – 17.6%, Uganda – 17.1%, and Rwanda – 11.8%)²⁴, Nepal was excluded because of its dissimilarity to Somaliland relative to the other three countries, all of which are in sub-Saharan Africa. The remaining three country's prevalence were weighted by total number of children in each study, resulting in an estimated 18.7% prevalence of pediatric surgical conditions. The above calculation has a built in ±2.5% error surrounding the 18.7% estimated prevalence making the estimated prevalence

16.2-21.9% for the suggested sample size (**Table 1: Equation 1**). The study used similar estimations for response rate, eligible rate, and design effect to the *Nationwide Cross-Sectional Representative Household Survey to Estimate the Burden of Surgical Conditions in Uganda* (**Table 1: Equation 1 & 2**). Although the SOSAS tool was originally designed to include both children and adults, our study focused on assessment of pediatric surgical conditions. Therefore, we chose interview only children ages 0-15 years. Since this was the largest community-based home health survey to be conducted in Somaliland to date, the original target number of households was doubled (**Table 1: Equation 3**) to account for potential challenges which would reduce the intended sample size.

2.2.1.2. SOMALILAND SAMPLING STRATEGY

Somaliland includes 6 regions: Awdal, Maroodi Jeex, Sahil, Sanaag, Sool, and Togdheer (**Figure 2**). Population estimates from 2005 and 2014 Somalia census' were used to estimate populations of Somaliland's 6 regions.^{49,54}

FIGURE 2: MAP OF SOMALILAND DISTRICTS



There are a total of 127 cities and villages in Somaliland which are currently populated, which are hereafter referred to as clusters.⁵⁵ This list was compiled by the Somaliland Family and Health Association (SOFHA) and the Ministry of Planning and National Development.⁵⁶ There are no population estimates for all villages, towns, and cities in Somaliland except for Hargeisa, the

capital. Subtracting Hargeisa city’s population from the region in which it resides, the remaining households were selected proportional to size by region. Due to timing and resource constraints, a total of 25 clusters (cities and villages) were sampled. Within each cluster, 20 households were selected. 25 clusters represent 19.69% of all clusters (n=127) identified in Somaliland. Sampling strata were population-weighted at the regional level to include representation of all 6 regions. Probability proportional to size (PPS) was used to determine the number of clusters to sample in each region. Clusters were randomly selected by assigning them a number and selecting the total clusters determined for that region (**Table 2**). Cities and semi-cities are internally defined as towns which are significantly larger in population and size than villages. Thus, cities and semi-cities were given a weight of 2 and villages were given a weight of 1 in selection, although no exact population data exists for cities or villages.

The population of Hargeisa is reported at 1.2 million⁵⁷ although on site collaborators and representatives from the Ministry of Planning and National Development report that 1.5 million is more accurate due to the recent influx of internally displaced persons. Because Hargeisa represents nearly 40% of the population of Somaliland, it was considered separately from other regions for sampling. The target total of households based on Hargeisa’s population was 547, with an actual total of 379 households, sampled because of its large proportion of the country’s population.

TABLE 2: PROPORTIONAL TO SIZE SAMPLING STRATEGY FOR HOUSEHOLD SELECTION

Region	Est. regional population	Est. regional child population	Target no. HH* per region	Actual cluster selected	Cluster type	Target no. of HH per cluster	Actual no. of HH per cluster
Maroodi Jeex (Hargeisa)	1,500,000	751,500	547	Hargeisa	City	551	379
Maroodi Jeex (not Hargeisa)	141,100	70,691	51	Abaarso	Village	20	19
				Alaybaday	Semi-city	20	19
				Dhubato	Village	20	19
				Dacar Budhuq	Semi-city	20	20
				Ina Igare	Village	20	20
				Habaas Wayn	Village	20	12
Sahil	107,740	53,978	39	Shiikh Abdaal	Semi-city	20	20

				Berbera	City	20	20
Awdal	673,263	337,305	246	Boroma	City	20	20
				Ceel Gaal	Village	20	20
				Caasho Cado	Village	20	18
				Saylac	Semi-city	20	14
				Garbo Dadar	Village	20	19
Togdheer	721,363	361,403	263	Oodwayne	Semi-city	20	20
				Beerato	Semi-city	20	20
				Burao	City	20	20
				Beer	Village	20	22
				Qoryaale	Village	20	19
				Oog	Semi-city	20	20
Sool	327,428	164,041	119	Yagoori	Semi-city	20	17
				Laas Anood	City	20	20
Sanaag	544,123	272,606	199	Gar Adag	Semi-city	20	22
				Eel Afwayn	Semi-city	20	20
				Erigavo	City	20	20
TOTAL	4,015,017	2,011,524	1,465	n=25		1031	839

*HH = household

2.2.1.3. HOUSEHOLD SELECTION AND RANDOMIZATION PROCEDURES

The target number of households per cluster was 20, except for Hargeisa, with actual households sampled detailed in **Table 2**. Households within each region were randomly selected. For all locations besides Hargeisa, enumerator pairs began in the middle of the town and each pair began in different directions. After completing the first survey, enumerators exited the household and flipped a coin using an app on a supplied smartphone. If heads, the pair would turn right, if tails, the pair would turn left. Then the pair would roll a dice using the same app. The number shown on the dice would determine the nth household they would next select. For example, if they flipped heads and rolled 5 the pair would turn right and sample the 5th household on the right. Anytime the pair came across a cross road, they would use the random generator on the smart phone app which would indicate to turn right, left, or continue straight. In cases where more than one household resides in a building and that building is the nth “household” determined by the dice, they would assign each household a number and randomly select one of those numbers using the dice, rolling until one of the assigned numbers was rolled.

For Hargeisa, a different starting point was determined each day due to the size of the city.

Hargeisa is divided into 5 districts. In order to avoid confusion of these districts with the larger

district unit of Somaliland, Hargeisa's 5 districts are hereafter referred to as neighborhoods. These 5 neighborhoods are: Kood-Boor, 26 June, Ga'an Libaah, Ahmed Dhegeh, and Mohamoud Haybe. The target 547 households to sample in Hargeisa were split up between the 5 neighborhoods, resulting in a target 110 households per neighborhood. Five pairs of enumerators (one male and one female) went to the 5 neighborhoods, one pair per neighborhood. Each pair was assigned a target of 10 surveys per day, resulting in a total of 11 days of data collection for Hargeisa. Each pair was given a random starting point in their assigned neighborhood, using <http://www.geomidpoint.com/random>.

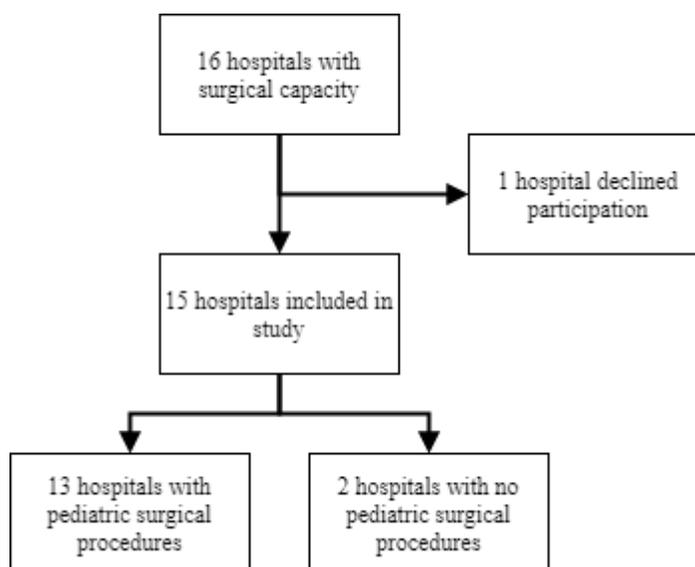
The area of each neighborhood was approximated with rectangular GPS coordinates. If the starting point generated was not in the selected neighborhood (for example, each neighborhood borders the river which may not fit into the rectangular area of selected neighborhood) then another point was selected. The pair located the closest household to this GPS coordinate and began the survey there. At the start of a new day of data collection, each pair will be given a new random starting location within the neighborhood and continue the same random sampling process as previously described.

2.2.2. Aim 2: Hospital survey

2.2.2.1. HOSPITAL CAPACITY ASSESSMENT

Hospitals were included in this study if they had the capacity to perform surgery, defined as the presence of at least one operating room. A total of 16 hospitals were identified by local collaborators, as no national registry exists. Hospitals which had no surgical capacity were excluded. In addition, we were not able to obtain data from one private hospital, International Hospital, due to a lack of willingness to complete the study surveys. Hospitals with surgical capacity but no procedures performed on children were included in analysis in order to understand the disparities of surgical capacity across all hospitals (**Figure 3**).

FIGURE 3: HOSPITALS INCLUDED IN STUDY



2.2.2.2. SURGICAL RECORD REVIEW

For Aim 2, we reviewed all hospital-based surgical records from 01 August 2016 to 31 July 2017.

For hospitals which did not have all records from this period (i.e. only had records from 2017), we collected medical records past 31 July 2017 through the day of data collection in order to maximize the number of procedures recorded up to 1 year (**Table 3**). Surgical records were collected from surgical logbooks at all surgically capable hospitals. All data was de-identified and reported on an aggregate level. Non-surgical medical records and surgical outpatient records were not included due to the difficulty of obtaining them and associating them with surgical logbook entries. Surgical records from logbooks were considered eligible if they included a surgical procedure for an individual ages 0-15 years.

TABLE 3: DATA COLLECTION TIME FRAME FOR HOSPITALS WITH SURGICAL CAPACITY IN SOMALILAND (N=16)

<u>Hospital</u>	<u>Region</u>	<u>Time frame collected</u>	<u>Total time</u>
Al Hayat Hospital	Awdal	August 1, 2016 - July 31, 2017	12 months
Alaale Hospital	Awdal	August 1, 2016 - July 31, 2017	12 months
Borama Regional Hospital	Awdal	August 1, 2016 - July 31, 2017	12 months
Edna Adan University Hospital	Maroodi Jeex	August 1, 2016 - July 31, 2017	12 months
Gargaar Multispecialty Hospital	Maroodi Jeex	October 1, 2017 - October 31, 2017	1 month
Gabiley Regional Hospital	Maroodi Jeex	August 1, 2016 - July 31, 2017	12 months
Hargeisa Group Hospital	Maroodi Jeex	January 1, 2017 - August 31, 2017	8 months
Hargeisa Neurology Hospital	Maroodi Jeex	August 1, 2017 - October 31, 2017	3 months

Manhal Hospital - Ophthalmology Surgeries	Maroodi Jeex	July 1, 2017 - October 31, 2017	4 months
Manhal Hospital - Specialized Surgeries	Maroodi Jeex	August 1, 2016 - July 31, 2017	12 months
Berbera Regional Hospital	Sahil	January 1, 2017 - September 30, 2017	9 months
Sheikh District Hospital	Sahil	August 1, 2016 - July 31, 2017	12 months
Erigavo Regional Hospital	Sanaag	August 1, 2016 - July 31, 2017	12 months
Las Anod Regional Hospital	Sool	August 1, 2016 - July 31, 2017	12 months
Burao Regional Hospital	Togdheer	August 1, 2016 - July 31, 2017	12 months
Daarul Xanaan Hospital	Togdheer	August 1, 2016 - July 31, 2017	12 months

2.3. DATA COLLECTION

2.3.1. Aim 1: Community survey

2.3.1.1. SOSAS

We collected community-based data to estimate the amount of surgical conditions in children using the SOSAS tool, adapted contextually for Somaliland. SOSAS is was designed based on the Demographic and Health Surveys (DHS) guidelines and the WHO Guidelines for Conducting Community Surveys for Injuries and Violence and the survey tool designed for road traffic injuries.⁵⁸ The SOSAS tool was revised to measure the prevalence of surgically treatable condition.⁵⁸ To date, there have been four countries in which SOSAS has been used to assess the national burden of surgical conditions: Nepal³³, Uganda⁵⁹, Rwanda³⁶, and Sierra Leone³², and SOSAS is currently being done in Nigeria.⁶⁰ The SOSAS survey for Somaliland was adapted slightly to include more pediatric specific questions based on us of SOSAS in Nigeria.⁶⁰ We also added several questions on poverty, income, and assets to understand better the financial burden of surgical conditions.³¹

The SOSAS tool includes three parts: a household demographics section, and two sections which assess the presence of surgical conditions at any point in the individual's lifetime. After gathering household demographic information, two children were randomly selected from the family to serve as participants in the second part. This study restricted selection of individuals to children ages 0-15. The child interview included questions on child demographics (age, general wellness, education level) and condition-specific questions for six body areas (facial, chest, back, abdominal, groin and extremities) (**Appendix A: SOSAS Somaliland**). Since surgical conditions

were only assessed for children, questions were asked to parents or guardians about surgical condition history in the child. The child was not required to be present during the interview, as interviews were often conducted during the school day. Parents were able to provide surrogate consent for children 12 years and younger. Children 13-15 years were required to provide oral consent in person along with their parent or guardian.

2.3.1.2. ENUMERATORS

Participants were interviewed by public health and nurse graduates from Edna Adan University in Somaliland, hereafter referred to as enumerators. Enumerators interviewed selected households in pairs, one male and one female, to ensure comfort during culturally sensitive questions. During data collection, enumerators approached households and stated their credentials and purpose and ask to consent the head of household.

2.3.2. Aim 2: Hospital survey

2.3.2.1. HOSPITAL CAPACITY ASSESSMENT

The research manager and/or coordinator asked permission from the lead clinician or administrator at each hospital (preferably the hospital director) for participation in the study and presented the study's letter of permission from the Ministry of Health (MoH). The identified hospital representative was interviewed using a one-page hospital capacity assessment adapted from the LCoGS's *Surgical Assessment Tool - Hospital Walkthrough*⁶¹ and GICS' *Global Assessment of Pediatric Surgery (GAPS)*.⁶² This survey collected data on hospital infrastructure, workforce, and other relevant pediatric surgical indicators (**Appendix B: Somaliland hospital capacity assessment**).

2.3.2.2. SURGICAL RECORD REVIEW

The surgical record review collected data from all pediatric surgical procedures performed at each hospital. After completing the hospital capacity assessment, the research manager and/or coordinator reviewed all surgical records for children age 0-15 who underwent surgical care

from 01 August 2016 to 31 July 2017 or adjusted time frame. The surgical records were reviewed using a quantitative survey tool (**Appendix C: Somaliland pediatric surgical record review tool**). As most surgical records are kept via handwritten logbooks, they were analyzed on site and de-identified data was entered into an electronic database.

2.4. MEASURES

2.4.1. Aim 1: Community survey

The SOSAS survey includes data on family demographics and surgical condition history. Family demographics include questions on family size, household location (rural vs urban), transportation to health facilities, income and assets, and recently deceased family members. Families were only asked to provide information on family members who had died in the previous one year. In questions which involved an aspect of time, time point cutoffs included the past 3 years (when the current drought started in Somaliland) and 7 years (the previous Somaliland presidential election) so that participants had a major event to conceptualize time. Health facilities were defined according to SOSAS⁵⁸ as Primary health facility: Health facility without functioning operating room; Secondary health facility: Health facility with functioning operating room; and Tertiary health facility: Health facility with functioning operating room and minimal one surgical specialists. As many families did not know the difference between secondary and tertiary hospitals in their country, these two categories were combined in analysis. The interview for surgical conditions includes questions on child demographics (age, general wellness, education level) and condition specific questions for six body areas (facial, chest, back, abdominal, groin and extremities). If a family reported a surgical condition in an identified body area, further follow up questions were asked on condition type, current presence of the conditions, healthcare seeking history, traditional healthcare, type of surgical procedure performed, disability status, and reason for not seeking or receiving healthcare. (**Appendix A: SOSAS Somaliland**). Major procedures were defined as procedures which require

regional/general anesthesia and minor procedures were defined as dressings, wound care, punctures, suturing and incision/drainage (I&D). Additionally, parents were asked to identify if a child's problem was one of 16 pediatric surgical conditions through a picture logbook presented by the enumerator, in order to determine condition diagnosis for 16 high burden congenital deformities.⁶³ (**Appendix D: Pediatric surgical portfolio**).

2.4.2. Aim 2: Hospital survey

2.4.2.1. HOSPITAL CAPACITY ASSESSMENT

Review of hospital capacity included general information (region, type of hospital), infrastructure (availability of electricity/water/oxygen, number of beds, operating rooms, and anesthesia machines), service delivery (catchment area, patients per admitted, operations, post-operative mortality, and workforce), and finances (surgery specific hospital budget, patient payment for services, cost of Bellwether procedures⁶⁴ and transportation/lodging costs).

2.4.2.2. SURGICAL RECORD REVIEW

The surgical record review included data on patient age, gender, surgical procedure performed, date of surgery and outcome (if available). Although the surgical record review tool included variables such as cost and outcome, logbooks rarely contained this information. As data was collected in a cross-sectional method from surgical logbooks, there was no data collected on admission diagnosis or surgical severity.

2.5. ANALYSIS

2.5.1. Aim 1: Community survey

To measure the burden of surgical conditions, we used the definition from the LCoGS, in which surgical conditions are "any disease, illness, or injury in which surgical care can potentially improve the outcome."¹ Although at least one enumerator in each pair was medically trained, conditions were confirmed as surgical by one pediatric surgeon not involved with data collection. Lifetime prevalence of surgical conditions was determined for all children who

reported a surgical condition at some point in their life. Households and individuals were weighted using design weights based on sampling fraction, known regional populations from Somalia census data⁴⁹, and pediatric proportion estimates.²⁴

Data were analyzed using SAS 9.4 (SAS Institute Inc, Cary, NC) and Microsoft Excel 2010 (Microsoft Corp, Redmond, WA). All data were analyzed with survey methodology, which included incorporating proportional-to-size methodology, the cluster-based sampling strategy, and the design weights based on sampling fractions. Household and child demographic data were analyzed through survey frequencies (with weighted %) and medians (with associated interquartile range (IQR)). Child demographics were compared across regions using the Wald chi-squared statistic for categorical variables and regressions statistics across continuous variable. Household, child, and condition specific data were compared between children who reported a surgical condition versus those who did not, for children who did have a condition and did seek healthcare versus those with a condition and did not seek healthcare, and for children who sought healthcare and received a surgical procedure versus those who sought healthcare but did not receive surgical procedure, using a weighted model. Condition characteristics and child demographics were reported for all children and stratified by age group, region, and the body location of the identified surgical conditions. Household death characteristics were reported in proportions and frequencies and were compared between adults and children for differences using the Wald chi-squared statistic.

The primary outcomes were presence of a surgical condition (dichotomous) and surgical procedure received (dichotomous). P-values were reported from the F test (2x2 tables) or Adjusted F test (greater than 2x2 tables) and did not include missing values. Frequencies are reported in whole values. Percentages, means, medians, IQR, and standard error (SE) are reported to two decimal places. P-values are reported to four decimal places. Significance was

assessed at p-values less than 0.05 and marginal significance was assessed at p-values less than 0.10.

2.5.2. Aim 2: Hospital survey

2.5.2.1. HOSPITAL CAPACITY ASSESSMENT

Responses to the hospital capacity assessment were aggregated and organized in Microsoft Excel 2010 (Microsoft Corp, Redmond, WA, USA). For continuous variables, sum of all values, medians, mode, and mean between hospitals were reported where appropriate.

2.5.2.2. SURGICAL RECORD REVIEW

Reported surgical diagnosis were coded due to the large variation in specificity of diagnosis and spelling errors by a research assistant and research manager (**Appendix E: Full list of surgical conditions and coding**). Surgical diagnosis codes were reviewed by a pediatric surgeon. Surgical procedures were categorized into surgical platforms of care by a pediatric surgeon (**Appendix E: Full list of surgical conditions and coding**).

Of the 15 hospitals, 11 hospitals had 12 months of surgical procedures. For the other 5 hospitals, 1 hospital had 9 months of data available, 1 hospital had 8 months of data available, 1 hospital had 4 months of data available, 1 hospital had 3 months of data available, and 1 hospital had 1 month of data available. One hospital which kept separate surgical logbooks for ophthalmological procedures and all other procedures had a full 12 months for one logbook and only 3 months for another and thus is counted twice in this consideration (**Table 4**).

To account for the missing data for these 5 hospitals, we used two methods. First, the surgical diagnoses and surgical procedures that were missing at each hospital were replicated based on existing data at that hospital, assuming the procedures captured were representative of procedures occurring during an entire 12-month period. For hospitals which reported greater than ½ year of data, but less than 1 full year, diagnosis and procedure pairs were randomly

selected from existing data to fill missing observations. Second, missing data for the child's age, gender, town of origin, type of anesthesia, surgery provider, and anesthesia provided were accounted for through multiple imputation (MI) using multivariate normal distribution (MVN) with SAS Markov Chain Monte Carlo (MCMC) so that all hospitals had 12 months of surgical procedures. (**Table 4**). Imputed gender, type of anesthesia, and provider variables were rounded to nearest whole value to analyze categorical levels. A total of 10 imputations were run. All subsequent analyses were conducted using one imputed dataset, rather than through multiple imputation analysis techniques. All variables in the final imputed dataset were compared with the original complete-case dataset and no differences were noted (assessed at a p-value of 0.05). The resulting dataset included 1,255 surgical procedures performed over a 12-month period for 15 Somaliland hospitals. Data were analyzed in SAS 9.4 (SAS Institute Inc., Cary, NC, USA) and Microsoft Excel 2010 (Microsoft Corp, Redmond, WA, USA).

Data were summarized using frequency tables and medians with associated IQR. Child demographics, surgical procedure categories, and surgical diagnoses were reported and stratified by hospital, as well as by region and hospital type (public or private) to determine differences. P-values were determined using Mantel-Haenszel Chi-Square test statistic. Frequencies were reported in whole values. Percentages, means, medians, IQR, and SE were reported to two decimal places. P-values were reported to four decimal places.

TABLE 4: SURGICAL RECORD ADDITIONS THROUGH MULTIPLE IMPUTATION

<u>HOSPITAL NAME</u>	<u>HOSPITAL CODE</u>	<u>REGION</u>	<u>DATA COLLECTION TIME FRAME</u>	<u>TOTAL TIME</u>	<u>SURGERIES RECORDED</u>	<u>MI* ADDITIONS</u>	<u>TOTAL</u>
Al Hayat Teaching Hospital	AHH	Awdal	August 1, 2016 - July 31, 2017	12 months	99	0	99
Alaale Hospital	AH	Awdal	August 1, 2016 - July 31, 2017	12 months	132	0	132
Borama Regional Hospital	BorRH	Awdal	August 1, 2016 - July 31, 2017	12 months	9	0	9
Edna Adan University Hospital	EAUH	Maroodi Jeex	August 1, 2016 - July 31, 2017	12 months	303	0	303
Gabiley Regional Hospital	GRH	Maroodi Jeex	August 1, 2016 - July 31, 2017	12 months	0	0	0
Manhal Specialty Hospital – Specialized Surgeries	MSH	Maroodi Jeex	August 1, 2016 - July 31, 2017	12 months	149	0	149
Sheikh District Hospital	SDH	Sahil	August 1, 2016 - July 31, 2017	12 months	16	0	16
Erigavo Regional Hospital	ERH	Sanaag	August 1, 2016 - July 31, 2017	12 months	2	0	2
Las Anod Regional Hospital	LARH	Sool	August 1, 2016 - July 31, 2017	12 months	0	0	0
Burao Regional Hospital	BRH	Togdheer	August 1, 2016 - July 31, 2017	12 months	38	0	38
Daaru Xanaan Hospital	DXH	Togdheer	August 1, 2016 - July 31, 2017	12 months	2	0	2
Berbera Regional Hospital	BerRH	Sahil	January 1, 2017 - September 30, 2017	9 months	2	1	3
Hargeisa Group Hospital	HGH	Maroodi Jeex	January 1, 2017 - August 31, 2017	8 months	123	62	185
Manhal Specialty Hospital – Ophthalmology Surgeries	MSH	Maroodi Jeex	July 1, 2017 - October 31, 2017	4 months	65	130	195
Hargeisa Neurology Hospital	HNH	Maroodi Jeex	August 1, 2017 - October 31, 2017	3 months	3	9	12
Gargaar Multispecialty Hospital	GMH	Maroodi Jeex	October 1, 2017 - October 31, 2017	1 month	9	101	110
Total					952	301	1255

*Multiple imputation using multivariate normal distribution (MVN) with SAS Markov Chain Monte Carlo (MCMC)

2.6. ETHICAL CONSIDERATIONS

Institutional Review Board (IRB) approval was granted from Duke University. Since Somaliland does not have a national IRB, a formal letter of approval for the study was granted from the Somaliland MoH. Results will be disseminated to all collaborators (including the MoH, participating hospital directors, and international collaborators) at the end of the study. Participants in the community survey (Aim 1) were consented verbally and given the option to start participation at any time. Study participants were given contact information about the study if they would like to seek out the study results. We obtained a waiver of consent to review medical records for the retrospective review.

3. Results

3.1. AIM 1: COMMUNITY SURVEY

3.1.1. Demographics of families and children (Table 5)

In this study, 1450 children, from 839 families, were interviewed. A total of 871 families were asked to participate and of these, 32 declined participation for a variety of reasons – no time (65.6%); no perceived benefit (21.9%); not willing (9.4%); and other (sick child) (3.1%) – resulting in 839 families participating in the survey. Nearly all the respondents for the survey were mothers of the household (88.8%). About half of these families were from urban areas (51.6%), the other half from rural areas (48.4%). Median household size was 5.8 members (IQR: 4.0, 7.9) and the median number of children per family was 3.0 (IQR: 1.8, 4.6). Most household members were under 15 years old (53.7%) and children 1-5 years (19.0%) and 6-10 years (18.2%) had the highest proportion of household ages.

Travel time, cost, and type of transport varied between primary, secondary and tertiary health facilities.⁵⁸ Families reported that the closest secondary/tertiary health was usually public (67.0%) with a median time of 0.9 hours to get to the facility (IQR: 0.5, 1.9 hours). Most families

reported being less than 2 hours from a secondary/tertiary health facility (76.6%). Families reported traveling to secondary/tertiary health facilities mostly by public transport (54.4%) and the median cost of transport was \$4.7 USD (IQR: \$0.8, \$18.0 USD).

TABLE 5: HOUSEHOLD DEMOGRAPHICS (N=839)

	%	(n)
Total		839*
DEMOGRAPHIC INFORMATION		
Village Type		
Rural	51.61	(398)
Urban	48.39	(441)
Household size	5.81	(4.04, 7.91)
No. children per household	3.01	(1.76, 4.61)
Household age		
< 1 y	2.45	(146)
1-5 y	18.98	(1090)
6-10 y	18.16	(1002)
11-15 y	14.07	(759)
> 15 y	46.34	(2623)
Population gender		
Female	50.37	(2856)
Male	49.59	(2760)
Respondent information		
Position in household		
Mother	88.83	(750)
Other**	11.17	(89)
HEALTH FACILITY INFORMATION		
Primary†		
Type		
Private	31.29	(272)
Public	56.03	(450)
Unknown/Missing	12.68	(117)
Travel time to facility (hours)	0	(0, 0.34)
Wait time for travel (hours)	0	(0, 0)
Type of transport §		
Public transport	8.88	(86)
Car	2.31	(22)
On foot	82.08	(661)
Carried	0.04	(2)
Unknown/Missing	6.68	(68)
Cost of transport (USD) (if cost >0) ‡	0.92	(0.38, 2.58)
Secondary†† and tertiary††† (n=1678) ***		
Type		
Private	33.01	(389)
Public	66.99	(648)
Unknown/Missing*	---	(641)
Travel time to facility (hours)	0.9	(0.47, 1.92)
≤ 2 hours	76.75	(885)
> 2 hours	23.25	(205)
Missing	---	(588)
Wait time for travel (hours)	0.41	(0, 0.76)
Type of transport §		
Public transport	54.42	(635)
Car	31.77	(310)
On foot	13.04	(139)
Carried	0.77	(5)
Unknown/Missing	---	(589)
Cost of transport (USD) (if cost >0) ‡	4.74	(0.8, 17.96)

*32 families denied participation for the following reasons: no time (65.63%); no perceived benefit (21.88%); not willing (9.38%); and other (sick child) (3.13%)

**Other respondents (grandmother, sister, father, aunt, daughter, grandfather, uncle, brother, head of household, girl, and step mother) each represent less than 4.5% of total

†Primary health facility: Health facility without functioning operating room

††Secondary health facility: Health facility with functioning operating room

†††Tertiary health facility: Health facility with functioning operating room and minimal one surgical specialists (Surgeons/Orthopedics/Gynecologist/Urologist)

‡For families that reported cost in Somaliland shillings, the current conversion rate of 1 USD:10000 shilling was used

§Other options (Motorcycle, Bicycle, Boat, Animal) had no responses

***As many participants did not know the nearest secondary or tertiary facility, nor the difference between the two, these health facility levels have been combined and missing frequencies are reported but not included in the percentage breakdown

3.1.2. Characteristics of children who died (Table 6)

We found 94 deaths using the SOSAS survey, of which 25 were children age 15 years or younger.

The median age of death for children was 1.5 years (IQR: 0.1, 3.1 years). Most pediatric deaths were among children between the ages of 1 to 5 years (58.0%) followed by those less than 1 year (27.3%), 11-15 years (13.2%) and 6-10 years (1.5%). Compared to adult deaths, pediatric deaths were more likely to be male (59.9% vs 45.5%, respectively) ($p = 0.03$). Nearly all pediatric deaths were categorized as “other” (77.9%), the next highest category being abdominal distention or pain (13.3%). About half of pediatric deaths sought healthcare (53.4%). Reasons for not seeking healthcare included no time (person died before arrangements) (48.5%), no money for healthcare (30.7%), fear/no trust (6.9%), no need (condition is not surgical) (6.9%), or facility/personnel/equipment not available (6.9%). Most did not seek traditional healthcare (86.8%) and most children died at home (65.3%) instead of in a health facility (34.7%). There were no significant differences in cost of healthcare between children (mean USD: \$386.4, SE: \$142.4) and adults (mean USD: \$518.7, SE: \$71.75) but children had significantly lower cost of funerals (mean USD: \$208.2, SE: \$40.7) compared to adults (mean USD: \$389.9, SE: \$38.8) ($p < 0.0001$). All children and adults who died had a funeral (100.0%).

TABLE 6: CHARACTERISTICS OF DEATHS IN CHILDREN AND ADULTS (N=94)

	Total	Children (≤ 15 y)	Adults (> 15 y)	p
	% (n)	% (n)	% (n)	
Total deaths	(94)	28.16 (25)	71.84 (69)	
Deaths per family (median, IQR)	1 (1.00, 1.00)			
Age at death (median, IQR)	43.39 (7.63, 58.86)	1.51 (0.05, 3.05)	55.09 (39.06, 65.06)	n/a
<1 y	7.7 (8)	27.34 (8)		
1-5 y	16.35 (12)	58.03 (12)		
6-10 y	0.41 (1)	1.45 (1)		
11-15 y	3.71 (4)	13.17 (4)		
> 15 y	71.84 (69)		100 (69)	
Gender				
Female	49.97 (47)	40.13 (11)	54.51 (36)	
Male	49.12 (46)	59.87 (14)	45.49 (32)	0.0296
Missing	0.91 (1)	. (0)	. (0)	
Females pregnant at death	3.35 (1)	. (0)	100 (1)	n/a
Reason for death				
Injury	6.21 (5)	8.01 (1)	5.72 (4)	
Wound not due to an injury	3.36 (3)	. (0)	4.68 (3)	
Bleeding or ill around childbirth	3.78 (2)	. (0)	5.26 (2)	
Mass (Growth or Swelling)	8.5 (9)	. (0)	11.54 (8)	n/a
Abdominal distention or pain	5.58 (5)	13.3 (3)	2.9 (2)	
Others	70.67 (69)	77.87 (19**)	69.91 (50)	
Missing	1.9 (1)	6.74 (1)	0 (0)	
Injury specific reason				
Bite or animal attack	18.89 (1)	0 (0)	28.56 (1)	
Car, truck, bus crash	17.95 (1)	0 (0)	27.13 (1)	
Gunshot / firearm	14.66 (1)	0 (0)	22.15 (1)	n/a
Others (specify)	48.5 (2)	100 (1)	22.15 (1)	
Surgically preventable death				
Possible	16.04 (14)	7.47 (1)	19.4 (13)	
Non-surgical	34.68 (35)	40.33 (10)	32.46 (25)	0.6496
Unknown	49.28 (45)	52.2 (14)	48.14 (31)	
Healthcare sought				
No	28.05 (20)	46.56 (10)	20.79 (10)	
Yes	71.95 (74)	53.44 (15)	79.21 (59)	0.1724
Reason for not seeking healthcare				
No time (person died before arrangements)	46.14 (9)	48.5 (4)	44.06 (5)	
No money for healthcare	23.55 (5)	30.66 (3)	17.3 (2)	
Fear / no trust	14.61 (2)	6.94 (1)	21.34 (1)	0.8583
No need (condition is not surgical)	9.21 (2)	6.94 (1)	11.2 (1)	
Not available (facility/personnel/equipment)	6.49 (2)	6.94 (1)	6.1 (1)	
Traditional healthcare				
No	87.68 (81)	86.79 (22)	91.5 (59)	
Yes	9.59 (10)	13.21 (3)	8.5 (7)	0.4914
Missing	2.73 (3)	. (0)	. (0)	
Type of healthcare				
Hospital visit	67.23 (71)	37.91 (12)	80.23 (59)	
Pharmacy visit	3.81 (2)	13.98 (2)	. (0)	
None	27.14 (19)	48.11 (10)	19.77 (9)	n/a
Missing	1.82 (2)	. (0)	. (0)	
Location of death				
Health facility	28.26 (29)	34.71 (10)	26.28 (19)	
Home	70.61 (63)	65.29 (13)	73.72 (50)	0.5353
Others	1.13 (2)	. (0)	. (0)	
FINANCIAL INFORMATION				
Cost of healthcare (USD) (mean, SE)	488.32 (79.95)	386.36 (142.38)	518.73 (71.75)	0.2436
Funeral (yes)	100 (94)	100 (25)	100 (69)	
Cost of funeral (USD) (mean, SE)	338.61 (44.82)	208.21 (40.67)	389.94 (38.75)	<.0001

*Other options which had no responses included: deformity congenital and deformity acquired

**Reasons for those selecting other include: anemia (n=1); asthma (n=1); cholera (n=1); diarrhea (n=2); drowning (n=1); esophagus blockage (n=1); heart attack (n=1); jaundice (n=1); labor (n=1); stillborn (n=5); stomach ache (n=1); vomiting (n=1)

3.1.3. Demographics of children surveyed for surgical conditions (Tables 7 & 8)

Within the 839 households, we collected data from 1450 children using the SOSAS survey.

Analysis of demographics in the 1450 children surveyed showed several findings. Most children were male (56.7%) and ages 1-5 years (43.2%) with a median age of 5.25 years (IQR: 2.4, 9.1 years). For children ages 6 and older, 35.1% had no education, 61.1% had primary school education, and 3.1% had secondary school education. Nearly all children were from Somaliland (97.1%), with others being from Ethiopia (1.0%), Somalia (0.7%), or Djibouti (0.4%). Median number of years living in the current house was 4.2 years (IQR: 1.8, 8.0 years). Most reported being generally healthy (93.6%). Nearly all children reported either no illness (66.6%) or 1-13 weeks of illness (30.3%) in the past 1 year. Similarly, nearly all children reported either no health visits (70.1%) or 1-3 health visits (24.4%) in the past 1 year.

When stratified by region, there were no differences by gender, education level or number of health visits. There were differences between regions in age category ($p < 0.0001$) and being generally healthy ($p < 0.0001$). The Sahil region had the highest proportion of children less than 1 year of age (9.2%) and 1-5 years (52.3%). The Sool region had the highest proportion of children ages 6-10 years (38.0%) and Sanaag region had the highest proportion of children 11-15 years (29.8%). Maroodi Jeex had the lowest proportion of children reporting being generally healthy (89.3%) while Togdheer had the highest proportion (98.3%). The Sahil region had the greatest proportion of children reporting four or more health visits in the last 1 year (7.7%) while children in the Awdal region reported had the highest proportion of children reporting 0 health visits in the past 1 year (78.2%) compared to other regions.

TABLE 7: DEMOGRAPHICS OF CHILDREN SURVEYED FOR SURGICAL CONDITIONS (N=1450)

	% (n)
Gender	
Female	43.34 (640)
Male	56.66 (810)
Age (median, IQR)	
< 1 y	5.25 (76)
1-5 y	43.24 (633)
6-10 y	32.67 (469)
11-15 y	18.85 (272)
Education if age ≥ 6*	
None	35.13 (282)
Primary school	61.14 (428)
Secondary school	3.13 (25)
Missing	0.6 (6)
Country of origin	
Missing	0.75 (13)
Somaliland	97.1 (1419)
Somalia	0.71 (6)
Ethiopia	1.04 (10)
Djibouti	0.4 (2)
Years lived in house	
	4.17 (1.83, 8.04)
Generally healthy	
No	5.51 (96)
Yes	93.56 (1338)
Missing	0.93 (16)
Illness frequency (week/last 12 months) (median/IQR)	
0	66.59 (906)
1-13	30.3 (482)
14-26	0.48 (11)
27-39	0.1 (2)
39-52	1.69 (30)
Missing	0.85 (19)
Number of health visits (last 12 months) (median/IQR)	
0	70.09 (968)
1-3	24.42 (385)
>4	4.51 (76)
Missing	0.98 (21)
*free public primary school begins for children ages 5-7 years. The median of 6 years was used as a cutoff point for analysis	

TABLE 8: DEMOGRAPHICS OF CHILDREN SURVEYED FOR SURGICAL CONDITIONS STRATIFIED BY REGION (N=1450)

	Total % (n)	Awdal % (n)	Maroodi Jeex % (n)	Sahil % (n)	Sanaag % (n)	Sool % (n)	Togdheer % (n)	p*
Total	(1450)	17 (159)	40.69 (848)	2.54 (65)	13.63 (107)	8.33 (64)	17.8 (207)	
Gender								
Female	43.34 (640)	39.15 (64)	46.56 (390)	44.62 (29)	44.91 (48)	39.4 (25)	40.3 (84)	0.61
Male	56.66 (810)	60.85 (95)	53.44 (458)	55.38 (36)	55.09 (59)	60.6 (39)	59.7 (123)	
Age								
< 1 y	5.25 (76)	7.1 (12)	4.36 (40)	9.23 (6)	7.46 (8)	3.35 (2)	4.1 (8)	<.0001
1-5 y	43.24 (633)	43.52 (65)	43.27 (367)	52.31 (34)	38.42 (41)	41.49 (27)	45.99 (99)	
6-10 y	32.67 (469)	37.7 (61)	32.84 (277)	24.62 (16)	24.39 (26)	37.97 (24)	32.57 (65)	
11-15 y	18.85 (272)	11.68 (21)	19.52 (164)	13.85 (9)	29.74 (32)	17.18 (11)	17.34 (35)	
Education if age ≥ 6*								
None (includes nursery)	35.13 (282)	34.17 (32)	35.19 (169)	56 (14)	34.36 (20)	37.69 (13)	32.66 (34)	0.5115**
Primary school	61.14 (428)	63.34 (48)	58.21 (246)	44 (11)	62.24 (36)	62.31 (22)	66.72 (65)	
Secondary school (junior / senior)	3.13 (25)	2.49 (2)	5.41 (21)	. (0)	3.4 (2)	. (0)	. (0)	
Missing	0.6 (6)	. (0)	1.19 (5)	. (0)	. (0)	. (0)	0.62 (1)	
Country originally from								
Somaliland	97.1 (1419)	89.95 (148)	97.63 (830)	100 (65)	100 (107)	98.58 (63)	99.41 (206)	n/a
Somalia	0.71 (6)	2.8 (3)	0.28 (2)	. (0)	. (0)	1.43 (1)	. (0)	
Ethiopia	1.04 (10)	4.45 (5)	0.7 (5)	. (0)	. (0)	. (0)	. (0)	
Djibouti	0.4 (2)	2.34 (2)	. (0)	. (0)	. (0)	. (0)	. (0)	
Missing	0.75 (13)	0.46 (1)	1.39 (11)	. (0)	. (0)	. (0)	0.59 (1)	
Generally healthy								
No	5.51 (96)	3.46 (8)	9.31 (74)	9.23 (6)	3.68 (4)	2.85 (2)	0.85 (2)	<.0001
Yes	93.56 (1338)	96.08 (150)	89.27 (762)	90.77 (59)	95.44 (102)	97.15 (62)	98.25 (203)	
Missing	0.93 (16)	0.46 (1)	1.42 (12)	. (0)	0.88 (1)	. (0)	0.9 (2)	
Illness frequency (week/last 12 months)								
0	66.59 (906)	78.51 (120)	55.64 (473)	66.15 (43)	73.07 (78)	77.12 (49)	70.5 (143)	n/a
1-13	30.3 (482)	20.21 (36)	39.32 (328)	26.15 (17)	25.96 (28)	22.88 (15)	26.58 (58)	
14-26	0.48 (11)	. (0)	0.92 (10)	. (0)	. (0)	. (0)	0.59 (1)	
27-39	0.1 (2)	. (0)	0.14 (1)	1.54 (1)	. (0)	. (0)	. (0)	
39-52	1.69 (30)	0.82 (2)	2.48 (20)	6.15 (4)	0.96 (1)	. (0)	1.44 (3)	
Missing	0.85 (19)	0.46 (1)	1.5 (16)	. (0)	. (0)	. (0)	0.9 (2)	
Number of health visits (last 12 months)								
0	70.09 (968)	78.23 (121)	59.77 (514)	67.69 (44)	78.51 (84)	77.12 (49)	76.62 (156)	0.1439
1-3	24.42 (385)	18.8 (33)	32 (261)	24.62 (16)	19.65 (21)	18.11 (12)	18.97 (42)	
>4	4.51 (76)	2.52 (4)	6.7 (56)	7.69 (5)	0.96 (1)	4.78 (3)	3.51 (7)	
Missing	0.98 (21)	0.46 (1)	1.53 (17)	. (0)	0.88 (1)	. (0)	0.9 (2)	

*statistical significance ran without missing values

**statistical significance ran for no education vs any education

3.1.4. Demographics by surgical condition, healthcare seeking behavior, and surgical treatment status (Table 9)

We found a total of 226 surgical conditions in 191 children, yielding a prevalence of surgical conditions in our study population of 13.7%. Of the 191 children, 158 reported 1 surgical condition, 31 reported 2 surgical conditions, and 2 reported 3 surgical conditions, totaling 226 surgical conditions. When stratified by presence or absence of a surgical condition, there was no difference in child age, gender, region, family income, or transport time. However, there were more children per family for children who had a surgical condition compared to those who did not have a surgical condition (mean 4.1 vs 3.8, respectively; $p = 0.05$). Children who had surgical conditions also were more frequently from urban areas (61.7% vs 46.2%, respectively; $p = 0.10$) and similar regions. Compared to children who did not have surgical conditions, children who reported surgical conditions were less likely to be generally healthy (95.7% vs 76.5%, respectively) ($p = 0.11$), had a higher number of health facility visits ($p = 0.003$), and higher number of weeks ill in the past one year ($p = 0.09$).

For children with a surgical condition ($n=226$ conditions in 191 children), 158 conditions were in children reported seeking healthcare and 64 were in children who did not seek healthcare for the condition. There were no differences in age, gender, family income, region, village type, health facility visits, number or weeks ill, or health status among children who sought healthcare for their condition compared to those who did not seek healthcare. However, families of children who sought healthcare had fewer children per family (3.7 vs 4.3, respectively) ($p = 0.01$) and shorter transport time to secondary/tertiary health facilities (1.8 vs 3.2 hours, respectively; $p = 0.01$). There was a difference in the proportion of children who lived over 2 hours from a secondary/tertiary facility between those who sought healthcare (18.2%) and did not seek healthcare (49.6%) ($p = 0.03$).

Among those children who sought healthcare (n=158), 55 reported receiving a surgical procedure and 99 did not; 4 children did seek healthcare but did not answer whether they had received surgery or not. There was no difference in age, number of children per family, village type, health status, health facility visits, or cost of transport among those who received a surgical procedure compared to those who did not. Most children who did not receive surgery reported a family income of 0-100 USD per month (41.8%) although children who did receive surgery most frequently reported an income of 400-700 USD per month (28.4%). Children who received surgery were marginally more likely to be male than those who did not receive surgery (73.6% vs 55.1%) ($p = 0.12$). There was a difference in primary care transport time (0.30 vs 0.16 hours, respectively) and wait time (0.2 vs 0.1 hours, respectively) with children who received surgery having higher average transport ($p = 0.001$) and wait times ($p = 0.03$) than those who did not.

TABLE 9: DEMOGRAPHIC CHARACTERISTICS OF CHILDREN STRATIFIED BY THE SURGICAL CONDITION, HEALTHCARE SEEKING BEHAVIOR, AND SURGICAL TREATMENT STATUS (N=1450)

	Total children	No surgical condition	Surgical condition*	p**	Did not seek healthcare	Sought healthcare	p**	Did not receive surgery	Received surgery	p*
	% (n)	% (n)	% (n)		% (n)	% (n)		% (n)	% (n)	
DEMOGRAPHICS										
No. of children interviewed	(1450)	86.27 (1302)	13.73 (226)		32.75 (64)	67.25 (158)		64.29 (99)	35.71 (55)	
No. children with conditions	(191)									
No. of conditions	(226)									
Age (mean, SE)	6.35 (0.12)	6.33 (0.11)	6.91 (0.46)	0.212	6.49 (0.76)	7.09 (0.37)	0.358	7.29 (0.49)	6.78 (0.35)	0.321
<1 y	5.25 (76)	4.93 (65)	6.59 (15)		12.31 (7)	3.97 (8)		5.48 (6)	1.5 (2)	
1-5 y	43.24 (633)	43.98 (583)	34.35 (75)	0.303	36.86 (25)	32.75 (48)	0.195	28.31 (26)	39.34 (20)	0.589
6-10 y	32.67 (469)	32.32 (411)	37.74 (87)		28.47 (17)	43.14 (70)		43.39 (44)	44.43 (25)	
10-15 y	18.85 (272)	18.78 (243)	21.32 (49)		22.36 (15)	20.14 (32)		22.82 (23)	14.73 (8)	
Gender										
Female	43.34 (640)	44.3 (586)	38.55 (92)	0.235	42.22 (28)	37.68 (64)	0.396	44.95 (45)	26.36 (18)	0.115
Male	56.66 (810)	55.7 (716)	61.06 (133)		56.56 (35)	62.32 (94)		55.05 (54)	73.64 (37)	
No. children per family (mean, SE)	3.85 (0.07)	3.82 (0.07)	4.10 (0.15)	0.045	3.65 (0.18)	4.31 (0.20)	0.006	4.25 (0.22)	4.56 (0.24)	0.139
Family income										
Missing	25.74 (423)	25.04 (370)	32.49 (83)		21.95 (18)	36.02 (61)		30.17 (33)	46.41 (27)	
\$0 - \$100	35.91 (481)	35.54 (429)	38.7 (78)	0.332	49.42 (28)	34.39 (50)	0.694	41.84 (39)	20.17 (9)	n/a
\$100 - \$400	31.72 (461)	32.7 (424)	24.17 (57)		21.93 (15)	25.83 (42)		24.86 (25)	28.43 (16)	
\$400 - \$700	5.77 (70)	5.97 (67)	3.46 (5)		4.27 (1)	3.15 (4)		3.14 (2)	3.33 (2)	
\$700 - \$1000	0.85 (15)	0.75 (12)	1.18 (3)		2.44 (2)	0.59 (1)		. (0)	1.67 (1)	
Village type										
Rural	52.32 (698)	53.79 (641)	38.31 (85)	0.104	54.96 (35)	31.12 (50)	0.123	35.79 (36)	22.89 (12)	0.240
Urban	47.68 (752)	46.21 (661)	61.69 (141)		45.04 (29)	68.88 (108)		64.21 (63)	77.11 (43)	
Region										
Awdal	17 (159)	17.58 (147)	13.71 (22)		31.44 (15)	5.41 (7)		8.63 (7)	. (0)	
Maroodi Jeex	40.69 (848)	39.22 (745)	51.92 (150)	0.131	31.91 (32)	60.52 (114)	0.268	54.66 (66)	70.05 (45)	n/a
Sahil	2.54 (65)	2.32 (54)	3.77 (14)		2.51 (3)	4.48 (11)		5.85 (9)	1.14 (1)	
Sanaag	13.63 (107)	14.32 (102)	5.86 (7)		12.8 (5)	2.62 (2)		4.18 (2)	. (0)	
Sool	8.33 (64)	7.86 (55)	12.2 (14)		13.61 (5)	11.8 (9)		12.9 (6)	10.43 (3)	
Togdheer	17.8 (207)	18.71 (199)	12.54 (19)		7.74 (4)	15.17 (15)		13.77 (9)	18.38 (6)	
Generally healthy										
Missing	0.93 (16)	1.01 (16)	0.83 (1)	0.113	2.56 (1)	. (0)	0.128	. (0)	. (0)	0.268
No	5.51 (96)	3.25 (52)	22.66 (56)		13.8 (10)	27.51 (46)		31.08 (33)	20.9 (12)	
Yes	93.56 (1338)	95.74 (1234)	76.52 (169)		83.64 (53)	72.49 (112)		68.92 (66)	79.1 (43)	
No. health facility visits in last 12 months										
Missing	0.98 (21)	1.05 (20)	0.91 (2)	0.003	2.56 (1)	0.13 (1)	0.516	0.21 (1)	. (0)	0.615
0	70.09 (968)	72.04 (892)	47.08 (106)		55.36 (41)	42.38 (62)		43.34 (38)	39.94 (22)	
1-3	24.42 (385)	23.35 (337)	38.84 (85)		30.71 (16)	43.13 (68)		40.08 (41)	50.23 (26)	

>4	4.51 (76)	3.57 (53)	13.16 (33)		11.37 (6)	14.35 (27)		16.37 (19)	9.83 (7)	
No. weeks ill in last 12 months										
Missing	0.85 (19)	0.98 (19)	0.39 (1)		1.22 (1)	. (0)		. (0)	. (0)	
0	66.59 (906)	68.45 (835)	45.5 (101)		49.24 (35)	42.97 (63)		44.29 (39)	39.94 (22)	
1-13	30.3 (482)	29.32 (426)	39.42 (87)	0.089	38.97 (20)	39.98 (66)	0.719	35.92 (38)	47 (26)	n/a
14-26	0.48 (11)	0.44 (9)	1.93 (6)		2.99 (3)	1.45 (3)		0.43 (1)	3.33 (2)	
27-39	0.1 (2)	0.06 (1)	1.09 (2)		2.54 (1)	0.41 (1)		0.65 (1)	. (0)	
39-52	1.69 (30)	0.75 (12)	11.68 (29)		5.04 (4)	15.19 (25)		18.71 (20)	9.73 (5)	
Transport time (hours) (mean, SE)										
Primary care	0.18 (0.04)	1.63 (0.18)	0.54 (0.18)	0.955	0.12 (0.06)	0.21 (0.03)	0.052	0.16 (0.03)	0.30 (0.02)	0.001
Secondary/tertiary care	2.15 (0.56)	2.14 (0.54)	2.24 (0.73)	0.784	3.16 (0.68)	1.82 (0.68)	0.007	1.85 (0.74)	1.82 (0.66)	0.930
Secondary/tertiary facility travel time †										
Missing ‡	--- (590)	--- (506)	--- (84)		--- (22)	--- (61)		--- (38)	--- (20)	
≤ 2 hours	76.57 (902)	77.31 (777)	71.8 (125)	0.393	50.43 (28)	81.81 (93)	0.031	83.1 (55)	78.79 (35)	0.663
> 2 hours	23.43 (209)	22.69 (176)	28.2 (33)		49.57 (17)	18.19 (16)		16.9 (11)	21.21 (5)	
Wait time (hours) (mean, SE)										
Primary care	0.15 (0.07)	2.51 (0.15)	1.26 (0.11)	0.219	0.05 (0.03)	0.13 (0.07)	0.354	0.08 (0.05)	0.23 (0.11)	0.032
Secondary/tertiary care	1.54 (0.75)	1.56 (0.81)	1.38 (0.65)	0.798	2.25 (0.92)	0.97 (0.55)	0.120	1.31 (0.82)	0.46 (0.14)	0.285
Cost of transport (USD) (if cost >0) * (mean, SE)										
Primary care	2.78 (0.96)	14.2 (2.78)	11.51 (2.81)	0.963	1.94 (1.59)	2.93 (1.00)	0.565	4.23 (2.33)	2.11 (0.47)	0.436
Secondary/tertiary care	91.01 (6.02)	43.21 (19.82)	201.95 (25.48)	0.001	3.00 (0.00)	206.17 (24.28)	<.0001	31.13 (21.93)	241.27 (13.45)	0.001
Did the cost of surgery make it difficult to pay for basic household needs?										
Yes									32.99 (13)	
No									67.01 (18)	
* No surgical condition (n=1302) and surgical conditions (n=226) total up to greater than number of children interviewed (n=1450) because some children had more than one surgical condition										
** p values analyzed without including missing variable values										
† n values total up to greater than total number due to secondary and tertiary health facility information being combined										
‡ Many participants did not know the nearest secondary or tertiary facility and therefore the frequency of missing is reported but missing values are not included in the percentage breakdown										

3.1.5. Condition specifics by healthcare seeking behavior and surgical treatment status (Table 10)

We found several trends in healthcare seeking behaviors and surgical treatment status in children who reported a surgical condition (n=226 conditions). Most children reported that the condition was still present (61.4%). Most reported that the timing of onset was in the last 1-12 months (22.3%) or over 7 years ago (18.0%). The most common condition reported were congenital deformities (34.4%), followed by wound related injuries (23.8%), burns (12.2%), wounds not injury related (11.5%), acquired deformities (11.1%), gastro-intestinal (GI) problems (2.8%), or masses (2.7%). If a condition was due to an injury, children reported the type of injury as a fall (33.9%), open fire/explosion (11.5%), hot liquid/hot object (11.5%), car, truck, or bus crash (5.9%), stab/slash/cut/crush (3.4%), bite or animal attack (2.9%), or gunshot (2.1%). Few sought traditional healthcare (19.6%) and most did not receive any type of surgical care (62.7%).

For those children who sought healthcare compared with those who did not seek healthcare, we did not find any difference in the current presence of the surgical condition, timing of condition onset, or seeking traditional healthcare for the condition. Of those who did NOT seek healthcare, conditions included congenital deformities (53.0%), wound related injuries (13.9%) or acquired deformities (12.5%). Of those who did seek healthcare, conditions included wound related injuries (29.2%) congenital deformities (26.2%) and wounds not injury related (13.2%). Injury types regardless of healthcare-seeking behavior were primarily falls (sought healthcare: 36.9%; did not seek healthcare: 25.4%). For those who did not seek healthcare, the reported reasons were no money for transportation (35.8%), no need (13.3%), no money for healthcare (7.9%), facility/personnel/equipment not available (6.1%), no time (4.8%), and fear/lack of trust (2.6%).

Among children who had a surgical condition and sought healthcare (n=158), 55 received a surgical procedure and 99 did not. We did not find any differences between those who received

a surgical procedure and those who did not in timing of onset or seeking traditional healthcare. Children who received surgical care were less likely to report having the condition now (27.8% vs 76.3%, respectively) ($p = 0.05$). Conditions for those who received surgery and those who did not were primarily wound related injuries (35.7% vs 25.4%, respectively) and congenital deformities (29.6% vs 24.1%, respectively). Injuries for those who received surgery were primarily due to falls (47.9%) and open fires/explosions (13.2%); while among those who did not receive surgery, injuries were primarily due to falls (29.2%) and hot liquids/hot objects (14.3%). Of those who received surgery, about 47.9% were major procedures and 52.1% were minor procedures. For those who did not receive surgery, but did seek healthcare ($n=99$), the reported reasons were “no need” (35.0%), “no money for healthcare” (25.5%), or “facility/personnel/equipment not available” (17.7%).

TABLE 10: CONDITION SPECIFICS BY HEALTHCARE SEEKING AND SURGERY RECEIVING STATUS (N=226)

CONDITION SPECIFIC	Surgical condition*	Did not seek healthcare	Sought healthcare	p	Did not receive surgical procedure	Received surgical procedure	P
	% (n)	% (n)	% (n)		% (n)	% (n)	
No. of children interviewed	(1450)						
No. children with conditions	(191)						
No. of conditions	(226)	32.75 (64)	67.25 (158)		64.29 (99)	35.71 (55)	
Present now (yes)	61.4 (132)	70.86 (41)	58.25 (91)	0.1826	76.33 (74)	27.75 (15)	0.0454
Timing of onset							
< 1 month	5.86 (16)	7.16 (4)	5.36 (12)	0.9690	5.08 (7)	5.75 (4)	0.1404
1-12 months	22.34 (54)	24.46 (17)	21.84 (37)		19.8 (20)	23.69 (15)	
1-3 years	21.8 (48)	21.68 (15)	22.38 (33)		14.69 (15)	36.99 (18)	
3-7 years	30.4 (62)	28.37 (16)	32.11 (46)		38.27 (35)	21.16 (10)	
>7 years	18.02 (42)	18.32 (12)	18.31 (30)		22.16 (22)	12.42 (8)	
Missing	1.57 (4)	. (0)	. (0)	. (0)	. (0)		
Condition specifics*							
Deformity congenital	34.39 (72)	52.98 (33)	26.15 (39)	n/a	24.05 (22)	29.58 (15)	n/a
Wound injury related	23.82 (51)	13.89 (8)	29.23 (43)		25.39 (22)	35.73 (20)	
Burn	12.16 (27)	10.8 (6)	12.52 (20)		13.35 (13)	11.67 (7)	
Wound not injury related	11.5 (32)	7.32 (6)	13.22 (25)		13.18 (18)	12.27 (6)	
Deformity acquired	11.14 (26)	12.46 (10)	10.76 (16)		17.18 (16)	. (0)	
GI problems*	2.75 (7)	. (0)	4.16 (7)	5.69 (6)	1.67 (1)		
Masses*	2.66 (7)	2.56 (1)	2.78 (6)	0.21 (1)	7.42 (5)		
Missing	1.57 (4)	. (0)	1.19 (2)	0.95 (1)	1.67 (1)		
Type of injury*							
Fall	33.85 (36)	25.35 (6)	36.87 (29)	n/a	29.16 (12)	47.94 (17)	n/a
Open fire / explosion	11.56 (11)	17.62 (3)	9.82 (8)		7.4 (3)	13.23 (5)	
Hot liquid / hot object	11.53 (12)	13.67 (3)	11.18 (9)		14.25 (6)	7.94 (3)	
Car, truck, bus crash	5.89 (7)	6.61 (2)	5.84 (5)		4.33 (2)	5.29 (2)	
Stab / slash / cut / crush	3.36 (4)	. (0)	4.67 (4)		6.5 (3)	2.65 (1)	
Bite or animal attack	2.85 (2)	6.94 (1)	1.51 (1)	2.79 (1)	. (0)		
Gunshot	2.06 (1)	. (0)	2.86 (1)	5.31 (1)	. (0)		
Missing	28.89 (30)	29.81 (9)	27.24 (19)	30.26 (11)	22.95 (7)		
HEALTHCARE RECEIVED							
Traditional healthcare							
No	78.4 (180)	79.76 (51)	79.61 (129)	0.8757	86.66 (85)	66.21 (40)	0.1545
Yes	19.63 (41)	19.02 (12)	20.39 (29)		13.34 (14)	33.79 (15)	
Missing	1.97 (5)	1.22 (1)	. (0)		. (0)	. (0)	
Type of care received (if healthcare sought)							
No care	62.65 (99)		62.65 (99)		100 (99)		
Major procedure	17.06 (26)		17.06 (26)			47.89 (26)	
Minor procedure	18.56 (29)		18.56 (29)			52.11 (29)	
Missing	1.73 (4)		1.73 (4)		. (0)	. (0)	
Reason for no healthcare seeking							
No (money for) transportation	35.77 (22)	35.77 (22)					
No need	13.3 (7)	13.3 (7)					
No money for healthcare	7.86 (7)	7.86 (7)					
Not available (facility/personnel/equipment)	6.06 (5)	6.06 (5)					
No time	4.8 (2)	4.8 (2)					
Fear / lack of trust	2.6 (3)	2.6 (3)					
Missing	29.6 (18)	29.6 (18)					
Reason for not receiving surgery							
No need	35.04 (40)				35.04 (40)		
No money for healthcare	25.46 (25)				25.46 (25)		
Not available (facility/personnel/equipment)	17.67 (13)				17.67 (13)		
Missing	21.83 (21)				21.83 (21)		
Current disability associated with condition							
The condition is not disabling	60.21 (98)	50.14 (34)	60.21 (98)	0.2395	58.08 (59)	63.55 (37)	0.4547
I feel ashamed	4.03 (6)	2.56 (1)	4.03 (6)		5.48 (5)	1.67 (1)	
I'm not able to work like I used to	2.32 (5)	1.22 (1)	2.32 (5)		0.95 (1)	4.83 (4)	
I need help with transportation and daily living	19.74 (29)	39.43 (22)	19.74 (29)		24.27 (23)	11.6 (5)	
Missing	13.7 (20)	6.64 (6)	13.7 (20)		11.22 (11)	18.35 (8)	

3.1.6. Characteristics of surgical conditions reported (Tables 11, 12 & 13)

Of the 1450 children, 191 reported having a surgical condition at some point in their life for a total of 226 surgical conditions identified. The rate of conditions was highest in children 6-10 years (37.7%) followed by 1-5 years (34.4%), 11-15 years (21.3%), and less than 1 year (6.6%). In total, 41.0% of conditions were reported in children less than 5 years old. Most conditions were reported by children in Maroodi Jeex (51.9%), followed by Awdal (13.7%), Togdheer (12.5%), Sool (12.2%), Sanaag (5.9%), and Sahil (3.8%).

3.1.6.1. CHARACTERISTICS OF SURGICAL CONDITIONS, STRATIFIED BY SOSAS BODY LOCATION (TABLE 11)

In the cohort of 1450 children, we found the most frequent location of surgical conditions (n=226) was in the face/neck (5.8%), followed by extremities (4.4%), abdomen (1.3%), groin (1.3%) chest (0.7%), and back (0.2%). Of the surgical conditions identified (n=226), there were no differences in presence of the condition currently, seeking traditional healthcare, or receiving surgical treatment between body locations. There was, however, a difference in body location for children greater or less than 5 years old ($p = 0.0004$). Abdomen and back locations were cited mostly among children 5 years and younger (64.9% and 71.0%, respectively); facial and groin locations were noted equally among children over and under 5 years (44.9% and 50.1%, respectively); and chest and extremities locations were mostly among children over 5 years (84.2% and 72.1%, respectively). There was also a difference in seeking healthcare between condition body locations ($p = 0.09$); children with abdominal conditions mostly did not seek healthcare (59.9%), about half of children with groin conditions did seek healthcare (53.0%), while most children sought healthcare with back (71.0%), chest (64.8%), extremities (65.3%), and facial (75.8%) conditions.

TABLE 11: CHARACTERISTICS OF SURGICAL CONDITIONS, STRATIFIED BY SOSAS BODY LOCATION(N=226)

	Total (n)	Abdomen (n)	Back (n)	Chest (n)	Extremities (n)	Facial (n)	Groin (n)	p*	
No. of children interviewed	(1450)								
No. of children with conditions	(191)								
No. of conditions**	13.74 (226)	1.34 (23)	0.23 (4)	0.68 (12)	4.36 (73)	5.83 (94)	1.31 (20)		
Age - categorical									
< 1 y	6.59 (15)	19.15 (3)	. (0)	. (0)	2.84 (2)	9.04 (10)	. (0)	n/a	
1-5 y	34.35 (75)	45.72 (10)	71.01 (3)	15.81 (2)	25.07 (21)	35.87 (30)	50.13 (9)		
6-10 y	37.74 (87)	10.81 (4)	28.99 (1)	62.96 (7)	44.58 (32)	34.37 (33)	45.75 (10)		
11-15 y	21.32 (49)	24.31 (6)	. (0)	21.23 (3)	27.51 (18)	20.72 (21)	4.13 (1)		
Age - dichotomous									
< 5	40.94 (90)	64.88 (13)	71.01 (3)	15.81 (2)	27.91 (23)	44.9 (40)	50.13 (9)	0.0004	
≥ 5	59.06 (136)	35.12 (10)	28.99 (1)	84.19 (10)	72.09 (50)	55.1 (54)	49.87 (11)		
Region									
Awdal	13.71 (22)	14.15 (1)	28.99 (1)	10.19 (1)	20.08 (11)	7.24 (6)	20.06 (2)	n/a	
Maroodi Jeex	51.92 (150)	54.94 (17)	71.01 (3)	65.01 (9)	54.49 (50)	44.36 (55)	63.76 (16)		
Sahil	3.77 (14)	5.55 (2)	. (0)	5.42 (1)	0.85 (1)	6.36 (10)	. (0)		
Sanaag	5.86 (7)	8.49 (1)	. (0)	. (0)	2.6 (1)	9.92 (5)	. (0)		
Sool	12.2 (14)	16.86 (2)	. (0)	19.38 (1)	10.79 (4)	12.61 (6)	8.6 (1)		
Togdheer	12.54 (19)	. (0)	. (0)	. (0)	11.18 (6)	19.5 (12)	7.58 (1)		
Generally healthy									
No	22.66 (56)	16.18 (4)	52.66 (2)	41.29 (6)	20.46 (14)	24.73 (27)	12.38 (3)	0.19	
Yes	76.52 (169)	83.82 (19)	47.34 (2)	58.71 (6)	76.94 (58)	75.27 (67)	87.62 (17)		
Missing	0.83 (1)	. (0)	. (0)	. (0)	2.6 (1)	. (0)	. (0)		
CONDITION CHARACTERISTICS									
Present now (yes)	61.4 (132)	32.15 (7)	76.33 (3)	60.48 (7)	57.79 (39)	69.06 (64)	66.98 (12)	0.1398	
Timing of onset									
< 1 month	5.86 (16)	6.82 (2)	. (0)	. (0)	7.65 (5)	5.6 (8)	4.13 (1)	n/a	
1-12 months	22.34 (54)	35.33 (7)	. (0)	43.1 (4)	19.21 (16)	22.39 (24)	12.38 (3)		
1-3 years	21.8 (48)	26.77 (5)	71.01 (3)	15.81 (2)	21.88 (16)	21.08 (18)	14.23 (4)		
3-7 years	30.4 (62)	14.91 (4)	. (0)	33.9 (4)	26.07 (19)	30.16 (24)	65.13 (11)		
>7 years	18.02 (42)	16.17 (5)	28.99 (1)	7.2 (2)	22.71 (15)	18.91 (18)	4.13 (1)		
Missing	1.57 (4)	. (0)	. (0)	. (0)	2.48 (2)	1.85 (2)	. (0)		
Condition specifics †									
Deformity congenital	34.39 (72)	1.68 (11)	0.54 (3)	0.34 (2)	2.52 (16)	6.07 (28)	1.63 (12)	n/a	
Wound injury related	23.82 (51)	0.21 (1)	. (0)	1.04 (4)	2.12 (25)	2.18 (20)	0.21 (1)		
Burn	12.16 (27)	0.3 (1)	0.21 (1)	0.51 (3)	2.79 (18)	0.44 (3)	0.21 (1)		
Wound not injury related	11.5 (32)	. (0)	. (0)	0.42 (2)	0.76 (6)	1.59 (22)	0.42 (2)		
Deformity acquired	11.14 (26)	1.69 (3)	. (0)	. (0)	0.6 (4)	1.56 (16)	0.63 (3)		
GI problems†	2.75 (7)	1.26 (6)	. (0)	. (0)	. (0)	. (0)	0.21 (1)		
Masses***	2.66 (7)	0.1 (1)	. (0)	0.21 (1)	0.21 (1)	0.78 (4)	. (0)		
Missing	1.57 (4)	. (0)	. (0)	. (0)	0.63 (3)	0.21 (1)	. (0)		
Type of injury ††									
Fall	33.85 (36)	14.94 (1)	. (0)	11.44 (1)	40.5 (24)	35.57 (10)	. (0)	n/a	
Open fire / explosion	11.56 (11)	. (0)	100 (1)	. (0)	13.58 (5)	11.73 (5)	. (0)		
Hot liquid / hot object	11.53 (12)	10.24 (1)	. (0)	77.12 (5)	7.36 (4)	. (0)	66.67 (2)		
Car, truck, bus crash	5.89 (7)	. (0)	. (0)	. (0)	6.87 (4)	4.85 (2)	33.33 (1)		
Stab / slash / cut / crush	3.36 (4)	14.94 (1)	. (0)	11.44 (1)	. (0)	4.85 (2)	. (0)		
Bite or animal attack	2.85 (2)	. (0)	. (0)	. (0)	3.6 (1)	3.13 (1)	. (0)		
Gunshot	2.06 (1)	. (0)	. (0)	. (0)	4.21 (1)	. (0)	. (0)		
Missing	28.89 (30)	59.89 (5)	. (0)	. (0)	23.88 (14)	39.86 (11)	. (0)		
HEALTHCARE RECEIVED									
Healthcare sought									
No	32.24 (64)	59.91 (12)	28.99 (1)	35.19 (3)	32.25 (21)	22.34 (19)	47.02 (8)	0.0924	
Yes	66.19 (158)	40.09 (11)	71.01 (3)	64.81 (9)	65.27 (50)	75.8 (73)	52.98 (12)		
Missing	1.57 (4)	. (0)	. (0)	. (0)	2.48 (2)	1.85 (2)	. (0)		
Traditional healthcare									
No	78.4 (180)	85.09 (19)	76.33 (3)	76.29 (9)	76.62 (57)	76.46 (75)	87.62 (17)	0.7305	
Yes	19.63 (41)	14.91 (4)	23.67 (1)	23.71 (3)	20.9 (14)	20.76 (16)	12.38 (3)		
Missing	1.97 (5)	. (0)	. (0)	. (0)	2.48 (2)	2.78 (3)	. (0)		
Type of care received (if healthcare sought)									
No care	62.65 (99)	79.82 (9)	33.33 (1)	75.61 (7)	51.98 (25)	63.8 (47)	84.42 (10)	0.8394*	
Major procedure	17.06 (26)	20.18 (2)	66.67 (2)	12.2 (1)	10.51 (5)	21.02 (15)	7.79 (1)		
Minor procedure	18.56 (29)	. (0)	. (0)	12.2 (1)	33.71 (18)	14.07 (9)	7.79 (1)		
Missing	1.73 (4)	. (0)	. (0)	. (0)	3.8 (2)	1.11 (2)	. (0)		
Reason for no healthcare seeking									
No money for healthcare	35.77 (22)	. (0)	. (0)	. (0)	60.85 (12)	50.36 (9)	11.94 (1)	n/a	
No need	29.6 (18)	56.73 (7)	. (0)	77.54 (2)	21.14 (3)	3.46 (1)	53.4 (5)		
Not available (facility/personnel/equipment)	13.3 (7)	25.14 (2)	100 (1)	. (0)	0.91 (1)	9.23 (2)	30.71 (1)		
Fear / lack of trust	6.06 (5)	4.63 (1)	. (0)	. (0)	7.69 (2)	7.62 (1)	3.94 (1)		
No (money for) transportation	4.8 (2)	. (0)	. (0)	. (0)	. (0)	16.33 (2)	. (0)		
No time	2.6 (3)	6.75 (1)	. (0)	. (0)	1.73 (1)	2.85 (1)	. (0)		
Missing	7.86 (7)	6.75 (1)	. (0)	22.46 (1)	7.69 (2)	10.16 (3)	. (0)		
Reason for no surgical care received §									
No need	35.04 (40)	74.72 (7)	. (0)	32.26 (2)	32.4 (9)	31.03 (18)	36.91 (4)	n/a	
No money for healthcare	25.46 (25)	. (0)	. (0)	11.06 (1)	31.19 (8)	28.36 (14)	26.18 (2)		
Not available (facility/personnel/equipment)	17.67 (13)	. (0)	100 (1)	3.62 (1)	18.5 (4)	23.68 (7)	. (0)		
Missing	21.83 (21)	25.28 (2)	. (0)	53.05 (3)	17.91 (4)	16.94 (8)	36.91 (4)		

*statistical significance ran for no procedure vs any procedure

*** represent the proportion of conditions in the interviewed population of children

†Category "GI problems" includes responses: Abdominal distention or pain, Inability to urinate, and Leaking of urine or feces (like fistula)

††Category "Masses" includes responses: Mass or growth (soft reducible), Mass or growth/goiter, and Breast mass / Breast cancer

‡Categories with no responses include: Mass or growth (solid); Bleeding (per rectum); Bleeding (per penis); and Obstructed delivery

†††Categories with no responses include: Motorcycle crash; Pedestrian, bicycle crash

§Categories with no responses include: No (money for) transportation; No time; Fear / lack of trust

3.1.6.2. CHARACTERISTICS OF SURGICAL CONDITIONS, STRATIFIED BY AGE (TABLE 12)

In the cohort of 1450 children, we found the most frequent age group for children with surgical conditions was 6-10 years (5.2%), followed by 1-5 years (4.7%), 11-15 years (2.9%), and less than 1 year (0.9%). Of the surgical conditions identified (n=226), we did not find any differences between ages for any condition or healthcare characteristics. For children 11-15 years, most conditions started more than 7 years previously (42.2%); for children 6-10, most conditions started 3-7 years previously (42.0%); for children 1-5 years, most conditions started 1-3 years previously (41.9%); and for children less than one year, all conditions started between 1 and 12 months previously (100%). Most conditions reported in children less than 1 year and between 1-5 years were congenital deformities (81.3% and 50.4%, respectively) while injury related wounds were most common for children ages 6-10 years (28.5%) and 11-15 years (34.7%). Falls were the greatest source of injury for ages 1-5 years (36.1%), 6-10 years (34.9%), and 11-15 years (29.1%). The primary reason for not seeking healthcare was “no money for healthcare” in children ages less than 1 year (53.1%), 1-5 years (36.6%), and 11-15 years (50.9%); the primary reason for not seeking healthcare in children 6-10 years was “no need” (44.9%). For children who did seek healthcare but did not receive surgery, the main reason was “no need” for children 1-5, 6-10, and 11-15 years (37.5%, 35.7% and 32.1%, respectively), and the primary reason was “facility/personnel/equipment not available” for children less than 1 year (47.1%).

TABLE 12: CHARACTERISTICS OF SURGICAL CONDITIONS, STRATIFIED BY AGE (N=226)

	Total	< 1 y	1-5 y	6-10 y	11-15 y	p*
	% (n)	% (n)	% (n)	% (n)	% (n)	
No. of children interviewed	(1450)					
No. of children with conditions	(191)					
No. of conditions**	13.74 (226)	0.91 (15)	4.72 (75)	5.18 (87)	2.93 (49)	0.3032
Region						
Awdal	13.71 (22)	52.45 (5)	11.32 (6)	12.91 (8)	7.01 (3)	
Maroodi Jeex	51.92 (150)	18.68 (5)	49.65 (49)	53.59 (60)	62.9 (36)	
Sahil	3.77 (14)	16.35 (4)	3.14 (4)	2.14 (3)	3.79 (3)	
Sanaag	5.86 (7)	12.51 (1)	7.45 (3)	. (0)	11.61 (3)	n/a
Sool	12.2 (14)	. (0)	12.77 (5)	18.14 (8)	4.52 (1)	
Togdheer	12.54 (19)	. (0)	15.67 (8)	13.22 (8)	10.16 (3)	
Condition location						
Abdomen	9.72 (23)	28.23 (3)	12.94 (10)	2.79 (4)	11.08 (6)	
Back	1.66 (4)	. (0)	3.43 (3)	1.28 (1)	. (0)	
Chest	4.97 (12)	. (0)	2.29 (2)	8.3 (7)	4.95 (3)	
Extremities	31.71 (73)	13.64 (2)	23.15 (21)	37.46 (32)	40.9 (18)	n/a
Face/Neck	42.41 (94)	58.13 (10)	44.29 (30)	38.63 (33)	41.22 (21)	
Groin	9.52 (20)	. (0)	13.9 (9)	11.55 (10)	1.84 (1)	
Generally healthy						
No	0.83 (1)	. (0)	. (0)	. (0)	3.87 (1)	
Yes	22.66 (56)	28.14 (4)	14.93 (12)	23.55 (23)	31.82 (17)	0.3809
Missing	76.52 (169)	71.86 (11)	85.07 (63)	76.45 (64)	64.31 (31)	
CONDITION CHARACTERISTICS						
Present now (yes)	61.4 (132)	89.15 (11)	51.72 (37)	64.62 (55)	62.7 (29)	0.5148
Timing of onset						
< 1 month	5.86 (16)	. (0)	5.62 (6)	8.65 (8)	3.11 (2)	
1-12 months	22.34 (54)	100 (15)	24.5 (21)	14.23 (13)	9.22 (5)	
1-3 years	21.8 (48)	. (0)	41.86 (31)	12.55 (11)	12.6 (6)	
3-7 years	30.4 (62)	. (0)	24.25 (14)	41.98 (35)	29.2 (13)	n/a
>7 years	18.02 (42)	. (0)	1.48 (1)	22.59 (20)	42.18 (21)	
Missing	1.57 (4)	. (0)	2.29 (2)	. (0)	3.69 (2)	
Condition specifics †						
Deformity congenital	34.39 (72)	81.31 (11)	50.43 (34)	20.45 (18)	18.69 (9)	
Wound injury related	23.82 (51)	. (0)	16.45 (13)	28.54 (22)	34.73 (16)	
Burn	12.16 (27)	. (0)	11.58 (10)	17.55 (13)	7.32 (4)	
Wound not injury related	11.5 (32)	5.96 (1)	6.24 (6)	11.06 (13)	22.48 (12)	
Deformity acquired	11.14 (26)	4.09 (1)	11.86 (9)	13.84 (12)	7.37 (4)	n/a
GI problems†	2.75 (7)	5.96 (1)	2.29 (2)	2.08 (2)	3.69 (2)	
Masses*††	2.66 (7)	2.68 (1)	. (0)	4.4 (5)	3.87 (1)	
Missing	1.57 (4)	. (0)	1.14 (1)	2.08 (2)	1.84 (1)	
Type of injury ††						
Fall	33.85 (36)	. (0)	36.11 (10)	34.91 (19)	29.05 (7)	
Open fire / explosion	11.56 (11)	. (0)	17.35 (6)	13.63 (5)	. (0)	
Hot liquid / hot object	11.53 (12)	. (0)	8.43 (2)	15.06 (7)	7.92 (3)	
Car, truck, bus crash	5.89 (7)	. (0)	5.95 (2)	1.72 (1)	14.83 (4)	
Stab / slash / cut / crush	3.36 (4)	. (0)	2.97 (1)	5.17 (3)	. (0)	n/a
Bite or animal attack	2.85 (2)	. (0)	. (0)	. (0)	12.56 (2)	
Gunshot	2.06 (1)	. (0)	. (0)	. (0)	9.09 (1)	
Missing	28.89 (30)	100 (1)	29.2 (11)	29.51 (12)	26.55 (6)	
HEALTHCARE RECEIVED						
Healthcare sought						
No	32.24 (64)	60.2 (7)	34.59 (25)	24.32 (17)	33.8 (15)	
Yes	66.19 (158)	39.8 (8)	63.12 (48)	75.68 (70)	62.51 (32)	0.1952
Missing	1.57 (4)	. (0)	2.29 (2)	. (0)	3.69 (2)	
Traditional healthcare						
No	78.4 (180)	100 (15)	78.93 (60)	72.87 (66)	80.67 (39)	
Yes	19.63 (41)	. (0)	18.78 (13)	27.13 (21)	13.8 (7)	n/a
Missing	1.97 (5)	. (0)	2.29 (2)	. (0)	5.53 (3)	
Type of care received (if healthcare sought)						
No care	62.65 (99)	86.55 (6)	54.16 (26)	63 (44)	70.99 (23)	
Major procedure	17.06 (26)	13.45 (2)	24.95 (11)	13.86 (9)	11.8 (4)	0.5892**
Minor procedure	1.73 (4)	. (0)	3.06 (2)	0.31 (1)	2.95 (1)	
Missing	18.56 (29)	. (0)	17.84 (9)	22.83 (16)	14.26 (4)	
Reason for no healthcare seeking						
No money for healthcare	35.77 (22)	53.11 (4)	36.61 (9)	15.32 (3)	50.86 (6)	
No need	29.6 (18)	12.24 (2)	31.28 (8)	44.91 (6)	16.9 (2)	
Not available (facility/personnel/equipment)	13.3 (7)	34.65 (1)	12.36 (2)	10.49 (2)	6.68 (2)	
Fear / lack of trust	6.06 (5)	. (0)	1.49 (1)	12.15 (2)	9.2 (2)	n/a
No (money for) transportation	4.8 (2)	. (0)	13.02 (2)	. (0)	. (0)	
No time	2.6 (3)	. (0)	3.76 (2)	4.28 (1)	. (0)	
Missing	7.86 (7)	. (0)	1.49 (1)	12.85 (3)	16.36 (3)	

Reason for no surgical care received §						
No need	35.04 (40)	29.17 (2)	37.49 (12)	35.72 (18)	32.14 (8)	0.5327
No money for healthcare	25.46 (25)	23.74 (2)	21.29 (5)	30.56 (12)	21.33 (6)	
Not available (facility/personnel/equipment)	17.67 (13)	47.09 (2)	26.32 (4)	7.23 (3)	19.72 (4)	
Missing	21.83 (21)	. (0)	14.9 (5)	26.49 (11)	26.8 (5)	

*statistical significance ran for no procedure vs any procedure

**% represent the proportion of conditions in the interviewed population of children

†Category "GI problems" includes responses: Abdominal distention or pain, Inability to urinate, and Leaking of urine or feces (like fistula)

††Category "Masses" includes responses: Mass or growth (soft reducible), Mass or growth/goiter, and Breast mass / Breast cancer

‡Categories with no responses include: Mass or growth (solid); Bleeding (per rectum); Bleeding (per penis); and Obstructed delivery

‡‡Categories with no responses include: Motorcycle crash; Pedestrian, bicycle crash

§Categories with no responses include: No (money for) transportation; No time; Fear / lack of trust

3.1.6.3. CHARACTERISTICS OF SURGICAL CONDITIONS, STRATIFIED BY REGION (TABLE 13)

In the cohort of 1450 children, we found the most frequent region for children with surgical conditions was Maroodi Jeex (7.1%), followed by Togdheer (1.7%), Awdal (1.9%), Sool (1.7%), Sanaag (0.8%), and Sahil (0.5%). Of the surgical conditions identified (n=226), there was a difference between regions in child age of over and under 5 years old ($p = 0.01$). Most of the children with surgical conditions were greater than 5 years old in Maroodi Jeex (64.8%), Sool (64.0%), and Sanaag (57.1%) while most of the children with surgical conditions were 5 years or younger in Awdal (53.6%), Sahil (57.1%) and Sanaag (57.8%). There was a marginal difference in children with surgical conditions reporting being generally healthy between the regions ($p = 0.12$). While nearly all children with conditions reported being generally healthy in Sool and Togdheer (93.3% and 94.2%, respectively), the proportion was less in Awdal (70.4%), Maroodi Jeex (70.5%), Sahil (78.6%), and Sanaag (70.4%). All the children in Awdal (100.0%) reported that the surgical condition was present now while 44.3% of children with surgical conditions in Maroodi Jeex reported the condition was currently present. The most frequent source of conditions was congenital deformities in Awdal (71.7%), Sahil (50.0%), Sanaag (56.3%), and Sool (56.3%) while injury related wounds were most common in Maroodi Jeex (27.9%) and Togdheer (34.6%). In Awdal and Sanaag, most children with conditions did not seek healthcare (73.9% and 70.4%) while most children with condition did seek healthcare in Maroodi Jeex (77.2%), Sahil (78.6%), Sool (64.0%) and Togdheer (80.1%). None of the children who sought care in Awdal or Sanaag received surgery (0.0%) and most did not receive surgery in Sahil (81.8%), Sool (68.5%), Togdheer (56.9%), and Maroodi Jeex (56.6%).

TABLE 13: CHARACTERISTICS OF SURGICAL CONDITIONS, STRATIFIED BY REGION (N=226)

	Total	Awdal	Maroodi Jeex	Sahil	Sanaag	Sool	Togdheer	p*	
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)		
No. of children interviewed	(1450)								
No. of children with conditions	(191)								
No. of conditions**	13.74 (226)	1.88 (22)	7.13 (150)	0.52 (14)	0.8 (7)	1.68 (14)	1.72 (19)	0.1307	
Age - categorical									
< 1 y	6.59 (15)	25.22 (5)	2.37 (5)	28.57 (4)	14.08 (1)	. (0)	. (0)	n/a	
1-5 y	34.35 (75)	28.34 (6)	32.84 (49)	28.57 (4)	43.66 (3)	35.97 (5)	42.93 (8)		
6-10 y	37.74 (87)	35.53 (8)	38.95 (60)	21.43 (3)	. (0)	56.13 (8)	39.79 (8)		
10-15 y	21.32 (49)	10.9 (3)	25.84 (36)	21.43 (3)	42.25 (3)	7.91 (1)	17.28 (3)		
Age - dichotomous									
≤ 5	40.94 (90)	53.57 (11)	35.22 (54)	57.14 (8)	57.75 (4)	35.97 (5)	42.93 (8)	0.0083	
> 5	59.06 (136)	46.43 (11)	64.78 (96)	42.86 (6)	42.25 (3)	64.03 (9)	57.07 (11)		
Condition location									
Abdomen	9.72 (23)	10.03 (1)	10.28 (17)	14.29 (2)	14.08 (1)	13.44 (2)	. (0)	n/a	
Back	1.66 (4)	3.51 (1)	2.27 (3)	. (0)	. (0)	. (0)	. (0)		
Chest	4.97 (12)	3.7 (1)	6.23 (9)	7.14 (1)	. (0)	7.91 (1)	. (0)		
Extremities	31.71 (73)	46.43 (11)	33.28 (50)	7.14 (1)	14.08 (1)	28.06 (4)	28.27 (6)		
Face/Neck	42.41 (94)	22.4 (6)	36.24 (55)	71.43 (10)	71.83 (5)	43.87 (6)	65.97 (12)		
Groin	9.52 (20)	13.93 (2)	11.7 (16)	. (0)	. (0)	6.72 (1)	5.76 (1)		
Generally healthy									
No	22.66 (56)	29.61 (8)	29.54 (42)	21.43 (3)	15.49 (1)	6.72 (1)	5.76 (1)	0.1168	
Yes	76.52 (169)	70.39 (14)	70.46 (108)	78.57 (11)	70.42 (5)	93.28 (13)	94.24 (18)		
Missing	0.83 (1)	. (0)	. (0)	. (0)	14.08 (1)	. (0)	. (0)		
CONDITION CHARACTERISTICS									
Present now (yes)	61.4 (132)	100 (22)	44.27 (71)	78.57 (11)	85.92 (6)	66.4 (9)	68.59 (13)	n/a	
Timing of onset									
< 1 month	5.86 (16)	10.03 (1)	7.08 (12)	21.43 (3)	. (0)	. (0)	. (0)	n/a	
1-12 months	22.34 (54)	25.22 (5)	24.52 (38)	35.71 (5)	29.58 (2)	22.53 (3)	2.62 (1)		
1-3 years	21.8 (48)	10.72 (3)	23.02 (34)	. (0)	. (0)	21.34 (3)	46.07 (8)		
3-7 years	30.4 (62)	32.41 (7)	26.1 (36)	28.57 (4)	42.25 (3)	49.41 (7)	22.51 (5)		
>7 years	18.02 (42)	21.62 (6)	16.26 (26)	14.29 (2)	28.17 (2)	6.72 (1)	28.8 (5)		
Missing	1.57 (4)	. (0)	3.03 (4)	. (0)	. (0)	. (0)	. (0)		
Condition specifics †									
Deformity congenital	34.39 (72)	71.68 (16)	20.32 (34)	50 (7)	56.34 (4)	42.69 (6)	28.8 (5)	n/a	
Wound injury related	23.82 (51)	3.7 (1)	27.94 (39)	. (0)	29.58 (2)	22.53 (3)	34.56 (6)		
Burn	12.16 (27)	21.12 (4)	10.12 (16)	7.14 (1)	. (0)	13.44 (2)	16.75 (4)		
Wound not injury related	11.5 (32)	3.51 (1)	16.37 (25)	28.57 (4)	. (0)	. (0)	11.52 (2)		
Deformity acquired	11.14 (26)	. (0)	13.38 (19)	14.29 (2)	. (0)	21.34 (3)	8.38 (2)		
GI problems†	2.75 (7)	. (0)	5.3 (7)	. (0)	. (0)	. (0)	. (0)		
Masses*†††	2.66 (7)	. (0)	3.54 (6)	. (0)	14.08 (1)	. (0)	. (0)		
Missing	1.57 (4)	. (0)	3.03 (4)	. (0)	. (0)	. (0)	. (0)		
Type of injury ††									
Fall	33.85 (36)	. (0)	38.55 (27)	33.33 (1)	26.83 (1)	12.98 (1)	52.8 (6)		n/a
Open fire / explosion	11.56 (11)	70.21 (3)	9.58 (6)	. (0)	. (0)	. (0)	8 (2)		
Hot liquid / hot object	11.53 (12)	14.89 (1)	11.89 (8)	33.33 (1)	. (0)	15.27 (1)	8.8 (1)		
Car, truck, bus crash	5.89 (7)	. (0)	11.17 (7)	. (0)	. (0)	. (0)	. (0)		
Stab / slash / cut / crush	3.36 (4)	. (0)	6.39 (4)	. (0)	. (0)	. (0)	. (0)		
Bite or animal attack	2.85 (2)	14.89 (1)	. (0)	. (0)	24.39 (1)	. (0)	. (0)		
Gunshot	2.06 (1)	. (0)	. (0)	. (0)	. (0)	15.27 (1)	. (0)		
Missing	28.89 (30)	. (0)	22.42 (19)	33.33 (1)	48.78 (2)	56.49 (4)	30.4 (4)		
HEALTHCARE RECEIVED									
Healthcare sought									
No	32.24 (64)	73.91 (15)	19.81 (32)	21.43 (3)	70.42 (5)	35.97 (5)	19.9 (4)	0.2678	
Yes	66.19 (158)	26.09 (7)	77.16 (114)	78.57 (11)	29.58 (2)	64.03 (9)	80.1 (15)		
Missing	1.57 (4)	. (0)	3.03 (4)	. (0)	. (0)	. (0)	. (0)		
Traditional healthcare									
No	78.4 (180)	79.25 (18)	77.76 (118)	92.86 (13)	100 (7)	78.66 (11)	65.45 (13)	n/a	
Yes	19.63 (41)	20.75 (4)	18.45 (27)	7.14 (1)	. (0)	21.34 (3)	34.56 (6)		
Missing	1.97 (5)	. (0)	3.79 (5)	. (0)	. (0)	. (0)	. (0)		
Type of care received (if healthcare sought)									
No care	62.65 (99)	100 (7)	56.58 (66)	81.82 (9)	100 (2)	68.52 (6)	56.86 (9)	n/a	
Major procedure	17.06 (26)	. (0)	18.44 (21)	. (0)	. (0)	31.48 (3)	14.38 (2)		
Minor procedure	18.56 (29)	. (0)	22.79 (24)	9.09 (1)	. (0)	. (0)	28.76 (4)		
Missing	1.73 (4)	. (0)	2.18 (3)	9.09 (1)	. (0)	. (0)	. (0)		
Reason for no healthcare seeking									
No money for healthcare	35.77 (22)	49.78 (10)	19.97 (6)	33.33 (1)	60 (3)	21.98 (1)	28.95 (1)	n/a	
No need	29.6 (18)	13.57 (1)	34.91 (11)	. (0)	20 (1)	78.02 (4)	13.16 (1)		
Not available (facility/personnel/equipment)	13.3 (7)	36.65 (4)	5.58 (3)	. (0)	. (0)	. (0)	. (0)		
Fear / lack of trust	6.06 (5)	. (0)	9.36 (3)	33.33 (1)	. (0)	. (0)	28.95 (1)		
No (money for) transportation	4.8 (2)	. (0)	. (0)	. (0)	20 (1)	. (0)	28.95 (1)		
No time	2.6 (3)	. (0)	5.54 (2)	33.33 (1)	. (0)	. (0)	. (0)		
Missing	7.86 (7)	. (0)	24.65 (7)	. (0)	. (0)	. (0)	. (0)		
Reason for no surgical care received §									
No need	35.04 (40)	14.16 (1)	43.52 (31)	44.44 (4)	. (0)	30.63 (2)	25.29 (2)	n/a	
No money for healthcare	25.46 (25)	28.32 (2)	20.63 (13)	44.44 (4)	. (0)	18.02 (1)	49.43 (5)		
Not available (facility/personnel/equipment)	17.67 (13)	43.35 (3)	5.59 (4)	11.11 (1)	100 (2)	33.33 (2)	12.64 (1)		
Missing	21.83 (21)	14.16 (1)	30.26 (18)	. (0)	. (0)	18.02 (1)	12.64 (1)		

*statistical significance ran for no procedure vs any procedure

**% represent the proportion of conditions in the interviewed population of children

†Category "GI problems" includes responses: Abdominal distention or pain, Inability to urinate, and Leaking of urine or feces (like fistula)

††Category "Masses" includes responses: Mass or growth (soft reducible), Mass or growth/goiter, and Breast mass / Breast cancer

‡Categories with no responses include: Mass or growth (solid); Bleeding (per rectum); Bleeding (per penis); and Obstructed delivery

‡‡Categories with no responses include: Motorcycle crash; Pedestrian, bicycle crash

§Categories with no responses include: No (money for) transportation; No time; Fear / lack of trust

3.1.7. Characteristics of 16 pediatric surgical conditions identified in SOSAS (Table 14)

Of the 16 pediatric surgical conditions which parents could identify through the pediatric surgical photo portfolio, 4 received no responses in the sampled population (patent urachus, cystic hygroma, hydrocele, inguinal hernia). Out of 226 surgical conditions reported, 74 were from the pediatric surgical portfolio (36.1%) and included hydrocephalus (7.2%), umbilical hernia (6.2%), cleft lip (5.1%), syndactyly (4.2%), cleft palate (3.8%), hypospadias (3.7%), undescended testis (1.8%), congenital clubfoot (1.5%), meningomyelocele (0.9%), chordee (0.9%), polydactyly (0.6%), and thyroglossal cyst (0.3%). Portfolio conditions were most frequently reported as present currently except for congenital clubfoot (46.5% present now) and hydrocephalus (43.1% present now). Portfolio conditions were primarily reported in children 1-5 years old (48.7%) and in children from Awdal (26.0%) and Maroodi Jeex (26.5%) regions. Nearly all children with portfolio conditions did not seek traditional healthcare; however, children with congenital clubfoot, cleft lip, and hydrocephalus sought traditional healthcare more frequently (26.8%, 32.9%, and 46.1% respectively). “No money for healthcare or transportation” was the primary reason for not seeking healthcare for most portfolio conditions except umbilical hernia (“no need”, 64.0%), thyroglossal cysts (“no time”, 100.0%), hypospadias (“no need”, 53.9%), meningomyelocele (“facility/personnel/equipment not available”, 100.0%), and undescended testes (“no need”, 69.0%). Among those with the identified surgical conditions who sought care but did not receive surgery (n=19), the reasons were “no money for healthcare” (39.3%), “facility/personnel/equipment not available” (34.0%), and “no need” (26.7%).

TABLE 14: CHARACTERISTICS OF 16 PEDIATRIC SURGICAL CONDITIONS IDENTIFIED IN SOSAS* (N=74)

	Total	Umbilical Hernia	Meningo- myelocele	Congenital Clubfoot	Polydactyl	Syndactyl	Cleft lip	Cleft palate	Thyro- glossal cysts	Hydro- cephalus	Hypo- spadias	Chordee	Undes- cended Testes
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Total**	36.1 (74)	6.22 (13)	0.87 (2)	1.47 (4)	0.6 (2)	4.19 (8)	5.13 (9)	3.77 (9)	0.27 (1)	7.2 (14)	3.7 (5)	0.93 (2)	1.75 (5)
Present now (yes)	63.68 (45)	23.55 (2)	100 (2)	46.5 (2)	100 (2)	90.62 (7)	78.26 (7)	79.12 (7)	100 (1)	43.06 (6)	89.39 (4)	57.64 (1)	77.52 (4)
Age													
< 1 y	15.6 (12)	23.62 (2)	. (0)	. (0)	84.5 (1)	. (0)	41.65 (4)	28.53 (3)	. (0)	6.2 (2)	. (0)	. (0)	. (0)
1-5 y	48.66 (34)	46.19 (6)	44.95 (1)	46.5 (2)	15.5 (1)	38.69 (3)	48.96 (3)	61.04 (5)	100 (1)	33.9 (4)	67.26 (3)	100 (2)	55.05 (3)
6-10 y	29.03 (23)	9.16 (2)	55.05 (1)	53.5 (2)	. (0)	44.09 (4)	9.38 (2)	. (0)	. (0)	59.9 (8)	32.74 (2)	. (0)	44.95 (2)
10-15 y	6.71 (5)	21.02 (3)	. (0)	. (0)	. (0)	17.22 (1)	. (0)	10.44 (1)	. (0)	. (0)	. (0)	. (0)	. (0)
Region													
Awdal	25.97 (15)	22.13 (1)	55.05 (1)	34.48 (1)	84.5 (1)	48.35 (4)	20.31 (2)	14.2 (1)	. (0)	13.73 (2)	37.14 (1)	57.64 (1)	. (0)
Maroodi Jeex	26.45 (32)	33.89 (8)	44.95 (1)	65.52 (3)	15.5 (1)	9.38 (1)	9.38 (2)	23.22 (3)	. (0)	18.28 (5)	21.23 (2)	42.36 (1)	100 (5)
Sahil	5.23 (7)	4.34 (1)	. (0)	. (0)	. (0)	. (0)	5.26 (1)	21.48 (3)	100 (1)	3.75 (1)	. (0)	. (0)	. (0)
Sanaag	9.15 (4)	13.28 (1)	. (0)	. (0)	. (0)	. (0)	32.18 (2)	21.92 (1)	. (0)	. (0)	. (0)	. (0)	. (0)
Sool	16.29 (7)	26.37 (2)	. (0)	. (0)	. (0)	. (0)	18.79 (1)	. (0)	. (0)	34.15 (3)	22.13 (1)	. (0)	. (0)
Togdheer	16.91 (9)	. (0)	. (0)	. (0)	. (0)	42.28 (3)	14.08 (1)	19.18 (1)	. (0)	30.1 (3)	19.5 (1)	. (0)	. (0)
Timing of onset													
< 1 month	0.99 (2)	. (0)	. (0)	. (0)	. (0)	. (0)	1.72 (1)	. (0)	100 (1)	. (0)	. (0)	. (0)	. (0)
1-12 months	18.52 (16)	29.95 (3)	. (0)	12.02 (1)	84.5 (1)	. (0)	41.65 (4)	30.87 (4)	. (0)	6.2 (2)	. (0)	. (0)	22.48 (1)
1-3 years	23.79 (17)	35.53 (4)	44.95 (1)	34.48 (1)	15.5 (1)	26.6 (2)	18.79 (1)	29.62 (2)	. (0)	22.52 (3)	. (0)	42.36 (1)	10.1 (1)
3-7 years	36.92 (23)	10.66 (2)	. (0)	. (0)	. (0)	32 (3)	30.17 (2)	29.08 (2)	. (0)	45.3 (5)	100 (5)	57.64 (1)	67.43 (3)
>7 years	19.79 (16)	23.86 (4)	55.05 (1)	53.5 (2)	. (0)	41.4 (3)	7.66 (1)	10.44 (1)	. (0)	25.99 (4)	. (0)	. (0)	. (0)
Healthcare sought													
No	55.1 (39)	89.34 (11)	55.05 (1)	46.5 (2)	100 (2)	50.77 (4)	60.85 (4)	21.52 (2)	100 (1)	29.96 (5)	80.5 (4)	57.64 (1)	32.57 (2)
Yes	44.9 (35)	10.66 (2)	44.95 (1)	53.5 (2)	. (0)	49.23 (4)	39.15 (5)	78.48 (7)	. (0)	70.04 (9)	19.5 (1)	42.36 (1)	67.43 (3)
Traditional healthcare													
No	80.7 (61)	87.35 (11)	100 (2)	73.25 (3)	100 (2)	100 (8)	67.13 (7)	100 (9)	100 (1)	53.95 (8)	89.39 (4)	100 (2)	77.52 (4)
Yes	19.3 (13)	12.65 (2)	. (0)	26.75 (1)	. (0)	. (0)	32.87 (2)	. (0)	. (0)	46.05 (6)	10.61 (1)	. (0)	22.48 (1)
Type of care received													
No care	64.01 (25)	62.77 (2)	100 (1)	. (0)	. (0)	100 (5)	41.91 (2)	73.4 (5)	. (0)	45.49 (5)	100 (2)	. (0)	100 (3)
Major procedure	31.69 (12)	37.23 (1)	. (0)	. (0)	. (0)	. (0)	58.09 (2)	26.6 (2)	. (0)	54.51 (6)	. (0)	100 (1)	. (0)
Minor procedure	4.3 (2)	. (0)	. (0)	100 (2)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)
Reason for not seeking healthcare													
No money for healthcare	35.39 (13)	. (0)	. (0)	74.16 (1)	84.5 (1)	100 (4)	73.56 (3)	10.89 (1)	. (0)	39.21 (2)	. (0)	100 (1)	. (0)
No need	27.44 (11)	64.02 (7)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	53.86 (3)	. (0)	69.01 (1)
Not available (facility/personnel/equipment)	20.16 (6)	28.37 (2)	100 (1)	. (0)	15.5 (1)	. (0)	. (0)	. (0)	. (0)	24.31 (1)	46.14 (1)	. (0)	. (0)
Fear / lack of trust	4.65 (2)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	. (0)	36.47 (1)	. (0)	. (0)	30.99 (1)
No (money for) transportation	8.01 (2)	. (0)	. (0)	. (0)	. (0)	. (0)	26.44 (1)	89.11 (1)	. (0)	. (0)	. (0)	. (0)	. (0)
No time	4.34 (3)	7.62 (1)	. (0)	25.84 (1)	. (0)	. (0)	. (0)	. (0)	100 (1)	. (0)	. (0)	. (0)	. (0)
Reason for not receiving surgery													
No money for healthcare	39.32 (8)	. (0)	. (0)	. (0)	. (0)	100 (4)	33.51 (1)	24.86 (2)	. (0)	. (0)	100 (1)	. (0)	. (0)
Not available (facility/personnel/equipment)	33.99 (5)	. (0)	100 (1)	. (0)	. (0)	. (0)	66.49 (1)	62.71 (2)	. (0)	42.36 (1)	. (0)	. (0)	. (0)
No need	26.69 (6)	100 (1)	. (0)	. (0)	. (0)	. (0)	. (0)	12.43 (1)	. (0)	57.64 (2)	. (0)	. (0)	100 (2)

*Four conditions (Patent Urachus, Cystic hygroma, Hydrocele, Inguinal Hernia) had no responses in the sampled population

**% represent the proportion of specific conditions out of all surgical conditions reported (n=226)

3.2. AIM 2: HOSPITAL SURVEY

3.2.1. Hospital characteristics (Table 15)

Of the 15 hospitals, eight are government hospitals, five are private/for-profit hospitals, and two are charity hospitals. Of the 8 government hospitals, one is a national hospital (Hargeisa Group Hospital), six are regional hospitals, and one is a district hospital. All hospitals reported a total of 4819 patients admitted per month, resulting in an average of 321.3 admitted patients per month per hospital. Admitted patients ranged from 60 patients per month (LARH) to 1200 patients per month (GMH). Pediatric patients admitted per month ranged from 8 (MSH) to 200 (GMH). Pediatric patients made up 15.9% of all patients admitted per month. There was an average of 79.1 operations per month per hospital, ranging from 13 operations per month (BerRH) to 220 operations per month (GMH). On average pediatric operations made up 11.0% of total operations per month, ranging from 0% (LARH, GRH) to 97.1% (EAUH). At the 15 hospitals, respondents reported a total of 38 surgeons, 1 pediatric surgeon, 3 anesthesiologists, 43 anesthetists, 14 obstetricians, and 484 nurses. All hospitals reported having electricity, running water, internet, and phone service more than 75% of the time. All hospitals reported having oxygen available more than 50% of the time. There was an average of 123.3 hospital beds per hospital, ranging from 30 hospital beds (HNN) to 500 hospital beds (HGH). On average, 13.3% of hospital beds were reserved for children. There was an average of 2.8 operating rooms and 2.3 anesthesia machines per hospital. In total there were 42 operating rooms, 34 anesthesia machines, and 7 ventilators at 15 hospitals. Ten hospitals reported 1-25% of their annual budget is allotted to surgery and anesthesia. Average out-of-pocket (OOP) costs were \$170.8 USD for C-sections, \$350.0 USD for open fracture repairs, and \$280.8 USD for laparotomy. Average surgery related lodging was \$5.5 USD. Hospitals reported that surgery related visits were paid primarily OOP (73.3%), followed by government (25.0%), charity (7.2%), insurance (7.1%) and NGOs (4.6%).

TABLE 15: CHARACTERISTICS OF HOSPITALS WITH SURGICAL CAPACITY IN SOMALILAND (N=15)

Total	(Average/ Mode/ Median)	SOMALILAND														
		Awdal			Maroodi Jeex			Sahil			Sanaag		Sool		Togdheer	
		Alaale Hospital	Borama Regional Hospital	Al Hayat Hospital	Edna Adan University Hospital	Gabiley Regional Hospital	Gargaar Multispecialty Hospital	Hargeisa Group Hospital	Hargeisa Neurology Hospital	Manhal Specialty Hospital	Berbera Regional Hospital	Sheikh District Hospital	Erigavo Regional Hospital	Las Anood Regional Hospital	Burao Regional Hospital	Daarul Xanaan Hospital
AH	BorRH	AHH	EAUH	GRH	GMH	HGH	HNH	MSH	BerRH	SDH	ERH	LARH	BurRH	DXH		
HOSPITAL DESCRIPTION																
Location	-	Borama	Borama	Borama	Hargeisa	Gabiley	Hargeisa	Hargeisa	Hargeisa	Hargeisa	Berbera	Sheikh	Erigavo	Las Anood	Burao	Burao
Type of Hospital		Private	Public	Private	Charity	Public	Charity	Public	Private	Public	Public	Public	Public	Public	Public	Private
Catchment population		400000	400000	400000	6000000	83000	4000000	4000000	4000000	4000000	250000	20000	250000	150000	400000	400000
Number of pediatric surgeries in 1 year	1253 (83.53)	132	9	99	303	0	110	185	12	344	3	16	2	0	38	2
SERVICE DELIVERY, PER MONTH																
Patients admitted (mean)	4819 (321.27)	130	400	180	400	100	1200	580	130	240	200	180	200	60	519	300
Pediatric patients admitted (mean)	670 (51.54)	-	106	10	63	20	200	-	15	8	46	55	15	13	109	10
Pediatric patients of total patients admitted (%)	0.14 (15.88)	-	26.50	5.56	15.75	20.00	16.67	-	11.54	3.33	23.00	30.56	7.50	21.67	21.00	3.33
Total operations (mean)	1187 (79.13)	80	100	70	26	20	220	200	15	200	13	45	30	25	93	50
Pediatric operations of total operations (%)	(11.03)	13.75	0.75	11.79	97.12	0	4.13	7.71	6.67	14.29	1.92	2.96	0.56	0	3.41	0.33
Laparotomies (mean)	63.9 (4.26)	10	5	20	0.7	1	2	5	0	11	0.2	0	3	1	2	3
C-sections (mean)	325 (21.67)	15	13	10	20	15	100	70	0	0	10	5	10	6	26	25
Open fracture repairs (mean)	169 (11.27)	0	30	40	0	0	30	32	0	30	0	0	7	0	0	0
Post-operative, in hospital deaths (mean)	15.4 (1.03)	0	0	2	0.1	0	2	0.2	1	0.1	2	2	1	1	2	2
PERSONNEL																
Surgeons (n)	38 (2.53)	3	2	1	2	2	6	4	1	8	0	1	3	1	2	2
Pediatric surgeons (n)	1 (0.07)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Anesthesiologists (n)	3 (0.20)	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0
Pediatric anesthesiologists (n)	0 (0.00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anesthetists (n)	43 (2.87)	1	1	5	3	1	3	11	1	3	2	1	2	1	7	1
Obstetricians (n)	14 (0.93)	1	1	0	2	1	2	3	0	0	0	0	1	1	1	1
Nurses (n)	484 (32.27)	12	27	25	39	14	28	125	12	14	18	11	70	26	47	16
Administrative staff (n)	71 (4.73)	3	5	2	5	5	3	4	4	5	13	3	5	4	5	5
Availability of non-surgeon to perform surgery 24 hours a day		Always	Always	Always	Always	Always	Always	Always	Never	Always	Always	Always	Always	Always	Always	Always
Availability of non-anes available to perform anes 24 hours a day		Always	Always	Always	Always	Always	Always	Always	sometimes	Always	Always	Always	Always	Always	Always	Always
INFRASTRUCTURE																
Availability of:																
Electricity (%)	100	100	100	100	100	100	100	100	100	100	100	76-99	76-99	100	100	76-99
Time reliance of generator (%)	1-25 (170.77)	1-25	1-25	1-25	1-25	1-25	1-25	1-25	-	76-99	100	1-25	1-25	1-25	1-25	0
Running water (%)	100	100	100	100	100	100	100	100	100	0	100	100	100	100	100	100
Internet (%)	76-99	76-99	76-99	76-99	76-99	76-99	76-99	76-99	76-99	100	100	76-99	76-99	76-99	76-99	76-99
Cell phone or phone (%)	100	100	100	100	100	100	100	100	100	76-99	100	100	76-99	100	76-99	100
Oxygen (%)	76-99	76-99	76-99	76-99	100	76-99	76-99	100	100	100	51-75	76-99	76-99	51-75	51-75	76-99
Hospital beds (n)	1850 (123.33)	73	150	100	80	102	100	500	30	62	180	38	100	125	171	39
Children beds (n)	216 (14.4)	12	30	20	20	20	7	32	5	0	20	6	20	0	20	4
Children's beds of total hospital beds (%)	(13.33)	16.44	20	20	25	19.61	7	6.4	16.67	0	11.11	15.79	20	0	11.7	10.26
Operating rooms (n)	42 (2.8)	3	2	3	3	2	5	5	3	5	2	2	1	3	2	1
Anesthesia machines (n)	34 (2.27)	5	2	3	5	2	4	3	2	2	1	1	1	1	1	1
Ventilators (n)	7 (0.47)	0	0	0	3	0	0	1	0	3	0	0	0	0	0	0
FINANCIAL																
How much of annual budget allotted to surgery and anesthesia? (%)	1-25 (170.77)	1-25	1-25	1-25	26-50	1-25	1-25	26-50	-	51-75	1-25	1-25	1-25	1-25	26-50	1-25
OOP costs for C-section	(350.00)	280	150	200	230	250	250	0	-	-	200	120	120	150	120	150
OOP costs for open fracture repair	(280.77)	-	250	350	250	-	500	200	-	600	-	-	300	-	-	-
OOP costs for laparotomy	(5.53)	300	250	250	400	200	450	250	-	350	150	-	200	300	250	300
OOP costs for surgery-related lodging		4	0	15	10	3	15	0	10	10	3	0	0	0	3	10
Costs of transport to and from hospital for:																
Patient coming from in town	(2.73)	1	3	3	5	3	3	3	3	3	2	2	3	3	2	2
Patient coming from out of town	(39.40)	40	40	40	100	20	40	50	70	40	25	30	40	40	8	8
For one surgery, what % of the entire stay is paid by:																
OOP	(73.27)	95	55	95	80	80	69	50	80	90	40	80	70	70	60	85
Insurance	(7.14)	4	-	2	10	-	10	-	8	5	-	-	-	-	-	11
Government	(25.03)	0.3	45	-	-	10	1	50	2	-	60	10	30	30	37	-
NGO	(4.58)	0.3	-	-	-	-	5	-	-	-	-	10	-	-	3	-
Charity	(7.19)	0.5	-	3	10	10	15	-	10	5	-	-	-	-	-	4

3.2.2. Demographics of children receiving surgery in Somaliland (Table 16)

There were 1255 children who received surgery from 15 hospitals in Somaliland during a 1-year time frame, after using MI to adjust for missing data. Hospitals varied greatly in the number and type of surgery delivered. Of the 1255 procedures, Manhal Specialty Hospital (MSH) performed the highest number of procedures (n=343, 27.3%) followed by Edna Adan University Hospital (EAUH) (n=303, 24.1%), Hargeisa Group Hospital (HGH) (n=185, 14.7%), Alaale Hospital (AH) (n=132, 10.5%), Gargaar Multispecialty Hospital (GMH) (n=110, 8.8%), Al Hayat Hospital (AHH) (n=99, 7.9%), Burao Regional Hospital (BurRH) (n=38, 3.0%), Sheikh District Hospital (SDH) (n=16, 1.3%), Hargeisa Neurology Hospital (HNH) (n=12, 1.0%), Boroma Regional Hospital (BorRH) (n=9, 0.7%), Berbera Regional Hospital (BerRH) (n=3, 0.2%), Erigavo Regional Hospital (ERH) (n=2, 0.2%), and Daarul Xanaan Hospital (DXH) (n=2, 0.2%). MSH, EAUH, HGH, and AH combined provided over ¾ of all procedures (76.7%). Two hospitals, Las Anood (LARH) and Gabiley Regional Hospital (GRH), had the capacity to perform surgery but recorded no procedures on children 15 or younger in the past 1 year. Nearly all procedures were performed in the Maroodi Jeex region (76.0%), and all hospitals in this region are in the capital city, Hargeisa. Awdal had the next highest proportion of procedures (19.1%), followed by Togdheer (3.2%), Sahil (1.5%), and Sanaag (0.2%). No pediatric procedures were done in the region of Sool.

In total, slightly more than half of the procedures were performed on males (56.7%). Females received most of procedures only at AH (54.6%), and DXH (100.0%). Children varied in ages with most being 6-10 years (29.0%), followed by 1-5 years (25.7%), 11-15 years (23.8%), and less than 1 year (21.6%). Nearly half of the procedures performed at GMH and EAUH were on children less than 1 year (50.0% and 47.5%, respectively) while six hospitals had no procedures on children less than 1 year (AH, BorRH, HNH, BerRH, SDH, and DXH). Males received more

procedures than females in every age group, with the largest disparity being in children 0-28 days (63.3% male vs 36.7% female) (Figure 4). Nearly all procedures were performed by a general surgeon (95.9%) and anesthesia technician (85.5%). Only 0.2% of procedures were performed by a pediatric surgeon and 12.0% of anesthesia was performed by a physician anesthesiologist. No anesthesia was performed by a pediatric anesthesiologist. Most procedures were done under general anesthesia (85.2%), with fewer performed under local (11.7%) or regional (3.1%) anesthesia. Only 0.2% of surgical records reported a post-operative death in the medical record, while 69.5% reported patient alive and 30.3% had no record of either outcome.

FIGURE 4: PERCENT OF MALE AND FEMALE PROCEDURES BY AGE GROUP (N=1255)

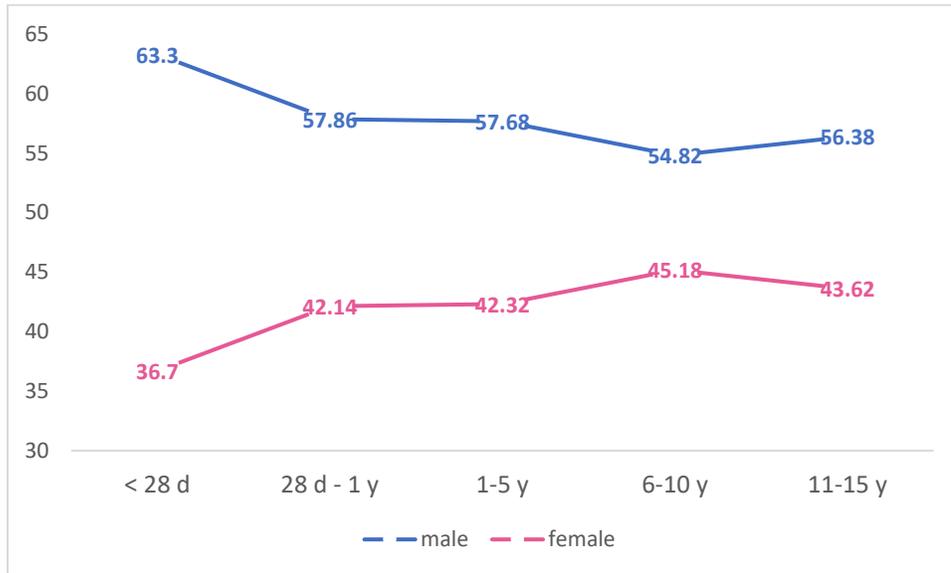


TABLE 16: DEMOGRAPHICS OF CHILDREN RECEIVING SURGERY IN SOMALILAND (N=1255) *

Hospital name	Total	Awdal			Maroodi Jeex					Sahil		Sanaag	Togdheer	
	% (n)	% (n) AH	% (n) BorRH	% (n) AHH	% (n) EAUH	% (n) GMH	% (n) HGH	% (n) HNNH	% (n) MSH	% (n) BerRH	% (n) SDH	% (n) ERH	% (n) BurRH	% (n) DXH
Total pediatric surgery	(1255)	10.52 (132)	0.72 (9)	7.89 (99)	24.14 (303)	8.76 (110)	14.74 (185)	0.96 (12)	27.41 (344)	0.24 (3)	1.27 (16)	0.16 (2)	3.03 (38)	0.16 (2)
Gender														
Male	56.73 (712)	45.45 (60)	77.78 (7)	68.69 (68)	54.79 (166)	53.64 (59)	57.84 (107)	58.33 (7)	57.27 (197)	100 (3)	50 (8)	100 (2)	73.68 (28)	0 (0)
Female	42.71 (536)	54.55 (72)	22.22 (2)	31.31 (31)	43.89 (133)	44.55 (49)	42.16 (78)	41.67 (5)	42.44 (146)	0 (0)	50 (8)	0 (0)	26.32 (10)	100 (2)
Unknown	0.56 (7)	0 (0)	0 (0)	0 (0)	1.32 (4)	1.82 (2)	0 (0)	0 (0)	0.29 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Age														
< 1 y	21.59 (271)	0 (0)	0 (0)	28.28 (28)	47.52 (144)	50 (55)	9.19 (17)	0 (0)	5.81 (20)	0 (0)	0 (0)	50 (1)	15.79 (6)	0 (0)
1-5 y	25.66 (322)	11.36 (15)	22.22 (2)	34.34 (34)	24.09 (73)	24.55 (27)	24.32 (45)	0 (0)	30.81 (106)	33.33 (1)	25 (4)	0 (0)	39.47 (15)	0 (0)
6-10 y	29.00 (364)	46.97 (62)	44.44 (4)	20.2 (20)	14.85 (45)	17.27 (19)	36.22 (67)	25 (3)	36.92 (127)	66.67 (2)	25 (4)	0 (0)	28.95 (11)	0 (0)
11-15 y	23.75 (298)	41.67 (55)	33.33 (3)	17.17 (17)	13.53 (41)	8.18 (9)	30.27 (56)	75 (9)	26.45 (91)	0 (0)	50 (8)	50 (1)	15.79 (6)	100 (2)
Region of origin														
Maroodi Jeex	54.98 (690)	37.12 (49)	11.11 (1)	56.57 (56)	53.14 (161)	52.73 (58)	65.95 (122)	41.67 (5)	69.48 (239)	33.33 (1)	0 (0)	0 (0)	0 (0)	0 (0)
Togdheer	15.54 (195)	6.82 (9)	0 (0)	17.17 (17)	15.84 (48)	16.36 (18)	9.73 (18)	0 (0)	12.21 (42)	0 (0)	37.5 (6)	0 (0)	100 (38)	100 (2)
Puntland	8.37 (105)	25.76 (34)	0 (0)	10.1 (10)	6.27 (19)	14.55 (16)	4.86 (9)	8.33 (1)	4.65 (16)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Awdal	7.33 (92)	25 (33)	88.89 (8)	7.07 (7)	3.3 (10)	2.73 (3)	4.86 (9)	33.33 (4)	5.23 (18)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Somalia	3.59 (45)	0 (0)	0 (0)	3.03 (3)	8.91 (27)	4.55 (5)	4.32 (8)	0 (0)	1.16 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sool	2.87 (36)	1.52 (2)	0 (0)	3.03 (3)	2.97 (9)	1.82 (2)	3.24 (6)	8.33 (1)	3.78 (13)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sahil	2.23 (28)	0.76 (1)	0 (0)	1.01 (1)	1.98 (6)	0 (0)	1.62 (3)	0 (0)	1.45 (5)	66.67 (2)	62.5 (10)	0 (0)	0 (0)	0 (0)
Sanaag	2.23 (28)	1.52 (2)	0 (0)	0 (0)	3.63 (11)	2.73 (3)	2.7 (5)	8.33 (1)	1.16 (4)	0 (0)	0 (0)	100 (2)	0 (0)	0 (0)
Ethiopia	1.99 (25)	1.52 (2)	0 (0)	2.02 (2)	3.63 (11)	4.55 (5)	2.16 (4)	0 (0)	0.29 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Unknown	0.88 (11)	0 (0)	0 (0)	0 (0)	0.33 (1)	0 (0)	0.54 (1)	0 (0)	0.58 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Surgery provider**														
Nurse	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Physician	0.16 (2)	0 (0)	0 (0)	0 (0)	0.66 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Surgeon	95.86 (1203)	100 (132)	100 (9)	97.98 (97)	88.78 (269)	96.36 (106)	99.46 (184)	75 (9)	98.84 (340)	33.33 (1)	100 (16)	0 (0)	100 (38)	100 (2)
Pediatric Surgeon	0.16 (2)	0 (0)	0 (0)	2.02 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Other	0.24 (3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.29 (1)	66.67 (2)	0 (0)	0 (0)	0 (0)	0 (0)
Unknown	3.59 (45)	0 (0)	0 (0)	0 (0)	10.56 (32)	3.64 (4)	0.54 (1)	25 (3)	0.87 (3)	0 (0)	0 (0)	100 (2)	0 (0)	0 (0)
Anesthesia type														
General	85.18 (1069)	99.24 (131)	100 (9)	91.92 (91)	94.72 (287)	85.45 (94)	77.84 (144)	66.67 (8)	82.56 (284)	100 (3)	0 (0)	50 (1)	44.74 (17)	0 (0)
Regional	3.11 (39)	0.76 (1)	0 (0)	0 (0)	1.98 (6)	6.36 (7)	3.24 (6)	8.33 (1)	4.36 (15)	0 (0)	6.25 (1)	0 (0)	0 (0)	100 (2)
Local	11.71 (147)	0 (0)	0 (0)	8.08 (8)	3.3 (10)	8.18 (9)	18.92 (35)	25 (3)	13.08 (45)	0 (0)	93.75 (15)	50 (1)	55.26 (21)	0 (0)
Anesthesia provider**														
Anesthesiologist	12.03 (151)	0 (0)	0 (0)	0 (0)	0 (0)	11.82 (13)	4.32 (8)	8.33 (1)	37.21 (128)	33.33 (1)	0 (0)	0 (0)	0 (0)	0 (0)
Anesthetist	85.5 (1073)	100 (132)	100 (9)	97.98 (97)	89.44 (271)	89.09 (98)	94.05 (174)	75 (9)	75 (258)	100 (3)	6.25 (1)	0 (0)	50 (19)	100 (2)
Nurse	0.16 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	8.33 (1)	0.29 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Clinical officer	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Other	3.75 (47)	0 (0)	0 (0)	0 (0)	0 (0)	4.55 (5)	1.08 (2)	0 (0)	1.74 (6)	0 (0)	93.75 (15)	0 (0)	50 (19)	0 (0)
Unknown	0 (0)	0 (0)	0 (0)	2.02 (2)	10.56 (32)	0 (0)	0.54 (1)	8.33 (1)	0 (0)	0 (0)	0 (0)	100 (2)	0 (0)	0 (0)
Surgery outcome														
Alive	69.49 (631)	100 (132)	100 (9)	98.99 (98)	46.89 (128)	. (0)	0 (0)	. (0)	100 (214)	0 (0)	100 (16)	. (0)	89.47 (34)	0 (0)
Dead	0.22 (2)	0 (0)	0 (0)	1.01 (1)	0.37 (1)	. (0)	0 (0)	. (0)	0 (0)	0 (0)	0 (0)	. (0)	0 (0)	0 (0)
Unknown	30.29 (275)	0 (0)	0 (0)	0 (0)	52.75 (144)	. (0)	100 (123)	. (0)	0 (0)	100 (2)	0 (0)	. (0)	10.53 (4)	100 (2)

* hospitals with no pediatric surgery (n=2) excluded from table

** multiple selections available in survey, totals may be over or under hospital specific totals; percentages are out of total surgeries performed at hospital

Acronym key: Alaale Hospital (AH), Boroma Regional Hospital (BorRH), Al Hayat Teaching Hospital (AHH), Edna Adan University Hospital (EAUH), Gabilay Regional Hospital (GRH), Gargaar Multispecialty Hospital (GMH),

Hargeisa Group Hospital (HGH), Hargeisa Neurology Hospital (HNNH), Manhal Specialty Hospital (MSH), Berbera Regional Hospital (BerRH), Sheikh District Hospital (SDH), Erigavo Regional Hospital (ERH), Las Anod Regional Hospital (LARH), Burao Regional Hospital (BurRH), Daarua Xanaan Hospital (DXH)

3.2.3. Pediatric surgical procedures in Somaliland (Table 17)

We classified the 1255 surgical procedures into 9 categories based on surgical specialty: general surgery (22.9%, n=287), otolaryngology (19.4%, n=243), orthopedic surgery (15.8%, n=198),

ophthalmology (15.1%, n=189),

neurosurgery (11.3%, n=142),

plastic (8.9%, n=112), urology

(5.8%, n=73), unknown (0.5%, n=6),

and obstetrics (0.4%, n=5) (**Figure**

5). At the four hospitals with the

highest number of procedures

(MSH, EAUH, HGH, and AH) the

most frequent surgical category

was ophthalmology at MSH

(54.9%), neurosurgery at EAUH

(44.6%), general pediatric surgery at

HGH (58.4%), and otolaryngology at AH (99.2%).

There were 72 unique surgical conditions recorded in surgical logbooks (**Appendix F: Full list of**

surgical conditions). Of all surgical conditions reported, the most common were tonsillitis

(18.3%), trauma/wound/snake bite (11.2%), hydrocephalus (7.5%), cataract (6.7%), fractures

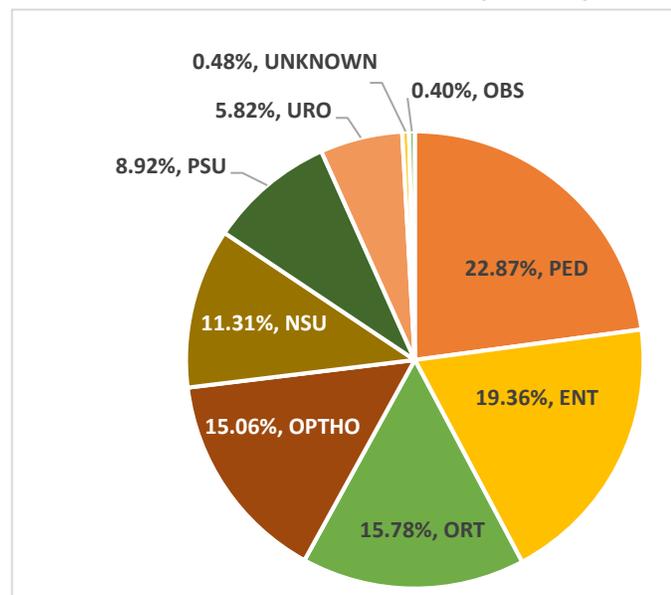
(6.5%), cleft lip (4.1%), and abscess (3.6%). At the four hospitals with the highest number of

procedures (MSH, EAUH, HGH, and AH) the most frequent surgical condition was tonsillitis at

MSH (27.9%), hydrocephalus at EAUH (30.4%), fractures at HGH (21.6%), tonsillitis at AH

(99.2%).

FIGURE 5: SURGICAL PROCEDURE CATEGORY AT 15 HOSPITALS WITH SURGICAL CAPACITY IN SOMALILAND (N=1255) *



Surgical category key: PED-General surgery; ENT-Otolaryngology; ORT-Orthopedics; OPTHO-Ophthalmology; NSU-Neurology; PSU-Plastic surgery; URO-Urology; OBS-Obstetrics

TABLE 17: PEDIATRIC SURGICAL PROCEDURES AT 15 HOSPITALS IN SOMALILAND (N=1255) *

	Total	AH	Awdal BorRH	AHH	EAUH	GMH	Maroodi Jeex HGH	HNH	MSH	Sahil BerRH	SDH	Sanaag ERH	Togdheer BurRH	DXH
	1255	132	9	99	303	110	185	12	343	3	16	2	38	2
Total	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Surgical category														
PED	22.87 (287)	0 (0)	33.33 (3)	38.38 (38)	6.27 (19)	45.45 (50)	58.38 (108)	66.67 (8)	4.36 (15)	33.33 (1)	81.25 (13)	100 (2)	76.32 (29)	50 (1)
ENT	19.36 (243)	99.24 (131)	0 (0)	1.01 (1)	0 (0)	0 (0)	4.86 (9)	0 (0)	29.07 (100)	0 (0)	0 (0)	0 (0)	5.26 (2)	0 (0)
ORT	15.78 (198)	0 (0)	66.67 (6)	17.17 (17)	14.19 (43)	27.27 (30)	34.05 (63)	33.33 (4)	8.14 (28)	66.67 (2)	12.5 (2)	0 (0)	7.89 (3)	0 (0)
OPTHO	15.06 (189)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	54.94 (189)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
NSU	11.31 (142)	0 (0)	0 (0)	7.07 (7)	44.55 (135)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
PSU	8.92 (112)	0 (0)	0 (0)	19.19 (19)	30.69 (93)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
URO	5.82 (73)	0 (0)	0 (0)	16.16 (16)	3.63 (11)	27.27 (30)	1.62 (3)	0 (0)	2.62 (9)	0 (0)	0 (0)	0 (0)	10.53 (4)	0 (0)
UNKNOWN	0.48 (6)	0 (0)	0 (0)	1.01 (1)	0.66 (2)	0 (0)	0 (0)	0 (0)	0.87 (3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
OBS	0.4 (5)	0.76 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1.08 (2)	0 (0)	0 (0)	0 (0)	6.25 (1)	0 (0)	0 (0)	50 (1)
Top 7 conditions														
Tonsillitis	18.33 (230)	99.24 (131)	0 (0)	0 (0)	0 (0)	0 (0)	1.62 (3)	0 (0)	27.91 (96)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Trauma/wound/snake	11.24 (141)	0 (0)	44.44 (4)	6.06 (6)	2.31 (7)	0 (0)	18.38 (34)	0 (0)	19.19 (66)	0 (0)	81.25 (13)	50 (1)	26.32 (10)	0 (0)
Hydrocephalus	7.49 (94)	0 (0)	0 (0)	2.02 (2)	30.36 (92)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cataract	6.69 (84)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	24.42 (84)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Fracture	6.45 (81)	0 (0)	33.33 (3)	14.14 (14)	0.33 (1)	0 (0)	21.62 (40)	33.33 (4)	4.94 (17)	66.67 (2)	0 (0)	0 (0)	0 (0)	0 (0)
Cleft Lip	4.14 (52)	0 (0)	0 (0)	8.08 (8)	14.52 (44)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Abscess	3.59 (45)	0 (0)	0 (0)	3.03 (3)	0.33 (1)	9.09 (10)	9.19 (17)	0 (0)	0.58 (2)	0 (0)	0 (0)	50 (1)	28.95 (11)	0 (0)

* hospitals with no pediatric surgery (n=2) excluded from table

Acronym key: Alaale Hospital (AH), Boroma Regional Hospital (BorRH), Al Hayat Teaching Hospital (AHH), Edna Adan University Hospital (EAUH), Gabiley Regional Hospital (GRH), Gargaar Multispecialty Hospital (GMH),

Hargeisa Group Hospital (HGH), Hargeisa Neurology Hospital (HNH), Manhal Specialty Hospital (MSH), Berbera Regional Hospital (BerRH), Sheikh District Hospital (SDH), Erigavo Regional Hospital (ERH), Las Anod Regional Hospital (LARH), Burao Regional Hospital (BurRH), Daaruu Xanaan Hospital (DXH)

Surgical category key: PED-General surgery; ENT-Otolaryngology; ORT-Orthopedics; OPTHO-Ophthalmology; NSU-Neurology; PSU-Plastic surgery; URO-Urology; OBS-Obstetrics

3.2.4. Pediatric surgical procedures in Somaliland, stratified by region (Table 18)

Of the 13 hospitals with pediatric surgical procedures, five are located in Maroodi Jeex, three are located in Awdal, two are located in Togdheer, two are located in Sahil, and one is located in Sanaag. The two hospitals that reported no pediatric surgery in the past year are located in Maroodi Jeex and Sool. The region with the highest rate of pediatric surgical procedures performed was Maroodi Jeex (76.0%), followed by Awdal (19.1%), Togdheer (3.2%), Sahil (1.5%), and Sanaag (0.2%). Although the distribution of surgical procedures for males and females varied across region, the majority of procedures in all regions were among male children. There was a difference in the proportion of surgical procedures in children greater than 5 years of age across regions ($p = 0.003$). The majority of procedures in Awdal and Sahil were in children greater than 5 years old (67.1% and 73.7%, respectively) while the approximately half of procedures in Maroodi Jeex, Sanaag, and Togdheer were equally among children greater than 5 (49.0%, 50.0%, and 47.5%, respectively).

Surgical procedure categories varied between regions. The majority of procedures in were categorized as pediatric general surgery in Sahil (73.7%), Sanaag (100.0%), and Togdheer (75.0%) were PED, while the majority in Awdal were otolaryngology (55.0%). Maroodi Jeex varied in of surgical procedure categories, with the majority being pediatric general surgery (21.0%), followed by ophthalmology (19.8%), orthopedic surgery (17.6%), neurosurgery (14.2%), and otolaryngology (11.4%).

The most frequent surgical conditions varied widely by region. The most frequent surgical condition in Maroodi Jeex was tonsillitis (54.6%). The most frequent surgical conditions in Awdal varied was trauma/wound/snake bite (11.2%), followed by tonsillitis (10.4%), hydrocephalus (9.6%) and cataracts (6.7%). In both Sahil and Togdheer, the most frequent conditions were abscesses (27.5% and 50.0%, respectively) and trauma/wound/snake bites (25.0% and 50.0%,

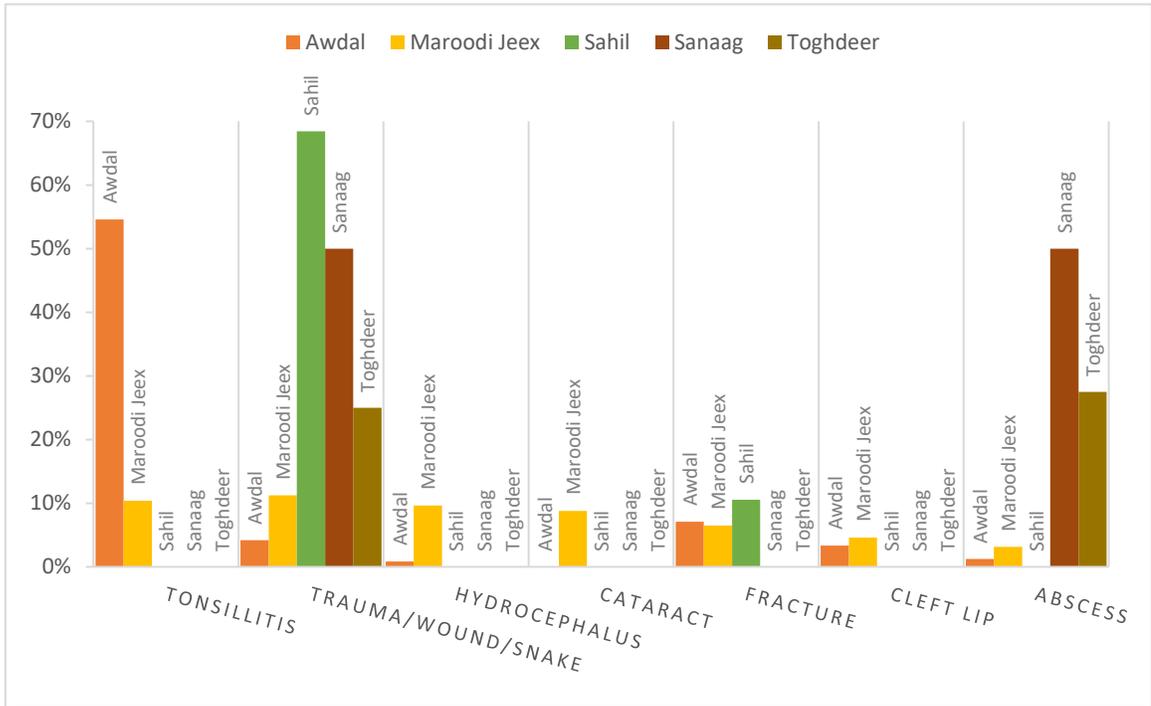
respectively). The majority of conditions in Sanaag were trauma/wound/snake bites (68.4%) followed by fractures (10.5%) (Figure 6).

TABLE 18: PEDIATRIC SURGICAL PROCEDURES AT 13 HOSPITALS IN SOMALILAND, STRATIFIED BY REGION (N=1255)

	Total % (n) (1255)	Awdal % (n) (240)	Maroodi Jeex % (n) (954)	Sahil % (n) (19)	Sanaag % (n) (2)	Togdheer % (n) (40)	p
Gender							
Male	56.73 (712)	56.25 (135)	56.18 (536)	57.89 (11)	100 (2)	70 (28)	0.1166*
Female	42.71 (536)	43.75 (105)	43.08 (411)	42.11 (8)	0 (0)	30 (12)	
Unknown	0.56 (7)	0 (0)	0.73 (7)	0 (0)	0 (0)	0 (0)	
Age							
≤ 5 y	47.25 (593)	32.92 (79)	51.05 (487)	26.32 (5)	50 (1)	52.5 (21)	0.003
> 5 y	52.75 (662)	67.08 (161)	48.95 (467)	73.68 (14)	50 (1)	47.5 (19)	
Region of origin							
Maroodi Jeex	54.98 (690)	44.17 (106)	61.32 (585)	5.26 (1)	0 (0)	0 (0)	<.0001
Togdheer	15.54 (195)	10.83 (26)	13.21 (126)	31.58 (6)	0 (0)	100 (40)	
Puntland	8.37 (105)	18.33 (44)	6.39 (61)	0 (0)	0 (0)	0 (0)	
Awdal	7.33 (92)	20 (48)	4.61 (44)	0 (0)	0 (0)	0 (0)	
Somalia	3.59 (45)	1.25 (3)	4.61 (44)	0 (0)	0 (0)	0 (0)	
Sool	2.87 (36)	2.08 (5)	3.25 (31)	0 (0)	0 (0)	0 (0)	
Sahil	2.23 (28)	0.83 (2)	1.47 (14)	63.16 (12)	0 (0)	0 (0)	
Sanaag	2.23 (28)	0.83 (2)	2.52 (24)	0 (0)	100 (2)	0 (0)	
Ethiopia	1.99 (25)	1.67 (4)	2.2 (21)	0 (0)	0 (0)	0 (0)	
Unknown	0.88 (11)	0 (0)	0.42 (4)	0 (0)	0 (0)	0 (0)	
Surgical category	% (n)						
PED	22.87 (287)	17.08 (41)	20.96 (200)	73.68 (14)	100 (2)	75 (30)	n/a
ENT	19.36 (243)	55 (132)	11.43 (109)	0 (0)	0 (0)	5 (2)	
ORT	15.78 (198)	9.58 (23)	17.61 (168)	21.05 (4)	0 (0)	7.5 (3)	
OPTHO	15.06 (189)	0 (0)	19.81 (189)	0 (0)	0 (0)	0 (0)	
NSU	11.31 (142)	2.92 (7)	14.15 (135)	0 (0)	0 (0)	0 (0)	
PSU	8.92 (112)	7.92 (19)	9.75 (93)	0 (0)	0 (0)	0 (0)	
URO	5.82 (73)	6.67 (16)	5.56 (53)	0 (0)	0 (0)	10 (4)	
UNKNOWN	0.48 (6)	0.42 (1)	0.52 (5)	0 (0)	0 (0)	0 (0)	
OBS	0.4 (5)	0.42 (1)	0.21 (2)	5.26 (1)	0 (0)	2.5 (1)	
Top 7 conditions							
Tonsillitis	18.33 (230)	54.58 (131)	10.38 (99)	0 (0)	0 (0)	0 (0)	n/a
Trauma/wound/snake	11.24 (141)	4.17 (10)	11.22 (107)	68.42 (13)	50 (1)	25 (10)	
Hydrocephalus	7.49 (94)	0.83 (2)	9.64 (92)	0 (0)	0 (0)	0 (0)	
Cataract	6.69 (84)	0 (0)	8.81 (84)	0 (0)	0 (0)	0 (0)	
Fracture	6.45 (81)	7.08 (17)	6.5 (62)	10.53 (2)	0 (0)	0 (0)	
Cleft Lip	4.14 (52)	3.33 (8)	4.61 (44)	0 (0)	0 (0)	0 (0)	
Abscess	3.59 (45)	1.25 (3)	3.14 (30)	0 (0)	50 (1)	27.5 (11)	

Surgical category code: PED-General surgery; ENT-Otolaryngology; ORT-Orthopedics; OPTHO-Ophthalmology; NSU-Neurology; PSU-Plastic surgery; URO-Urology; OBS-Obstetrics

FIGURE 6: MOST FREQUENT SURGICAL DIAGNOSIS STRATIFIED BY REGION (N=1255)



3.2.5. Pediatric surgical procedures in Somaliland, stratified by hospital type (Table 19)

Of the 1255 pediatric procedures performed, 79.8% were done at private hospitals (including private charity) and only 20.16% at public hospitals. The majority of procedures were performed on male children at public and private hospitals, although there was a higher proportion of procedures on male children at public hospitals (61.26%) than private hospitals (55.59%) ($p = 0.13$) (**Figure 7**). There was also a difference in the proportion of surgical procedures on children over or under 5 years old ($p < 0.0001$), with children 5 years and younger having more procedures at private hospitals (50.1%) than at public (36.0%) (**Figure 7**). The types of procedures also varied between private and public hospitals ($p < 0.0001$); the majority of procedures at private hospitals were otolaryngology (23.2%), ophthalmology (18.9%) and neurosurgery (14.2%) while at public hospitals the majority of procedures were pediatric general surgery (61.7%) and orthopedic surgery (30.0%). There was no otolaryngology, neurosurgery, or ophthalmology surgeries performed at public hospitals (**Figure 8**). The most frequent surgical conditions at private hospitals were tonsillitis (22.7%), hydrocephalus (9.4%), cataracts (8.38%), and trauma/wounds/snake bites (7.9%). At public hospitals, the most frequent conditions were trauma/wounds/snake bites (24.5%), fractures (17.8%), and abscesses (11.5%) (**Figure 9**).

TABLE 19: PEDIATRIC SURGICAL PROCEDURES AT 15 HOSPITALS IN SOMALILAND, STRATIFIED BY HOSPITAL TYPE (N=1255)

	Total % (n)	Private % (n)	Public % (n)	p
Total	(1255)	79.84 (1002)	20.16 (253)	
Gender				
Male	56.73 (712)	55.59 (557)	61.26 (155)	0.1296*
Female	42.71 (536)	43.71 (438)	38.74 (98)	
Unknown	0.56 (7)	0.7 (7)	0 (0)	
Age				
≤ 5 y	47.25 (593)	50.1 (502)	35.97 (91)	<.0001
> 5 y	52.75 (662)	49.9 (500)	64.03 (162)	
Region of origin				
Maroodi Jeex	54.98 (690)	56.69 (568)	49.01 (124)	<.0001
Togdheer	15.54 (195)	13.57 (136)	24.51 (62)	
Puntland	8.37 (105)	9.58 (96)	3.56 (9)	
Awdal	7.33 (92)	7.49 (75)	6.72 (17)	
Somalia	3.59 (45)	3.89 (39)	3.16 (8)	
Sool	2.87 (36)	2.99 (30)	2.37 (6)	
Sahil	2.23 (28)	1.3 (13)	5.93 (15)	
Sanaag	2.23 (28)	2.1 (21)	2.77 (7)	
Ethiopia	1.99 (25)	2.1 (21)	1.58 (4)	
Unknown	0.88 (11)	0.3 (3)	0.4 (1)	
Surgical category	% (n)			
PED	22.87 (287)	13.07 (131)	61.66 (156)	<.0001
ENT	19.36 (243)	23.15 (232)	4.35 (11)	
ORT	15.78 (198)	12.18 (122)	30.04 (76)	
OPTHO	15.06 (189)	18.86 (189)	0 (0)	
NSU	11.31 (142)	14.17 (142)	0 (0)	
PSU	8.92 (112)	11.18 (112)	0 (0)	
URO	5.82 (73)	6.59 (66)	2.77 (7)	
UNKNOWN	0.48 (6)	0.6 (6)	0 (0)	
OBS	0.4 (5)	0.2 (2)	1.19 (3)	
Top 7 conditions				
Tonsillitis	18.33 (230)	22.65 (227)	1.19 (3)	n/a
Trauma/wound/snake	11.24 (141)	7.88 (79)	24.51 (62)	
Hydrocephalus	7.49 (94)	9.38 (94)	0 (0)	
Cataract	6.69 (84)	8.38 (84)	0 (0)	
Fracture	6.45 (81)	3.59 (36)	17.79 (45)	
Cleft Lip	4.14 (52)	5.19 (52)	0 (0)	
Abscess	3.59 (45)	1.6 (16)	11.46 (29)	

Surgical category code: PED-General surgery; ENT-Otolaryngology; ORT-Orthopedics; OPTHO-Ophthalmology; NSU-Neurology; PSU-Plastic surgery; URO-Urology; OBS-Obstetrics

FIGURE 7: DIFFERENCES IN PUBLIC AND PRIVATE HOSPITALS FOR GENDER AND AGE DISTRIBUTION OF SURGICAL PROCEDURES (N=1255)

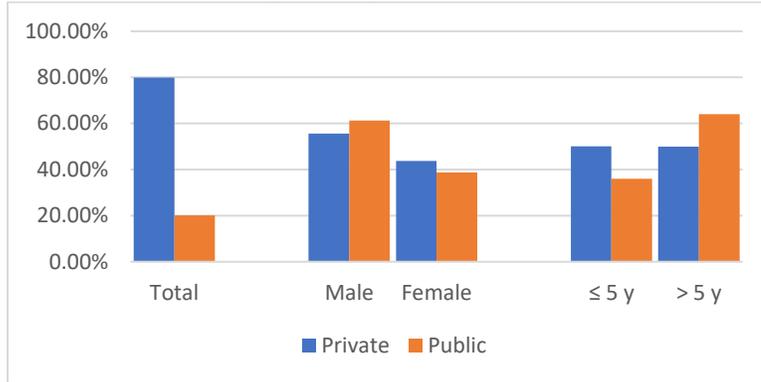


FIGURE 8: DISTRIBUTION OF SURGICAL PROCEDURE CATEGORY BETWEEN PRIVATE AND PUBLIC HOSPITALS IN SOMALILAND (N=1255)

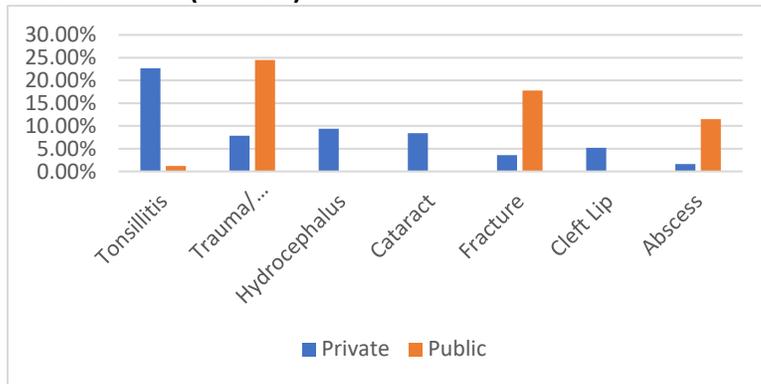
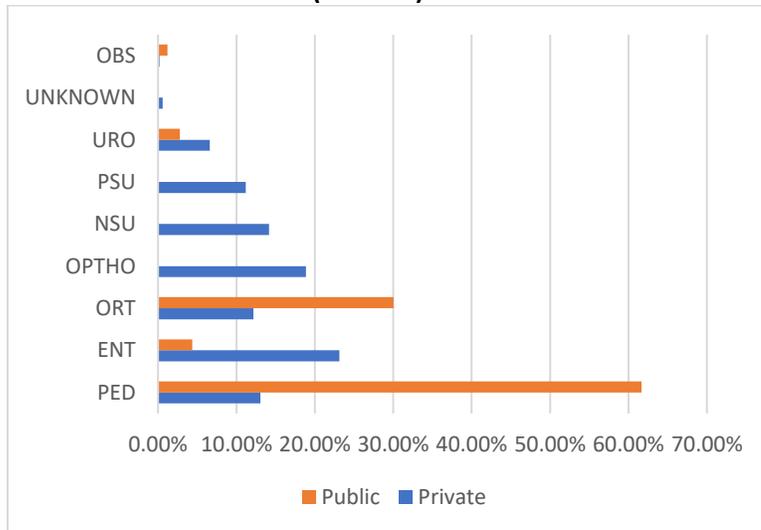


FIGURE 9: DISTRIBUTION OF MOST FREQUENT SURGICAL CONDITIONS BETWEEN PRIVATE AND PUBLIC HOSPITALS IN SOMALILAND (N=1255)



Surgical category code: PED-General surgery; ENT-Otolaryngology; ORT-Orthopedics; OPTHO-Ophthalmology; NSU-Neurology; PSU-Plastic surgery; URO-Urology; OBS-Obstetrics

4. Discussion

4.1. AIM 1: COMMUNITY SURVEY

We found a 13.7% prevalence of surgical conditions in children in Somaliland. Of children with these surgical conditions, only 23.6% receive a surgical procedure while 75.7% either did not seek healthcare (33.1%) or did not receive a surgical procedure (42.6%). The prevalence of pediatric surgical conditions in Somaliland is similar to those previously reported in Rwanda (11.8%), Sierra Leone (27.5%), Uganda (17.1%) and Nepal (17.6%).^{24,32–34,36}

4.1.1. Need and unmet need for pediatric surgery

The definition of unmet need for pediatric surgical care is the total need subtracted by the met need.^{1,14,65} LCoGS defines surgical care as: the provision of operative, perioperative, and non-operative management; anesthesia; and obstetric care for all surgical conditions.¹ Although experts agree that the best way to determine unmet need is through community assessments,¹⁴ there is no current established standard to define the met surgical care in a population. Met need is inherently challenging to define, and surgical care may involve receiving an operative procedure as well as a range of non-operative surgical care.⁴⁰ In light of these limitations, we have chosen for our current analysis to define the met need as the rate of children who have a surgical condition and who obtained either surgical consultation or surgical intervention. Unmet need is defined as the rate of children with a surgical condition and who did not obtain either surgical consultation or surgical intervention. Although not all children with surgical conditions require a surgical procedure,⁹ the presence of a surgical condition has been defined by consensus to require the expertise of a surgically trained provider.⁶⁵

In our current study, 75.7% of children who had a surgical condition did not receive a surgical procedure. This 75.7% is comprised of 33.1% who did not seek healthcare and 42.6% which

sought some type of healthcare but did not receive a surgical procedure. As we do not know if the type of healthcare involved a surgeon, we chose to report the unmet need as a range from children who did not seek any healthcare (definitely unmet) to children who did not receive a surgical procedure (possibly unmet). Thus, we found the unmet need for children in Somaliland is between 33.1% and 75.7%.

The unmet need in Somaliland is similar to the reported rates of 70.3% in Sierra Leone, 64.9% in Uganda, 54.3% in Rwanda, and 41.8% in Nepal.²⁴ Based on these estimates, there are an estimated 276,383 children in Somaliland who have had a surgical condition at some point in their lifetime, and between 91,483 – 209,222 children who have an unmet need for surgical care.

4.1.2. Burden of surgical conditions

Most surgical conditions reported in our study started when children were young, although exact age of onset was not recorded. Children 5 years old and under comprised 40.9% of all surgical conditions, and children over 5 years old reported that conditions started many years previously. Other studies have also shown a high burden of surgical conditions in young children and infants.^{24,66} The large burden of conditions in children is likely due to the high prevalence of congenital deformities found in the population. Approximately 1/3 of all surgical conditions reported were congenital deformities. Prevalence of congenital anomalies was much higher in rural regions such as Sool, Sanaag, and Awdal. Data on congenital anomalies in LMICs suggests an incidence of 3-6%,⁶⁷ however based on the high prevalence of congenital deformities we found in Somaliland, that number may be much higher. As surgical techniques are improved, congenital anomalies which were previously fatal can now be treated with success rates exceeding 90 percent.⁶⁷ However these inspiring improvements are typically restricted to high income countries. Although death rates for congenital anomalies have decreased, they are rising

as leading causes of death for children over time.⁶⁸ Pediatric surgery has the potential to avert the large burden associated with congenital anomalies.^{63,69–74} While general surgeons and practitioners can meet basic pediatric surgical needs, more complex conditions such as congenital deformities and hydrocephalus require a specialized pediatric surgeon.²⁴

4.1.3. Healthcare seeking and healthcare receiving status

The LCoGS used the “Three Delay Framework” to understand how various delays affect the delivery of safe and appropriate surgical care.¹ This framework can be applied to the surgical care of children in Somaliland. We found that what are described as the first and second delay – delay in seeking care and delay in reaching care—are seen in approximately 1/3 of children who had a problem but did not seek health care. Most families did not seek health care because of a lack of money for transport, which can be considered a delay in reaching care. About half of families who did not seek healthcare reported that they live over 2 hours away from a secondary or tertiary facility. The mean transport time for those who did not seek healthcare was 2 hours greater than the mean for those who sought healthcare. Additionally, almost half of children who did not seek healthcare reported that the condition was still majorly disabling compared to only 20% of children who did seek healthcare.

We found a large divide in the delivery of surgical care between urban and rural communities in Somaliland, which has been reported in other areas of health care.⁴² Those living in rural areas have less access to surgical care and there are fewer surgical providers.⁷⁵ Although LMICs have a much higher burden of surgical conditions than high-income countries (HIC), within LMICs, those living in rural areas fare worse than those in urban areas.¹ Although primary health facilities (those without an operating room) in this study were easily identified by families as maternity and child health (MCH) clinics, participants often did not know what secondary or tertiary health facility they would go to if needed. Some reported that it was not available since they simply

would not go if the need arose. As a result, about 1/3 of families reported unknown for secondary or tertiary facilities (35.7%), further highlighting the need for improved availability of such facilities. Somaliland lags behind the recent developments of other African countries in terms of health system development, which can accentuate challenges to providing pediatric surgery such as limited facilities, manpower shortages, the large number of sick children, late presentation and advanced pathology, lack of pediatric surgeons outside the tertiary hospitals, and inadequate governmental support.²¹

4.2. AIM 2: HOSPITAL SURVEY

A total of 1255 pediatric surgical procedure were performed in 1 year at all hospitals with surgical capacity in Somaliland (except for 1 hospital with no available data), equating to a rate of 62.4 surgical procedures per 100,000 children ages 0-15 years. This is far below the minimum operative volume of 5,000 surgical procedures per 100,000 population in adults as identified by LCoGS.¹

4.2.1. Procedure type and volume

Hospitals in Somaliland do not fit established definitions of first-, second-, and third-level hospitals,^{1,76} but public hospitals are either labeled as district or regional hospitals which have the potential to provide first-level or second-level care respectively. While HGH is the largest public hospital in the country and should aspire to perform as a third-level hospital, the current capacity at second-level care. The LCoGS has identified common surgical procedures that can and should be done in first-level hospitals, of which the following are important procedures for pediatric populations: fractures, cleft lip, and inguinal hernia.¹ Considering these procedures, only 4/81 fractures, 0/52 cleft lips, and 3/10 inguinal hernias were performed at a regional public hospital. No procedures identified by LCoGS were performed at a district public hospital.

Significant capacity building and resource allocation will be needed in order to provide essential surgery at first-level hospitals.⁷⁷

Private facilities performed over 75% of procedures in 1 year, a sign of Somaliland's weak public health sector. Although the government sets priorities in health services, the public health sector is not well regulated and is limited by the country's lack of recognition by multilateral agencies such as WHO.⁴² Most private hospitals (except EAUH and MSH) are for-profit facilities. Notably, the two charity hospitals provided half of all surgeries in the country. Although visiting surgeons are not identified in surgical logbooks, many hospitals perform large volumes of procedures in short amounts of time due to surgical camps and visiting surgeons. While surgical camps can be a successful model for providing surgery to rural areas,⁷⁸ visiting surgeons in Somaliland typically come to large hospitals with advanced surgical capacity. Additionally, the large number of procedures performed by short-term surgeons likely inflates the capacity of hospitals to perform pediatric surgery. Additionally, this is not a long-term, sustainable solution to increase surgical capacity for kids.^{19,37}

The large number of surgical procedures performed for patients with tonsillitis was striking in this population. Tonsillitis is typically not a high burden pediatric surgical condition and is likely performed so frequently in this population due to the availability of ENT specialist surgeons at specific hospitals.

4.3. CONNECTING COMMUNITY AND HOSPITAL SURVEYS

The community surgical need and hospital procedure volumes are difficult to link directly for several reasons. First of all, not all surgical conditions reported in the community will require a surgical procedure, and thus would not appear in surgical logbooks at hospitals. Certain surgical conditions, such as burns and injuries, may only need a minor procedure and not require an

operating theater or surgically capable hospital – yet they are still considered surgical conditions in the community survey. On the other hand, children who reported surgical conditions in the community may not receive any surgical care and would therefore not be captured in the hospital surgical logbooks. Also, the SOSAS survey has limitations in capturing conditions such as cancer and low-prevalence conditions such as emergent neonatal conditions. Additionally, some specific surgical conditions identified in the community survey (such as hydrocephalus, cleft lip, and inguinal hernia) may not need immediate surgical care, although surgical care will be required. Some studies have attempted to link the met need recorded in surgical logbooks to the reported need in the community,⁴⁰ but we believe the limitations involved in this would provide an overestimate of unmet need based on non-procedure based surgical care.

Despite the difficulties with comparison of pediatric surgical conditions at the community level to the number of surgical procedures in the hospitals, there are several striking patterns of surgical care that can be detected from comparing the two surveys.

4.3.1. Burden of surgical conditions

Both the community and hospital surveys recorded a large proportion of congenital deformities and trauma-related conditions, such as wounds and fractures. We found several disparities in regional locations for congenital deformities, with rural areas having a higher prevalence of these conditions and the majority of procedures on congenital deformities being performed at private hospitals in the urban capital city, Hargeisa. These disparities in care can have major implications for child health, as children with congenital deformities may require more emergent surgical care than other conditions. Children who live in rural areas are more likely to have congenital deformities and less likely to seek treatment due to financial and transportation barriers, thus leading to worse outcomes for these children and increasing health disparities across Somaliland.

Trauma, wounds, and fractures were frequently recorded in the community survey and the hospital surgical logbooks. Most of the procedures performed at public hospitals were for fractures. This analysis is limited by the unknown etiology of trauma and fractures in the hospital level compared to injury related wounds in the community level.

4.3.2. Workforce density

The hospital capacity survey showed that the surgical, anesthesia, and obstetric (SAO) workforce in Somaliland includes: 38 surgeons, 1 pediatric surgeon, 3 anesthesiologists, 43 anesthetists, and 14 obstetricians. This number is unlikely to be significantly higher when considering the 1 hospital which declined participation in our survey. Therefore, the SAO workforce density in Somaliland is approximately 2.5 per 100,000 population. This SAO workforce density is likely an overestimation of the actual workforce density, as many SAO providers work at multiple health facilities. Even with this overestimation, it is clear that the SAO workforce density is far below 20 per 100,000 population target as recommended by LCoGS.^{1,79} The ratio of pediatric surgeons to children is approximately 1 pediatric surgeon per 2 million children, similar to that of Nigeria (1 pediatric surgeon to 2.2 million children)⁸⁰ and far below that of the United States (20 pediatric surgeons per 2 million children).⁸¹ The need for pediatric surgery shown in the population is unlikely to be met with the current disparity in surgical workforce and extreme lack of pediatric specific surgical workforce.

4.3.3. Financial barriers to healthcare

Financial catastrophe is defined as a household incurring health payments that are higher than their resources.⁸² Half the global population is at risk of financial catastrophe from surgery because they do not have financial risk protection,^{1,30} and throughout this study, families reported finances as a major barrier in seeking care, receiving care, and after care. Just under

50% of participants said they did not seek healthcare due to lack of money for healthcare or transport; 50% of participants who sought healthcare said they did not get surgery because of lack of money; and 1/3 of patients who received surgery said that paying for the surgery made it difficult to pay for other basic household goods such as food, water, and clothing. In this study, nearly 2/3 of children with conditions reported that the condition was currently present and 3/4 of children with a condition reported that they are generally healthy. Although condition severity was not evaluated in this survey, the disparity between general healthiness and current presence of a condition raises the question of cultural perceptions of health and surgical conditions. This in turn may affect healthcare seeking behavior.

Out of pocket (OOP) expenditure for health care are the predominant form of health financing in many regions,⁸³ and was seen in approximately 75% of how all patients paid for surgical services in Somaliland. As a result, there is high risk for financial impoverishment or catastrophe expenditures based on the high cost of procedures and low monthly income of Somaliland families. The Bellwether⁶⁴ procedures costs averaged several hundred USD at Somaliland hospitals and many families made less than \$100 USD per month.

4.4. IMPLICATIONS FOR POLICY AND PRACTICE

This study provides critical information to inform important community and hospital interventions, as well as national health system planning to improve pediatric surgical care in Somaliland. Although there are limitless opportunities for policy change in pediatric surgery, the following were identified as priority topics to have the greatest impact on pediatric surgical care in Somaliland.

1. *The development of a national healthcare plan for Somaliland should address pediatric surgical care.* Surgical systems should be integrated into national health care programs, and surgical needs should be given significant attention in national health agendas.⁸⁴ A

national surgical plan will need commitment and engagement from stakeholders at the national and international levels, and from public, private, and charitable sectors.¹ It is imperative that pediatric surgery has a part in this plan given the high burden of pediatric surgical conditions in Somaliland. Any national surgical plan should also include protective barriers for the poor to avoid financial catastrophe as a result of surgery.

2. *Focus on reducing burden of congenital deformities through antenatal care and utilization of MCH clinics.* The large burden of congenital deformities identified in this study indicate a need to focus on antenatal care, particularly in rural areas. Somaliland has a rich network of MCH clinics located in all areas of the country, which have the potential to implement early diagnosis and intervention programs to improve maternal and child health.
3. *Increasing capacity of public hospitals, focusing on district and regional hospitals.* The majority of surgical care for children should be provided at a first-level hospital, with some reports of up to 80% of care delivered at this level.⁶² Although our report did not specifically analyze the level of care delivered in Somaliland, expansion of district and regional hospitals provide an opportunity to increase the provision of pediatric surgical care in rural areas of Somaliland. Increasing capacity will require additional investment in workforce and infrastructure to provide adequate pediatric surgical care.

4.5. IMPLICATIONS FOR FURTHER RESEARCH

This study identified a large discrepancy between the prevalence of surgical conditions in the population and the current provision of pediatric surgery at the hospital level in Somaliland. The next step for research is to estimate the met versus unmet need for pediatric surgical care and model scale-up interventions for increasing surgical volume.

There is also value in refining tools for measuring surgical need in the community. Further investigation into the type of care children received, if any, would help determine if a surgical need was met. Additionally, it is necessary to independently identify low-prevalence but high-risk conditions such as gastroschisis and inguinal hernia; these did not show up in our survey but can have severe implications in children if untreated.^{85,86}

There is also a need to explore further the association of poverty in healthcare seeking behavior. Studies on poverty in India have deeply and extensively explored this issue through qualitative research.³¹ Similar research focusing on surgery and healthcare seeking behavior, will help inform policy to avoid catastrophic health expenditure for Somaliland's poor. For this to happen, there needs to be additional data on the level of poverty in Somaliland and other financial indicators.

4.6. STUDY STRENGTHS AND LIMITATIONS

4.6.1. Strengths

A major strength of our study was our ability to sample all regions of the country, with adequate and proportional representation of rural and urban populations. In addition, we were able to interview a large number of children to identify patterns and trends of surgical need.

A major strength of the hospital assessment was our ability to survey nearly all hospitals in Somaliland. The inclusion of regional and district hospitals in rural areas of Somaliland helped in our analysis of regional disparities.

4.6.2. Limitations

4.6.2.1. AIM 1: COMMUNITY SURVEY

Many limitations of the SOSAS survey have been well described, and also apply to this study.^{24,32-34,36,58,59} The enumerators for the community survey were not surgeons, but were medical professionals. Additionally, a pediatric surgeon reviewed all suspected surgical conditions for confirmation. A limitation of the SOSAS survey is the use of individual self-

reporting of surgical conditions. However, the survey was compared with a visual examination that agreed with participant self-reporting in 94.6 % of cases.³³ It is also conceivable that there is a recall bias for older children in this study, as parents with many children may not remember all surgical conditions a child has had in their life, especially if they are older. The analysis of health facilities was also complicated by confusion from both enumerators and study participants in identifying primary, secondary, and tertiary health facilities. Although some countries, such as Uganda, have a clearly defined definition of national, regional, and district level hospitals,⁸⁷ Somaliland's public health sector struggles with regulation and organization.⁴² Our study decided to only interview children for surgical conditions, due to time and resource constraints. However, analysis of surgical conditions in Somaliland adults could provide some insight to pediatric surgical conditions as well. Finally, Somaliland has a large nomadic population (although numbers are decreasing) which are unlikely to have equal representation in this survey. However, it is likely that Somali nomads were included in smaller villages of the survey, where they set up *aqal*, a dome-shaped, collapsible hut made from poles covered by hides, woven fiber mats, or sometimes cloth or tin. These types of households were included in random selection.

4.6.2.2. AIM 2: HOSPITAL SURVEY

There are also several limitations in the hospital survey. In this retrospective data collection, there is not available data on the outcome of procedures, quality of care provided, or severity of the condition prior to surgery, thus limiting our ability to do any inferential analysis. Prospective studies on pediatric surgical care in Africa have found a high burden of trauma and burns^{8-10,18}. However, as our study used retrospective data collection this data was not available. Generally, little information is recorded besides name, age, procedure and signature of the surgeon or physician. The number of post-operative, in-hospital deaths is likely to be inaccurate and much

higher than reported,⁸⁸ as local collaborators indicated that hospitals often under report hospital deaths or over report success rates when asked. We are also only able to guess for reasons for large numbers of some procedures (i.e. tonsillectomy) based on collaborator opinion and experiences in the field. Finally, the hospital survey only collected data from surgical logbooks which limits our ability to assess the total amount of pediatric surgical care provided. In- and outpatient visits with surgeons which did not result in a surgical procedure were not able to be recorded based on difficulty or impossibility of obtaining such records.

5. Conclusion

Children have a high burden of surgical conditions in Somaliland and affect 13.7% of the pediatric population (276,000 children). Much of this surgical care is unmet, with between 91,500 – 209,000 children having unmet surgical need at some point in their life. This highlights the need for pediatric specific infrastructure, resources, and workforce to provide needed surgical care. Congenital deformities and injury related wounds comprised a large portion of the surgical need, which provide a baseline for possible intervention strategies on the community level. Hospital level care was reflective of the struggling health system, with most procedures being done at private facilities in the capital city. Surgical procedures performed were not reflective of high burden pediatric conditions. This study joins a growing literature on pediatric surgery which can provide the foundation for scale-up of pediatric surgical services, reduction of out-of-pocket costs for surgery, and improving access to surgical care.

Appendix A: SOSAS Somaliland

Household Code: _ _ _ _

Respondant: HH / C1 / C2

Surgeons Overseas Assessment of Surgical Need (SOSAS) Somaliland Version

Items in bold are the new questions.

Under the bold items the questions to be asked.

(Items in italics are instructions to the interviewer.)

Paragraphs in the boxes are explanations during the interview for the respondent. Read these out loud and be sure that the person understands the explanation.

Household

A. HOUSEHOLD INFORMATION (TAB: Household)

[Check off each visit to the household, check the box at the end if this is a replaced household]

A1. Participant ID [from RedCap] _____

A3. Household Code: _____

A2. Village Type: _____

_____ Rural _____ Urban

A4. Interviewer Name: _____

Good morning/evening. My name is _____ I work for Edna Adan Hospital in Hargeisa, we are working with researchers from Duke University in the United States, and the Ministry of Health (show the information letter). We are trying to find out if there are enough doctors in this area, specifically if there are enough surgeons. A surgeon is a medical doctor who cures patients by taking care of wounds and broken bones or cutting out masses. Sometimes surgeons must put you to sleep to do these things, and other times they must only numb the hurt body part.

To find out if there are enough doctors taking care of these problems in your village, we'd like to ask you and some other members of your household some questions. We will ask questions about health, such as whether members of your household have ever had wounds, broken bones, or masses. By asking these questions, we hope that we can help make more skilled doctors available in your village. We won't be offering medical care right now, but we hope that the information you provide will help create improved services in the future.

This survey will take about 45 minutes to 1 hour. All of your responses will be confidential. Participating in this survey is voluntary, and you may stop participating at any time. First I will ask you some questions about the people who live in this house. After that, I will randomly choose two people from your household and ask them more detailed questions about their health.

This information is confidential, and nobody will find out what answers you gave other than me and my research team, and we will not collect your name.

We will record the location of this place to determine your exact distance to health facilities. This information will be kept separate from all other responses in the survey and you may request that we do not collect this information. This data will be kept private and never shared outside the research team. We have an information sheet for you, and we will obtain your consent to participate and separate from the household members who will participate.

Additionally, researchers may return in a month or so to follow-up on this survey. You may ask that we do not return or a follow up survey. Do you have any questions at this moment?

Subax/Wanaagsan/Galab/Wanaagsan / Magacayay/Waa _____ Waxaan Ka shaqeeyaa dhakhtarka Edna Adan ee Koojaha Hargeisa. waxa aanu ka sameynaysa cilmii baadhis oo aanu ka wada shaqaynayo wassanaada caafimaadka. (Tus warqadda). waxaan isku dayaynaa inaan ogaano haddi ay jiraan dhakhaatir ku fican wadanka Somaliland walba kuwo qalinka sameynaya inay yihiin kuwo fican dalka oo daboorkara baahida taala. Dhakhtarka qalinka waa dhakhtarka kudweeyya zanuunada ubaahen qalinka oo walba si gaara loogu tabaray (Sida kabinka la faha, goyna fiisaha iyo qabsinada). marka qalinka la sameynayo waxay kugu sameynaysa si fican lagu qalo in lagu wada seerayo ama meesha laga jirayo wax la kabiido yeeyo.

Si aan xog fican uga helna inay jogaan dhakhaatir ku fican oo qalinka iyo baahiyaha caafimaadka ee loo qabo dhakhaatirka qalinka magaladina iyo wadankaba. waxaan si xushmedaleh kaaga codsanaynaa adiga iyo xafadada dadka kula degen qarkood in aad waydiiho suusko ku saabsaan caafimaadka sida in qof idinke mid ah waligaas dhawac ama naber kugu dhacay, laf ka jabsay ama fiio kasso baxeen.

Su'aalahan aan inay waydiiyo waxaan rajeynaysa inaad faaidi doontaan mustaqbalka in magaaladaada iyo deegaanada hoto dhakhaatir xirfaddeh, wakhigan la jooga ama hada wax caafimaad ah ma fidneyno kaliya waxaan oqeynaa xog, xogtaas aad nasiiyaan waxay idinke caawin doortaa in la inuu abuurin wax qabad caafimaad oo wanaagsan inaad heshaan.

Xog unurintan waxay qaadan doortaa mad dhan 45 daqiiqo ilaa inal saac. Jawaabaha aad nasiiyo dhamaantood waxay noqonayaa sir labadeena inaga dharaysa.

Ka qayb qadashadaada xog unurintan waa mutadawacnimo wax lacag ah laguugu masiinayo lagaqamama qaadayo wakhigaad rabiddan waad joojin kartaa.

Marka kowaad waxaan wax ka waydiiho doonaa in aqof ee guriga kuwada nooshihin kadibna waxaan doonaa doonaa laab qof oo idinka mida ah oo aan ka waydiiho suusko ku saabsaan xaalada caafimaadkooda. xogtaad nasiiyaan iyo jawaabaha waxuu noqon doonaa sir labadeena iyo sida xogta qaadayna inaga dharaysa cid kale la wadaagimayyo waxaad ku jawaabteen ogaana maayaan. Magacagana lagaa qorimayyo.

Waan dhaan galmidnaa goobtan aad dejenahay si loo ogaado inaad uqatnaa goobta caafimaad ee kuugu dhaw, xogtan waxaan ku heyndoonaa meel kale oo aan ahaayn halkaan dhigayno xogta jawaabaha hore markaas waxaad codsanaysan kartaa inaan lagaa qarin xogtan, warbixinta waxaa lagu heyndoonaa meel goonya cidkale lalama wadaagayo cid aanan aheyn qofdaan xogta unurintayna ee ka shaqeynaysa. waxaan kuu haynaa waraaq warbixinta ku qorantahay. waxaan laa qaadiyaa si xeeq oqofasho ah inaad ka qayb qaadiyo xog unurintan iyo mad gaara oo ah oo la simdoona cidkale ee xafidnaa ee ka qayb qaadiyaa si ay yaguna oqofasho la biyaan.

Xog kale ayaa insha afaah bikaadib ayaa haddina dib laguugu soo noqon doonaa si loo daba socdo xog unurintaa. Waad naga codsan kartaa inaan kugu soo noqon karno.

Household Code: _ _ _ _

Respondant: HH / C1 / C2

A5. Informed consent:

Would you like to participate in this survey?

Mu jeelan lahayd inaad ka qaybqaado xog unurintan?

Yes _____ No _____

No (if no, what is the reason?) _____ **Maya (Hadi, lahey maya, wa maxay sababtu?)**

(no time / no willingness / no reason / no seen benefit / other explain ...)

(Umahyo waqti / ma doonyo / Bila sabab / waxa fald ah iguma jiro / Farfahin kale)

[Without informed consent you cannot proceed. Make sure the person understands the purpose of this survey. If they don't want to participate, ask why and mark this.]

A6. Number of visits: _____ 1 _____ 2 _____ 3 _____ 4

Date: _____

Time: _____

Household Code: _____

Respondant: HH / C1 / C2

B. LIVING HOUSEHOLD MEMBERS

The following questions will be about your household members. I want to include every household member that normally eats from the same cooking pot, and slept here last night. We will start the information of the oldest household member and finish with the youngest, also babies and neonates and disabled household members need to be listed in order of their age.
 Suaalaha soo sood waxay ku saabsanyihiin dadka kamid ah qoyska. Waxan doonay in aan qofkasto katirisan qoyskaga oo aad wax wada cuntaan oo xafadana xalay u hoyday waxanu ka bilaabi doona qofka ugu weyn qoyska waxaanan kuso galgaleysanayna qofka ugu yara qoyska wata kale oo kudarajna tirade caruurta yar yar, numyada iyo weliba dadka naafada ah sida ay ukala weynyihiin.

[Fill in all the household members' age and sex in the table, ordered by age, the oldest household person first. Also the household members who are disabled or ill should be mentioned. At the end of the list of household members you need to ask specifically for the newborns and babies in the family and collect the information for each of them in individual tabs.]

B0. Number of household members:
 What is your position in the household?
 Kaalinta baaad kaga jirta guriga?

Age of respondent in years (as at last birthday)
 Imisa sano baad jirta?

Gender Jinsiga	
Male	Lab
Female	Dheddig

In total, how many people live in your household?
 Guud ahaan, imisa qof syaad ku nooshin gurigaaga?

Tab	B1. Age: (year's for adults/ months for < 1 yr*)	B2. Sex: Male/Female
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

Step 1, remember the definition: all the persons eating from the same pot.

Household Code: _____

Respondant: HH / C1 / C2

B4: GPS coordinates of household

[At this time record the GPS coordinates of the household on the last page, please record here the village cluster number and household code for identification purposes]

Cluster #

 Household code

C. TRANSPORTATION MEANS

The following questions will be about the health facilities availability for you and your household members, and the transportation you are able to provide for them in need of health care.
 Suaalaha soo socada waxa y ku saabsanyihiin xarumaha caafimaad adga iyo dhaaman cikasto ka mid ah qoyskaga sida baad ku gaadhaan xarumaha caafimaad marka aad u bahataan

C1.1. TRANSPORT TO PRIMARY HEALTH FACILITY:
 Which is the nearest primary health facility to you?
 Halke baa kugu dhaw xarun caafimaad?

Type: Public / Private [circle one]

What is the main way for you or your household members to go to a primary health facility?
 Sida baa ugu haboone ee aad ku tagtaan adiga ama qoyskaga xarunta caafimaad ee kugu dhaw?

On foot	Lug
Public transport (bus/taxi/okada/tricycle) circle	Gaadiidka dadweynaha (Bas / Taksir/ Baasgilaad)
Private Car	Baaburkaga
Private Motorcycle	Dhugdhuglay
Bicycle	Baasgilaad
Boat	Doon
Animal	Xoolaha sida gaadhi ximaar, Awr
Carried	Wa lagu sooqaday
Other:	Qaar kale

Primary health facility: Health facility without functioning operating room
 Time guideline: one person can walk 3 miles in one hour or 1 mile takes 20 minutes to walk

C1.2. Travel time to primary health facility:
 How long does it take you in total to get to your primary health facility if you don't have to wait for transportation? (hours)
 Muddo intee leeg ayey qaadata in aad ku gaadho xarunta caafimaad ee kugu dhow marku kuso doono Gaadiidki ku qaadi laaha? (Saacadood)

C1.3. Waiting time for transport:
 How long do you probably have to wait for transportation to a primary health facility? (hours)
 Muddo intee leeg ayey qaadata in aad sugo gaadiidka ku gayn laha xarunta caafimaadka? (imisa Saacadood)

C1.4. Cost for transport:
 What does it cost you to provide transportation to a primary health facility for a sick household member?
 Waa imisa qiimaha gaadiidka qaadaya qofka xanuusanaya ee qoyskaaga marka lagaynayo xarunta caafimaad ee kugu dhow

C1.5. Transport money available?
 Are you always able to pay for these means for transport of a sick household member?
 Markasta ma awoodda in aad iska bixiso kharashka Gaadiidka qaadaya qofka ka xanuusanaya?

Yes	Haa
No	Maya
N/A	Mikhusaysyo

Household Code: _____

Respondant: HH / C1 / C2

2.1. TRANSPORT TO SECONDARY HEALTH FACILITY:

Which is the nearest secondary health facility to you?
 Halke baa kugu dhaw xarun caafimaad oo labaad ?

Type: Public / Private [circle one]

What is the main way for you or your household members to go to a secondary health facility?
 Side baa ugu haboone ee aad ku tagtaan adiga ama qoyskagu xarunta caafimaad ee labaad ?

Public transport (bus/taxi)	Gaadiidka dadweynaha (basaska / taksi)
Car	Baabur
Motorcycle	Dhugdhuglay
Bicycle	Baaskilad
Boat	Doon
Animal	Xoolo side gaadhi ximaar emba awr
On foot	Lug
Carried	Waa lagu soogaaday

Secondary health facility: Health facility with functioning operating room
 Time guideline: one person can walk 3 miles in one hour or 1 mile takes 20 minutes to walk

C2.2. Travel time to secondary health facility:

How long does it take you in total to get to your secondary health facility if you don't have to wait for transportation? (hours)
 Muddo intee le'eg ayey kugu qaadata in aad ku gaadho xarunta labaad ee caafimaad marku ku soo doono Gaadiidka ku qaadi laaha ?
 (imisa Saacadood)

C2.3. Waiting time for transport:

How long do you probably have to wait for transportation to a secondary health facility? (hours)
 Muddo intee le'eg ayey kugu qaadata in aad sugto gaadiidka ku gayn laha xarunta labaad ee caafimaad? (imisa Saacadood)

C2.4. Cost for transport:

What does it cost you to provide transportation to a secondary health facility for a sick household member?
 Waa imisa qiimaha gaadiidka qaadaya qofka xanuusanaya ee qoyskaaga marka lagaynayo xarunta labaad ee caafimaad?

C2.5. Transport money available?

Are you always able to pay for these means for transport of a sick household member?
 Markasta ma awoodda in aad iska bixiso kharashka Gaadiidka qaadaya qofka ka xanuusanaya ?

Yes	Haa
No	Maya
N/A	Makhaysyo

C3.1. TRANSPORT TO TERTIARY HEALTH FACILITY:

Which is the nearest primary health facility to you?
 Halke baa kugu dhaw xarun caafimaad oo saddexaad ?

Type: Public / Private [circle one]

What is the main way for you or your household members to go to your tertiary health facility?
 Side baa ugu haboon ee aad ku tagtaan adiga ama qoyskagu xarunta caafimaad ee saddexaad ?

Public transport (bus/taxi)	Gaadiidka dadweynaha (Basaska / taxi)
Car	Baabur
Motorcycle	Dhugdhuglay
Bicycle	Baaskilad
Boat	Doon
Animal	Xoolo side gaadhi ximaar emba awr
On foot	Lug
Carried	Waa lagu soogaaday

Tertiary health facility: Health facility with functioning operating room and minimal one surgical specialists
 (Surgeons/Orthopedics/Gynecologists/Urologists)
 Time guideline: one person can walk 3 miles in one hour or 1 mile takes 20 minutes to walk

Household Code: _____

Respondant: HH / C1 / C2

C3.2. Travel time to tertiary health facility:

How long does it take you in total to get to your tertiary health facility if you don't have to wait for transportation? (hours)
 Muddo intee le'eg ayey kugu qaadata in aad ku gaadho xarunta caafimaad ee saddexaad marka aanad sugayn Gaadiidka ku qaadi laaha

C3.3. Waiting time for transport:

How long do you probably have to wait for transportation to a tertiary health facility? (hours)
 Muddo intee le'eg ayey qaadata in aad sugto gaadiidka ku gayn laha xarunta caafimaad ee saddexaad? (imisa Saacadood)

C3.4. Cost for transport:

What does it cost you to provide transportation to a tertiary health facility for a sick household member?
 Waa imisa qiimaha gaadiidka qaadaya qofka xanuusanaya ee qoyskaaga marka lagaynayo xarunta saddexaad ee caafimaad?

C3.5. Transport money available?

Are you always able to provide these means for transport of a sick household member?
 Markasta ma awoodda in aad iska bixiso kharashka Gaadiidka qaadaya qofka ka xanuusanaya ?

Yes	Haa
No	Maya
N/A	Makhaysyo

C4.1. Assets

What assets do you currently own? (check all that apply)

Chickens or ducks	Digaag
Small animals (goats/sheep)	Achi (Riyo, Ido)
Large animals (cows, buffaloes, camels)	Xoleha sda loada, dibiyo, Geel
Bicycle	Baaskilad
Motorcycle or motor-scooter	dhugdhuglay
Radio or TV	Raadiyo ama tilifashan
Refrigerator	talagad
Washing machine	qasaalad
Car or tractor	Baabur ama cagaf cagaf

C4.2. Assets 3 years ago

What assets did you own 3 years ago, before the drought? (check all that apply)

Chickens or ducks	Digaag
Small animals (goats/sheep)	Achi (Riyo, Ido)
Large animals (cows, buffaloes, camels)	Xoleha sda loada, dibiyo, Geel
Bicycle	Baaskilad
Motorcycle or motor-scooter	dhugdhuglay
Radio or TV	Raadiyo ama tilifashan
Refrigerator	talagad
Washing machine	qasaalad
Car or tractor	Baabur ama cagaf cagaf

C4.3. Assets 7 years ago

What assets did you own 7 years ago, during the last election, held in 2010? (check all that apply)

Chickens or ducks	Digaag
Small animals (goats/sheep)	Achi (Riyo, Ido)
Large animals (cows, buffaloes, camels)	Xoleha sda loada, dibiyo, Geel
Bicycle	Baaskilad
Motorcycle or motor-scooter	dhugdhuglay
Radio or TV	Raadiyo ama tilifashan
Refrigerator	talagad
Washing machine	qasaalad
Car or tractor	Baabur ama cagaf cagaf

C4.4 What is your household's monthly income?

Waa imisa dakhliga kusoo gela bishii?
 [income produced by all working members of the house, includes money sent from relatives out of town]

\$0-\$100
\$100-\$400
\$400-\$700
\$700-\$1000
\$1000 or more

Household Code: _____

Respondant: HH / C1 / C2

D. DECEASED HOUSEHOLD MEMBERS

D0. Number of household deaths:
Did you have any household member who passed away in the past year?
Mejlita cid ka lirsan qoyskaaga oo geeriyooday sanad ka hor?

[If the answer is no, do not ask the following questions but record 0. If no deaths within the past 1 year, skip to section E]

I'm very sorry to hear that, how many people from your household died in the past year?
Aad baan ugu xumahay inaan maqal: Iinsa qof oo ka lirsan qoyskaaga ayaa geeriyooday sanad ka hor

[Ask specifically for neonates and babies]

[FOLLOWING QUESTIONS ONLY IF THERE WAS A DECEASED HOUSEHOLD MEMBER IN THE LAST YEAR, UNDER ROW 1 THE ANSWERS FOR THE FIRST HOUSEHOLD DEATH. CONTINUE WITH THE FOLLOWING ROWS IF THERE WERE MORE HOUSEHOLD DEATHS IN THE LAST YEAR]

I'm sorry to hear that you lost a household member in the last year. The following questions are about this/these deceased person(s).
Aad baan ugu xumahay geeridaad ku weydeen qof ka lirsan qoyskaaga sanad ka hor... waxaan wax idinka su'aali doona dadkii geeriyooday.

D1. Age at death:
How old in years was the household member when she/he died?
Marzuumininta geeriyooday imahay da'doodu?

1.....	2.....	3.....	4.....	5.....
--------	--------	--------	--------	--------

[Age for babies (in months)]

D2. Sex:
What was the sex of the household member?
Nooca jinsiga marxuunka ama marxuumaada?

	1.....	2.....	3.....	4.....	5.....
Male					
Female					

D2.1 Pregnant at death: Yes = 1 No = 2 [only if D2 was female]
Was the household member pregnant when she died or did she deliver within 6 weeks of her death?
Goofka ka dhintay qoyskaaga ma waxa uu ahaa gabadh uur leh markii ay dhimatay. mise way umul soortay muudka yar laba bilood

1.....	2.....	3.....	4.....	5.....
--------	--------	--------	--------	--------

D3.1. Death specifics:
Did the household member have any of the following problems less than a week before she died?
Goofka ka lirsanaa qoyskaaga intaan geeriyoon ka hor in ka yar hal toddobaad, miyu qabey dhilbaalooyinka
For neonates / babies: Did the child look normal and could it drink, urinate and defecate normally after birth?
Cariurta yaryari: Imuhu ma u eekaa caadi, ma qaadanayey cabiitaanka, ma kaajay oo ma saxarooday marku dhashay ka dib?

		1.....	2.....	3.....	4.....	5.....
Injury	Dhaawac					
Wound not due to an injury	Nabar aan ka iman dhaawac					
Bleeding or ill around childbirth	Dhig bax ama xanuun xiliga foosha/umusha					
Mass (Growth or Swelling)	Fix (kayso bax)					
Deformity congenital	Cilad lagu dhasho /bilaabmatay marku dhashay qofku					
Deformity acquired	Cilad bilaabmatay ka dib marku qofku dhashay					
Abdominal distention or pain	Caloosha oo dibarta ama xanuun					
None of the above	Midna maha					
Others (specify)	Qaar kale (qeeq)					

[Show empathy for the story told. Don't be judgmental in any way; let the person tell his/her story. For definitions see Question F2.1]

D3.1.1 Type of injury / accident: [Only if D3.1 is answered with 'injury']

Did the problem start after an injury or accident? What kind of accident?
Dhacdo ma waxay bilaabatay dhaawaca ka dib mise shikha? Was noocma shikha?

[Pick the one that best describes the injury / accident. All can be intentional or unintentional]

		1.....	2.....	3.....	4.....	5.....
Car, truck, bus crash	Shil baabuur yar, amba baabuur xamuul ah ama bas					
Motorcycle crash	Shil mootada					
Pedestrian, bicycle crash	Dadka lugta ah, shil baaskil					
Guns/shot / firearm	Toogasho ama riisaa					
Stab / slash / cut / crush	Mind / xaglin / jafid / burburin					
Bite or animal attack	Oaninyo ama weerar xayawaan					
Fall	Dhicid					
Open fire / explosion	Dab kaqay / qarax					
Hot liquid / hot object	Disereere kutuul / shay kutul					
Others (specify)	Qaar kale (qeeq)					

Household Code: _____

Respondant: HH / C1 / C2

D4. Healthcare sought:
Did the household member go to a health facility or see a doctor/nurse before she/he died?
Qof qoyskaaga ka lirsan: ma tagay xarun caafimaad ka hor inta aanu dhiman ma lakulmay dhakhlar amba kakaaliye/ kakaaliso caafimaad?

Yes	Haa	1.....	2.....	3.....	4.....	5.....
No	Na					

D4.1.0. What was the main reason for not going to a health facility to see a doctor/nurse or not to have an operation or dressings?
[only if D4 was 'no']

Was money a problem? Weyn ee uu utagi wayaya xarun caafimaad si uu ula kulmo dhakhlar, kakaaliye/kakaaliso caafimaad oo aan losameyn wax qalin amba dhayid

		1.....	2.....	3.....	4.....	5.....
No money for health care	Ma haysto lacag aan ku tago xarun caafimaad					
No (money for) transportation	Ma haysto lacag aan ku raaco gaadiid					
No time (person died before arrangements)	Maan qorshaysan wacdi ka hor inta aanu dhiman qofku					
Fear / no trust	Cabsi/ kalsooni darro					
Not available (facility/personnel/equipment)	Lama helin adeeg/qofki / qalab					
No need (condition is not surgical)	Looma baahna xasid qalin					

D4.1.1. Traditional Healer:
Was the household member taken to a traditional healer, traditional doctor, witch doctor or bone setter for this problem?
Goofka ka lirsan qoyskaaga miya loo geeyay goob dawo dhacqaneed, ama dhakhlar dhacqan, dhakhlar ku ma wax uu aha mid dawooyaya lafaha jaba

Yes	Haa	1.....	2.....	3.....	4.....	5.....
No	Na					

D4.1.2. Type of healthcare received:
What type of healthcare was given?
Muxuu ahaa nooca dawo ee la siiyay

		1.....	2.....	3.....	4.....	5.....
Hospital visit	Miyuu tagay cusbitaal					
Pharmacy visit	Miyuu tagay farmasi					
Chemist/patient medicine store visit	Miyuu tagay goob lagu kaydiyo dawooyinka					
Home care by nurse	Miyuu ku helay guriga kakaaliye / kakaaliso caafimaad					
None	Midna					

D5. Location of death:
Where did the household member die?

Halkaee buu ku geeriyooday qofkii qoyskaaga ka lirsanaa

		1.....	2.....	3.....	4.....	5.....
Home	Guriga					
Health Facility	Goob caafimaad					
Others	Meel kale					

D6. Healthcare costs:
How much did healthcare cost for this person?
Iltuu leeg yahay: Miyaashka caafimaad ee kaaga baxay goofka

1.....	2.....	3.....	4.....	5.....
--------	--------	--------	--------	--------

D7. Money for healthcare:
Did you raise money for their healthcare?
Miyaad lacag u urursatay daryeelkooda caafimaad

[yes means they used money to pay for healthcare, no means they did not use money, it was free or no payment was used]

Yes	Haa	1.....	2.....	3.....	4.....	5.....
No	Na					

D8. Money raised for healthcare: [only if D7 is yes]
How did you raise money for the funeral?
Sideed u urursatay lacagta aaska?

		1.....	2.....	3.....	4.....	5.....
Own savings	Lacag kayd ah					
Loans from relatives	Amah xig tada ah					
Medical insurance program	Barnaamijka Caaymiska caafimaadka					
Job paid for it	Ma mushaharkaga ayaa ka bixisay					
Loans from banks or other institutions	A mah bang amba hay'ad kale					
Loans from moneylenders	Ma ganacsato ayaa ka amahatay lacagta					

Household Code: _____

Respondant: HH / C1 / C2

D9. Funeral:

Did this person have a funeral?
Miya la sassy qalka

Table with 5 columns (1-5) and 2 rows (Yes/No) for funeral status.

D10. Cost of funeral: [only if D9 is yes]

How much did the funeral cost?
Kharash intee leeg ayaa ku baxay aaska

Table with 5 columns (1-5) for funeral cost.

D11. Money for funeral: [only if D9 is yes]

Did you raise money for their funeral cost?
Ma lacag ayaa u ururisay kharashka askooda
Yes means they used money top pay for funeral.
No means they did not use money, it was free or no payment was used

Table with 5 columns (1-5) for money for funeral.

D12. Funeral assets: [only if D9 is yes]

Did you give up assets for their funeral or healthcare?
Miyaad u rahanay wax hanti ah askooda ama daryeelkooda caafimaad

Table with 5 columns (1-5) for funeral assets.

D13. Funeral/healthcare assets: [only if D12 is yes]

What assets did you give up for their funeral/healthcare?
Maxay aheed hanti ah u rahanay askooda ama daryeelkooda caafimaad

Table listing assets like Chickens or ducks, Small animals, Large animals, Bicycle, Motorcycle, Radio or TV, Refrigerator, Washing machine, Car or tractor.

D. Give a brief explanation of the story told.

Thank you very much for answering these questions. Let me go quickly over the survey to check everything.
Aad baad u mahadsantahay sida aad uga jirahay dhamaan su'aalaha aan ku weydiiyay. Aan yara hubiyo dhamaan xogta aad jirahay.

[Go over all the tabs to ensure that you have everything, ask the questions again which you accidentally skipped.]

I checked the household information tab, there is no data missing:

_____ [date] _____ [name] _____ [signature of interviewer]

Thank you very much for giving all this information. I have a letter with contact information for you if you would have questions for us about this survey. Can I speak to the household members who I have randomly chosen to ask them more specific questions about their health?
Aadbaad u mahadsan tahay sida aad noo siiyey warbixinta oo dhan. Waxan ku haye waraq ay ku qoran yihiin halkaad naga la soo xidhiidhi kartid hadi aad wax su'aalo qabtid oo ku saabsan xog ururintan. Ma la hada kara dadka ka masuulkaa guriga oo aan ka daran doono qofkan weydii lahaa su'aalo khaas ah oo ku saabsan caafimaadkooda?

[Give the letter with the contact information about the survey. If the household members are not available now, you should make an appointment for later on that day or the next day.] [TIME: _____ hour _____ min]

IF THERE WERE MORE THAN ONE DECEASED HOUSEHOLD MEMBER, FILL IN THE SECOND OR THIRD PERSONS DETAILS IN THE APPROPRIATE SPACES (THE TABS OR COLUMNS WITH 2 OR 3 RESPECTIVLY).

Household Code: _____

Respondant: HH / C1 / C2

THE FOLLOWING QUESTIONS IN SECTION E, F, G, H, I, J, K ARE TO BE ASKED TO THE TWO HOUSEHOLD MEMBERS OF THE FAMILY WHO WERE RANDOMLY SELECTED FOR THE INTERVIEW.

CHILD RESPONDENT: Survey 1

E. GENERAL INFORMATION (Survey 1)

[TIME: _____ hour _____ min]

E1. Child ID number: [example: 1025 1/]

E2. Sex:

Table with 2 columns (Male/Female) and 2 rows (Lab/Dhedg).

E3. Age (as at last birthday)

Good morning/evening. My name is _____. I work for Edna Adan Hospital in Hargeisa. We are working with the Ministry of Health [show the information letter]. We are trying to find out if there are enough doctors in this area, specifically if there are enough surgeons. A surgeon is a medical doctor who cures patients by taking care of wounds and broken bones or cutting out masses. Sometimes surgeons must put you to sleep to do these things, and other times they must only numb the hurt body part. To find out if there are enough doctors taking care of these problems in your village, we'd like to ask you some questions. We will ask you questions about your health, such as whether you have ever had wounds, broken bones, or masses. By asking you these questions, we hope that we can help make more skilled doctors available in your village. We won't be offering medical care right now, but we hope that the information you provide will help create improved services in the future. This survey will take about 30 minutes. All of your responses will be confidential. You have the right to not participate in the survey, or to stop during the interview. We have an information sheet for you, and we will bring your consent to participate. Do you have any questions at this moment?

Subax Wanaagsan/Galab Wanaagsan. Magacyagu Waa _____. Waxaan Ka shaqeyaa dhakhtarka Edna Adan- ee kula Hargeisa, waxa aanu ka sameynayna cimi baadiis- oo aanu ka wadashaqeyno waxaarada caafimaadka. (Tus warqada) waxaan isku dayaynaa inaan ognano haddi ay jiraan dhakhsatir ku filan wadanka Somaliland waliba kuwa qalinka sameynaya inay yihiin kuwo filan dalka oo dabooli kara baahida taala. Dhakhtarka qalinku waxa dhakhtarka kudarweeya xanuunada ubahsan qalinka oo waliba sigaar loogu tabaray (Sida kabiinka lafaha, goyna fixaha iyo qabsinada), marka qalinada la sameynayo waxay kugu sameynayaan si sifican lagu qalo in laguwada seexyo ama meesha laga jarayo wax la kabaub yeeyo.

Si aan xog filan uuga helna inay joogaan dhakhsatir ku filan oo qalinka iyo baahiyaha caafimaadka ee loo qabo dhakhtariinta qalinka magaalada iyo wadankaba waxaan si xushmadaleh kaaga codsanaynaa adiga iyo safadaha dadka kula degen qaarood in aad weydiiho su'aalo ku saabsan caafimaadka sida in qof idinka mid ah waliba dhawac ama nabad kugu dhacay, laf ka jabtay ama fixo kasoo baxeen. Su'aalaha aan inii weydiiyo waxaan raajeynaynaa inaad faa'iido doontaan mustaqbalka in magaaladaada iyo dalbuka helo dhakhsatir sifadii. Waktiigan la jooga ama hada wax caafimaad ah ma fidineyo kalya waxaan qoreynaa xog, xogtaas aad nasisaan waxay idinka caawin doontaa in la inuu abuurin wax qabad caafimaad oo wanaagsan inaad heshaan.

Xog uruurtintani waxay qaadan doontaa mud dhan 30 daqiiqo. Jawaabaha aad nasiso dhamaantood waxay noqonayaan sir labadaena inaga dhaxaysa. Kaqayb qaybahaadaada xog uruurtintan waxa mudawacnimada wax lacag ah laguugu masiiryo lagaagaminaa qaadayo waktiigaad rabtidan waad joojin kartaa, waxa aan haya waraq ay ku qoran yihiin hamaan macluumaadka oo dhambi, waxa kale oo aanu u baahanahay saxeexa ah inaad oggiiyay ka qayb qaadashada haddi aad qabto wax su'aal ah waad na waydin karta imakaba?

E4. Informed consent: Would you like to participate in this survey? OR

Is it okay for your son/daughter to participate in this survey?

Ma aad oggohay in aad naqila qayb qaadato xog uruurtintan? Caadi ma tahay inay naqila qayb qaaan inankaga iyo inanaaduba xog uruurtintan?

Table with 2 columns (Yes/No) and 2 rows (Haa/Umahyo waqti / ma doonyo / Bila sabab / waxa faldid ah iguma seen benefit / other explain...)

[For minors (individuals under age 18), this consent E4 is obtained from a guardian/parent. Without informed consent you cannot proceed. Make sure the person understands the purpose of this survey. If they don't want to participate, ask why and mark this.]

E5. Minor assent:

Would you like to participate in this survey?

Ma aad oggohay in aad naqila qayb qaadato xog uruurtintan?

Table with 2 columns (Yes/No) and 2 rows (Haa/Umahyo waqti / ma doonyo / Bila sabab / waxa faldid ah iguma seen benefit / other explain...)

[Surrogate consent only: this can be used in case of a child under 12 years of age, who is not around for the interview. The guardian/parent can answer all the questions for the child. When the child is around, the permission to participate (assent) is asked and only with the assent of the child the interview is held together with the guardian/parent. For children over the age of 12 the guardian/parent can be around for the interview depending on the wish of the child.]

The following questions are general questions, later on I will ask more about your health.
Su'aalaha soo socdaa waa su'aalaha guud kadibna waxaanu wax badan ka weydii doona xalada caafimaad.

Household Code: _____

Respondant: HH / C1 / C2

E6. Education:

What is the highest educational level that you have achieved or are currently following?
Waa maxay heshiis ugu sareeya ee waxarasho ee aad qaaday ama hadda ka dib?

None (includes nursery)	Majiro (xadaamad)
Primary school	Dugsi Hoose
Secondary school (junior / senior)	Dugsi sare
Tertiary (university, colleges, bachelors)	Jaamacad
Graduate degree (Master degree, PhD)	Heer jamacadeed ka qalin jabiyay sida Degree - Master, Phd

E6.1 Literacy:

Are you able to read and write in any language?

Miyad wax qori kara ama akhary kara? Kuqadaha?

(For children who are currently learning how to read and write answer: 'No')

Yes	Haa
No	Maya

E.7 Country

If non Somali, specify country of origin:.....
Haddi aan Soomaali, cadee waddanka ka soo jeedo:

--

E8. Length of stay in house:

How many years have you lived in this household?
Imisa sansdood ayasad ku noolayd gurigan?

--	--	--

E9. Health status:

Are you generally healthy?

Guud ahaan adigu ma caafmaad qabta?

Yes	Haa
No	Maya

E10. Time ill:

In total how many weeks have you been ill during the past year?

Guud ahaan imisa toddobaad ayasad xanuunsatay sanadkii la soo dhafay?

--	--	--

E11. Number of health facility visits:

How many times have you visited a clinic or hospital or nurse / medical doctor in the last year?

Imisa jeer baad boqay xarun caafmaad ama cusbitaal ama kakaaliye caafmaad ama dhaktar sand kii hore?

--

E12. Recovery from illness:

Have you recovered fully from the illness you had?

Mead loo boqstay xanuuski kugu dhacay?

Yes	Haa
No	Maya

EXPLAIN:

Surgery, also known as an operation, can be done for a swelling, mass, abdominal pain, and many other things. Patients often have a bandage after having surgery or may need to stay in the hospital for some time. Sometimes, children are born with problems that can be fixed with an operation. Examples of these problems are open lips, missing anus, or strange feet.

Some people who break a bone or have a wound, may not have an operation but still need to be seen by a doctor or stay in the surgical ward of a hospital. Since this does not include an operation, but includes surgical consultation, we call it surgical care.

Now I'm going to ask you about all the surgical problems you've had in your lifetime. We'll start with your head and move all the way down to your toes.

Surgery waxa kale oo aynu u naqansaa qalin - waxa kale oo lagu samayn kara qalinka sida saarita fiixaha, caloosha, xanuunka iyo waxaylo kale oo badan. Baakanka badana marka loo sameeyo qalinka waxa lagu dhiba basandhay amab wax uu joogi doona cusbitaalka dher maslmoood, mararka qaar kood caruurto waxay ku dhacshaan dhibatoyin lagu xalin karo qalin, tusasle ahaan dhibatoyinkani waxay noqon karaan sida: feruurta, bila daba ah amab lugah aad u qejiqooca.

Dadka qaar kood oo ka jaba lafaha ama nabar leh laga yaab imamay ubaahan qalin lakin waxay weli u bahanyihiin inu arko dhaktar ama wasdhka qalinka - xita haddi uunan u baahaneen qalin oo uu lakin u bahan yahaya talo dhaktar oo aanu ku magacawno daraydka qalinka hadaba imaka waxa aan wax ka weydin doona dhamaan wixi dhibatoyin qalinka ah ee aad la kulantay noloshada - waxaanu ka bilaabayna kore illa hoos (madaxa illa suulasha)

Household Code: _____

Respondant: HH / C1 / C2

F. FACE / HEAD / NECK

F1. Face / head / neck:

Have you ever had a wound, bum, mass / goiter, deformity, problem with eating/drinking, a problem with your eyes or ears or an operation on your face, head, or neck?

Waxiga maad isku aragtay nabar, qubasho, goiter [fixda kaso baxada cunaha] ciid ama majirto dhibaad aad kala kulinta cuntaanka/cabtaanka aragtida (indhaha) maqalka (dhagaha) ama qalinn lagugu sameyay wajiga madaxa qoorta?

Yes	Haa
No	Maya

IF THERE WERE/ARE NO PROBLEMS WITH THIS ANATOMICAL SECTION YOU CAN CONTINUE WITH SECTION G. IF THE PERSON HAD A PROBLEM WITH THIS ANATOMICAL SECTION YOU QUESTION FIRST ON PROBLEM 1 ALL THE QUESTIONS ON THIS PAGE AND GO FURTHER IF THERE ARE MORE PROBLEMS!

F1.1 Show picture portfolio

Pathology selected from picture

	Problem 1	Problem 2	Problem 3
Cleft lip			
Cleft palate			
Thyroglossal cysts			
Cystic hygroma			
Hydrocephalus			

F1.1. Face / head / neck location:

On what part of your head / neck / face did the problem occur?

Qaybtee baya kaga dhacday dhibaataadu wajiga madaxa iyo qoorta?

	Problem 1	Problem 2	Problem 3
Eye	Ishe		
Ear/nose/throat	Dhagaha / Sanka / cunaha		
Dental/lips/mouth	Kiiska / dibnaha / aafka		
Neck	Qoorta		
Head	Madaxa		

F2.1. Face / head / neck specifics:

Tell me what problem you have had.

ii sheeg waxa dhibaata ah kaso qaaday.

	Problem 1	Problem 2	Problem 3
Wound injury related	Nabar la xidhiidha dhawaca		
Wound not injury related	Nabar aan la xidhiidhin dhawaca		
Bum	Dab		
Mass or growth / goiter	Fiix ama korysa / fix cunaha ah		
Deformity congenital	Qaab badal / uu ku dhacsho qofku		
Deformity acquired	Qaab badal bilaabmatay marku qofku dhacay		

Deformity:

An abnormal tissue arrangement or malformation

Congenital:

The person is born with the problem. Think about: cleft lips, cleft palate, hydrocephalus etc.

Acquired:

The person got the problem later in life. Think about: scars and broken bones

F2.1.1 Type of injury / accident:

Did the problem started after an injury or accident? What kind of accident?

Dhibaataadani ma waxay kugu bilaab matay dhawaca mise shika kadd? Waa Nooc muu aha shiku?

[Pick the one that best describes the injury / accident. All can be intentional or unintentional.]

	Problem 1	Problem 2	Problem 3
No, it was not due to an injury / accident	Maya maha wax la xidhiidha dhawaca / shika		
Car, truck, bus crash	Shil baabuur yar, amba baabuur xamuul ah amba bas		
Motorcycle crash	Shil mooto		
Pedestrian, bicycle crash	Dadka lugta ah, shil baaskil		
Gunshot	Toogasho		
Stab / slash / cut / crush	Mind / xagtin / jarrid / burburin		
Bite or animal attack	Qaniinyo ama weerar xayawaan		
Fall	Dhicid		
Open fire / explosion	dab kacay / qarax		
Hot liquid / hot object	dereere kulul / shayga kulul		

Household Code: _____

Respondant: HH / C1 / C2

F3.1. Timing:
When did this problem start?
Goorma ayay kuugi bilaati malay dhibaataadani?

		Problem 1	Problem 2	Problem 3
In the last month	Bishi hore			
During the past 12 months but longer than a month ago	Sandi hore /dhexdisa in kabadan bil			
Between 1 and 3 years ago (after drought began)	Inta u dhawaysa 1 ila 3 sano abaari hore inta aanay bilaabmin			
Between 3 and 7 years ago (before drought, after last election)	3 ila 7 sano ka hore amab abaarati ka hor, ama doorshadi kadib			
More than 7 years ago (before last election)	In ka badan 7 sano ka hor [doorashadi hore]			

F3.1.1 At this moment:
Do you have this problem now (or during the last week)?
Ila hada dhibaataad may ku hasta ama inta laguda jiro todobaadkii la soo dhafay?

	Yes	Ha	Problem 1	Problem 2	Problem 3
	Yes	Ha			
	No	Maya			

F4.1. Healthcare sought:
Did you go to a health facility or see a doctor/nurse for this problem?
Miyaad ula tagalay dhibtooyinkan xarun caafimaad ama dhakhtar / kalkaaliye, kalkaalisoo?

	Yes	Ha	Problem 1	Problem 2	Problem 3
	Yes	Ha			
	No	Maya			

F4.1.1. Traditional Healer:
Did you go to a traditional healer traditional doctor witch doctor or bone setter for this problem?
Miyaad u tagalay ugaay dawo dhaqameed, dhakhtar ka dawo dhaqameedku ma waxa uu aha mid wax ka qaban kara lafaha iyo dhibatooyinka?

	Yes	Ha	Problem 1	Problem 2	Problem 3
	Yes	Ha			
	No	Maya			

F5.1. Type of healthcare received: [Only when 'yes' to F4.1]
What kind of treatment did you receive?
Noorma ayay aheed dawaynka aad ka heshay?

		Problem 1	Problem 2	Problem 3
None / No surgical care	Waxba / may aheen mid qalin			
Major procedure = a procedure which requires regional/general anesthesia	Qalin culus = qaabka qalinka oo lii bahana wada suuxin ama qayb			
Minor procedures = dressings, wound care, punctures, suturing and I&D	Qalin fudud = dhaqmo, darjeel naber, in la daloolayay, la tolay			

F5.2. Cost of care: [only if F5.1 is major or minor procedure]
How much did you spend on the surgery?
Inte inleeg baa kaga baxaday qalinkaas

	Problem 1	Problem 2	Problem 3

F5.3. Money for healthcare: [only if F5.1 is major or minor procedure]
Did you raise money for surgery?
Miyaad qalinka lacagtiisa oo u urursatay

	Yes	Ha	Problem 1	Problem 2	Problem 3
Yes (had to use money for surgery)	Yes	Ha			
No (did not have to pay money for surgery)	No	Maya			

F5.4. Raising money for healthcare: [only if F5.3 is yes]
How did you raise money for surgery? Check all that apply
Side baad uso urursatay lacagta qalinkaas?

		Problem 1	Problem 2	Problem 3
Own savings	Lacag keyd ah			
Loans from relatives	Amaah xig tada ah			
Medical insurance program	Barnaamijka Caaymiska caafimaadka			
Job paid for it	Ma mushaharigaaga ayaa ka bixisay			
Loans from banks or other institutions	A maah bangi amba hayaydo kale			
Loans from moneylenders	Ma ganacsato ayaa ka amahatay			
Sold assets	Ma Hantibaad u ibixisay			

Household Code: _____

Respondant: HH / C1 / C2

F5.5 Assets sold for surgery: [only if "sold assets" on F5.4 is checked]
What assets did you sell to pay for surgery?
Hanti nooca ah laad u ibixisay si aad qalinka isaga bixiso?

		Problem 1	Problem 2	Problem 3
Chickens or ducks	Digaag			
Small animals (pets/sheep)	Adhi (Riyo, Ido)			
Large animals (cows, buffaloes, camels)	Kolaha sda loads, dibiyo, Geel			
Bicycle	Baaskiid			
Motorcycle or motor-scooter	dhugdhuglay			
Radio or TV	Raadiyow ama laifeshan			
Refrigerator	lalaygaad			
Washing machine	Qasaaad			
Car or tractor	Baabuur ama caga/cagaal			

F5.6. Did paying for this surgery affect your household's ability to pay for other household needs? [such as food, water, clothing, medicine]
Lacagta aad ku bixisay qalinka miyey saamayn ku yeelatay baahiyaha gurigaaga? (sida cunsada biyaha, dharka iyo daawooyinka)
[only answer if child HAD surgery, major or minor]

	Yes	Ha	Problem 1	Problem 2	Problem 3
	Yes	Ha			
	No	Maya			

F6.1. Reason for not having surgical care: [Answer if they did NOT get surgery or did NOT go to health care facility]
What was the main reason not to go to a health facility to see a doctor/nurse or not to have an operation or dressings?
Waa maxay sababta u weey ee aad tagi waday xarun caafimaad sii uu ku arko dhakhtar ama kalkaaliye caafimaad adigo aan aini ama dhaylo lagu samayeen?

[If the person went to a traditional healer ask why (s)he didn't go to a health care facility and mark that as the answer. If the person was referred but did not go to the referral hospital, mark the answer why (s)he did not go here.]

		Problem 1	Problem 2	Problem 3
No money for health care	Ma haysto lacag aan ku tago xarun caafimaad			
No (money for) transportation	Ma haysto lacag aan ku rraaco gaadiid			
No time	Waxa aan u wayay wacdi			
Fear / no trust	Caabu fal soon damo			
Not available (facility/personnel/equipment)	Lama helin adeeg / qofkii / qalab			
No need	Looma baahna			

F7.1. Disability:
Does this problem still impact your daily life?
Miyaad iila hada dhibaataadan weel saameyn ku leedahay nolol maalmoodkaaga?

		Problem 1	Problem 2	Problem 3
The condition is not disabling	Xaaladu maha wax naafo sababaya			
I feel ashamed	Waan ka xishoonaya			
I'm not able to work like I used to	Ma awoodo inan socdo siidaan hore ugu socan jiray			
I need help with transportation	Waxaan u bahansay in layga caawiyo kharshaka gaadiidka			
I need help with daily living	Waxaan u bahansay caawin maalin kasata			

[Disability: a physical problem that impacts your life, or makes it difficult to carry out your daily activities.]

[ASK IF THE PERSON HAD ANOTHER PROBLEM REGARDING THIS ANATOMICAL LOCATION. IF SO, GO TO THE FOLLOWING ROW, PROBLEM 2 OR 3, TO REGISTER THIS PROBLEM. IF HERE ARE NO OTHER PROBLEMS REGARDING TO THIS LOCATION YOU CAN GO TO THE FOLLOWING ANATOMICAL LOCATION. IN CASE OF MORE THAN 3 PROBLEMS, MARK THE ONES WHICH ARE MOST RESENT AND MOST RELEVANT FOR THE RESPONDENT]

AFTER DOCUMENTING THE PROBLEMS, EXAMINE AS DEFINED BELOW OR USE THE PICTURE PORTFOLIO FOR THE FOLLOWING CONDITIONS

- 1.1. DEFINITIONS
 - 1.1.1. Cleft lip [Congenital cleft in the lip - inspection]
 - 1.1.2. Cleft palate [Congenital cleft in soft/hard palate - inspection]
 - 1.1.3. Thyroglossal cysts [Congenital cystic swelling in midline of neck anteriorly - palpation]
 - 1.1.4. Cystic hygroma [Congenital cystic swelling in the posterior triangle of the neck/floor of the mouth, transluminates - palpation]
 - 1.1.5. Hydrocephalus [Generalized Swelling of the upper portion of the head above the face]

Pathology from clinical examination

	Problem 1	Problem 2	Problem 3
Cleft lip			
Cleft palate			
Thyroglossal cysts			
Cystic hygroma			
Hydrocephalus			

Household Code: _____

Respondant: HH / C1 / C2

G. CHEST / BREAST

G1. Chest / breast:

Have you ever had a wound, bum, breast mass, deformity, or an operation on your chest (including heart or lungs) or breast?
 Weligaa ma nabar ma yeelatay, ama ma gubalay, ama fix naaska ma kasoo baxday, qaab badal ma ku dhacay jidhkaaga, qalin ma lagu sameeyay
 (aabkaada [oo ay mujraan wadaha, sambabada, ama naaska])

Yes	Haa
No	Maya

[IF THERE WERE/ARE NO PROBLEMS WITH THIS ANATOMICAL SECTION YOU CAN CONTINUE WITH THE FOLLOWING. IF THE PERSON HAD A PROBLEM WITH THIS ANATOMICAL SECTION YOU QUESTION FIRST ON PROBLEM 1 ALL THE QUESTIONS ON THIS PAGE AND GO FURTHER IF HERE ARE MORE PROBLEMS]

G2.1. Chest / breast specifics:

Tell me what problem you have had
 Ii sheeg waxa dhibaato ah oo kaso gaadhay:

		Problem 1	Problem 2	Problem 3
Wound injury related	Nabar la xidhiidha dhawaca			
Wound not injury related	Nabar aan la xidhiidhin dhawaca			
Bum	Gubasho			
Breast mass / breast cancer	Fiirsho kaso baxa naaska / kansarka naasaha			
Deformity congenital	Igaqoosnaa qalooqsaan			
Deformity acquired	qalooqsaan ku heleen			

[Wound: Open skin, sometimes leaking blood, pus or liquid
 Deformity: An abnormal tissue arrangement, malformation
 Congenital: The person is born with the problem. Example: heart malformation
 Acquired: The person got the problem later in life]

G2.1.1 Type of injury / accident:

Did the problem started after an injury or accident? What kind of accident?
 Dhibaatooyin ma waxay kugu bilaab malay dhawaca mise shilka kade? Waxa Nooc mui aha shilku?
 [Pick the one that best describes the injury / accident. Pedestrian and bicycle crash definition: there was no motorized vehicle involved. All can be intentional or unintentional]

		Problem 1	Problem 2	Problem 3
No, it was not due to an injury / accident	Maya maha wax la xidhiidha dhawaca / shilka			
Car, truck, bus crash	Shil baabuur yar, amba baabuur xamuul ah amba bas			
Motorcycle crash	shil mode			
Pedestrian, bicycle crash	Shilka ka dhaca wadooyinka laga taalabo shil baaskillad			
Gunshot	Toogasho			
Stab / slash / cut / crush	Mind / xagtin / jarmid / burburin			
Bite or animal attack	Qaniyo ama weerar xayawaan			
Fall	Dhicid			
Open fire / explosion	dab kacay / qarax			
Hot liquid / hot object	dareere kulul/shayga kulul			

G3.1. Timing:

When did this problem start?
 Goormay dhibaatan kugu bilaab matay?

		Problem 1	Problem 2	Problem 3
In the last month	Bishi hore gudsheeds			
During the past 12 months but longer than a month ago	Sandi hore dhuksa in kabadan bil			
Between 1 and 3 years ago (after drought began)	Inta u dhaxaysa 1 ila 3 sano abaartii hore inta aanay bilaabmin			
Between 3 and 7 years ago (before drought, after last election)	3 ila 7 sano ka hore amab sbaartii kahor, ama doorashadi kadib			
More than 7 years ago (before last election)	In ka badan 7 sano ka hor / doorashadi hore			

G3.1.1 At this moment:

Do you have this problem now (or during the last week)?
 Ila hada dhibaatan may ku hasta, ama inta laguda jro toobaadkii la soo dhacay?

Yes	Haa	Problem 1	Problem 2	Problem 3
No	No			

Household Code: _____

Respondant: HH / C1 / C2

G4.1. Healthcare sought:

Did you go to a health facility or see a doctor/nurse for this problem?
 Maad u tagay xarun caafimaad ama aad aragto dhakhtar / kalsiye caafimaad dhibaatan?

Yes	Haa	Problem 1	Problem 2	Problem 3
No	Maya			

G4.1.1. Traditional Healer:

Did you go to a traditional healer, traditional doctor, witch doctor or bone setter for this problem?
 Maad u tagay xarun dawo dhaqameed ama dhakhtar dhaqan ama faaiye sii u xal ugu helo dhibaatan lafaha?

Yes	Haa	Problem 1	Problem 2	Problem 3
No	Maya			

G5.1. Type of healthcare received: [Only when 'Yes' to G4.1]

What kind of treatment did you receive?
 Wax maay/hooka daaweynta aad heshay?

		Problem 1	Problem 2	Problem 3
None / No surgical care	Waxba / mujrin daryeel qallin			
Major procedure = a procedure which requires regional/general anesthesia	Qalin culus = qaabka qalinka oo u baxna wada suuxin ama qayb			
Minor procedures = dressings, wound care, punctures, suturing and I&D	Qalin fadud = dheyimo, daryeel naber, in la dalooyay, la tooy			

G5.2. Cost of care: [only if G5.1 is major or minor procedure]

How much did you spend on the surgery?
 Kharash intee leeg ayaa kaga baxay qalinka?

Problem 1	Problem 2	Problem 3
-----------	-----------	-----------

G5.3. Money for healthcare: [only if G5.1 is major or minor procedure]

Did you raise money for surgery?
 Miyaad u urursatay lacag qalinka

Yes (had to use money for surgery)	Haa	Problem 1	Problem 2	Problem 3
No (did not have to pay money for surgery)	Maya			

G5.4. Raising money for healthcare: [only if G5.3 is yes]

How did you raise money for surgery? Check all that apply
 Side baad u urursatay lacagata qalinka

		Problem 1	Problem 2	Problem 3
Own savings	Lacag kayd ah			
Loans from relatives	Amash xagtada ah			
Medical insurance program	Barnaamijka caymiska caafimaadka			
Job paid for it	Ma mushaharka shaqada aad ka bixisay			
Loans from banks or other institutions	Amash bangi ama haydo kale			
Loans from moneylenders	Amah aad kaso qaadayay ganacsato			
Sold assets	Ma waxa aakiibisay Hantidaada			

G5.5 Assets sold for surgery: [only if 'sold assets' on G5.4 is checked]

What assets did you sell to pay for surgery?
 Maaxaad hanti u ibisay si aad iskaga bixiso qalinka

		Problem 1	Problem 2	Problem 3
Chickens or ducks	Digaag			
Small animals (goats/sheep)	Adhi [Ryo, idaj]			
Large animals (cows, buffaloes, camels)	Xoodo [o, qeel, dibayo]			
Bicycle	baaskillad			
Motorcycle or motor-scooter	dhuqdhugay			
Radio or TV	Radio/ow ama teelfeeshin			
Refrigerator	Talagad			
Washing machine	Qaasiad			
Car or tractor	Baabuur, cagaf cagaf			

G5.6. Did paying for this surgery affect your household's ability to pay for other household needs? [such as food, water, clothing, medicine]

Lacagata aad ku bixisay qalinka miyey saamayn ku yeelatay baahiyahe gurigaaga? (sida cunada, biyaha, dharka iyo daawooyinka)
 [only answer if child HAD surgery, major or minor]

Yes	Haa	Problem 1	Problem 2	Problem 3
No	Maya			

Household Code: _____

Respondant: HH / C1 / C2

G6.1. Reason for not having surgical care: *(Answer if they did NOT get surgery or did NOT go to healthcare facility)*
 What was the main reason not to go to a health facility to see a doctor/nurse or not to have an operation or dressings?
 Maxay tahay sababta ugu weyn ee aanad u tagin xarun caafimaad si aad u aragto dhakhtar, kalskaaher/kalkalsiso caafimaad adoon qalin galeen ama lagu dhayeen
(If the person went to a traditional healer ask why (s)he didn't go to a health care facility and mark that as the answer. If the person was referred but did not go to the referral hospital, mark the answer why (s)he did not go here.)

		Problem 1	Problem 2	Problem 3
No money for health care	Ma haysto lacag aan ku lago xarun caafimaad			
No (money for) transportation	Ma haysto lacag aan ku rraaco gaadiid			
No time	Waxa aan u wayay waqtii			
Fear / no trust	Cabsi/kaal sooni dero			
Not available (facility/personnel/equipment)	Lama helin adeegy/gorku / qalab			
No need	Looma baahna			

G7.1. Disability:
 Does this problem still impact your daily life?
 Miyay la hada dhibaatan wali saameyn ku leedahay nolol maalmeedkaaga?

		Problem 1	Problem 2	Problem 3
The condition is not disabling	Xaaladu maha wax naafo sababaya			
I feel ashamed	Waan ka wisoona			
I'm not able to work like I used to	Ma awoodo inaan socdo sidadan hore ugu socon jiray			
I need help with transportation	Waxaan u bahanay in laga caawiyo kharshaks gaadidka			
I need help with daily living	Waxaan u bahanay caawin maalin kasata			

(Disability: a physical problem that impacts your life, or makes it difficult to carry out your daily activities.)
ASK IF THE PERSON HAD ANOTHER PROBLEM REGARDING THIS ANATOMICAL LOCATION. IF SO, GO TO THE FOLLOWING ROW, PROBLEM 2 OR 3, TO REGISTER THIS PROBLEM. IF THERE ARE NO OTHER PROBLEMS REGARDING TO THIS LOCATION YOU CAN GO TO THE FOLLOWING ANATOMICAL LOCATION. IN CASE OF MORE THAN 3 PROBLEMS, MARK THE ONES WHICH ARE MOST RESENT AND MOST RELEVANT FOR THE REPONDENT)

Household Code: _____

Respondant: HH / C1 / C2

H. BACK

H1. Back:
 Have you ever had a wound, burn, mass, deformity, or an operation on your back?
 Weligaa nabar ma yeelatay, ama ma gubalay, ama fix naaska ma kasoo baxday, qaab badal ma ku dhacay jidhkaaga, qalin ma lagu sameeyay dhawacaaga

Yes	Haa
No	Maya

(If there were/are no problems with this anatomical section you can continue with the following. If the person had a problem with this anatomical section you question first on problem 1 all the questions on this page and go further if there are more problems)

H1.1.1 Show picture portfolio

Pathology selected from picture	Problem 1	Problem 2	Problem 3
Meningocele			

H2.1. Back specifics:

Tell me what problem you have had.
 Ii sheeg waxa dhibaato ah oo kaso gaadhay.

		Problem 1	Problem 2	Problem 3
Wound injury related	Nabar la xidhiidha dhaawaca			
Wound not injury related	Nabar aan la xidhiidhin dhaawaca			
Burn	Gubasho			
Mass or growth / gater	Fix ama korysa / fix cunaha ah			
Deformity congenital	Qaab badal / uu ku dhasho, gorku			
Deformity acquired	Qaab badal ah oo ku dhaca qof marku dhasho			

*(Wound: Open skin, sometimes leaking blood, pus or liquid
 Deformity: An abnormal tissue arrangement, malformation
 Congenital: The person is born with the problem (spina bifida, scoliosis)
 Acquired: The person got the problem later in life)*

H2.1.1 Type of injury / accident:

Did the problem started after an injury or accident? What kind of accident?
 Dhibaateenii ma waxay kugu bilaab mayay dhaawaca mise shiika kade? Waa Hore muu aha shiiku?
(Pick the one that best describes the injury / accident. Pedestrian and bicycle crash definition: there was no motorized vehicle involved. All can be intentional or unintentional.)

		Problem 1	Problem 2	Problem 3
No, it was not due to an injury / accident	Maya maha wax la xidhiidha dhaawaca / shiika			
Car, truck, bus crash	Esabuur yar, gaari samuul ah, shil bus			
Motorcycle crash	shil mooto			
Pedestrian, bicycle crash	Shiika ka dhaca wadooyinka laga taalabo			
Gunshot	Toogasho			
Stab / slash / cut / crush	Mindi / xaqim / jarmid / burburin			
Bite or animal attack	Qanihiyo / weerar xaywsan			
Fall	Dhiid			
Open fire / explosion	diab kacay / qarax			
Hot liquid / hot object	dareere kulul / shayga kulul			

H3.1. Timing:

When did this problem start?
 Goormay dhibaatan kugu bilaab matay

		Problem 1	Problem 2	Problem 3
In the last month	Bishi hore gudaheeda			
During the past 12 months but longer than a month ago	Sandi hore, dhexdisa in kabadan bil			
Between 1 and 3 years ago (after drought began)	inta u dhaxaysa 1 ila 3 sano abaarti hore inta aanay bilaabmin			
Between 3 and 7 years ago (before drought, after last election)	3 ila 7 sano ka hore imaab abaarati ka hor, ama doorshadi kadi			
More than 7 years ago (before last election)	In ka badan 7 sano ka hor (dorashadi hore)			

H3.1.1 At this moment:

Do you have this problem now (or during the last week)?
 Ila hada dhibaatanii may ku hasta ama inta laguda jiro todobaadkii la soo dhafay?

Yes	Haa	Problem 1	Problem 2	Problem 3
No	Maya			

Household Code: _____

Respondant: HH / C1 / C2

H4.1. Healthcare sought:

Did you go to a health facility or see a doctor/nurse for this problem?
 Mead u tagay xarun dawo dhacameed ama dhakhtar/ dhaqan ama faalye. Si u xal ugu helo dhibaataadan. Iafaha?

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	No			

H4.1.1. Traditional Healer:

Did you go to a traditional healer, traditional doctor, witch doctor or bone setter for this problem?
 Mead u tagay xarun dawo dhacameed ama dhakhtar/ dhaqan ama faalye. Si u xal ugu helo dhibaataadan. Iafaha?

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	No			

H5.1. Type of healthcare received: *[Only when 'Yes' to H4.1]*

What kind of treatment did you receive?
 Waa maxay nooca dawaynta aad heshay?

		Problem 1	Problem 2	Problem 3
None / No surgical care	Waxba / mujirin daryeel qalin			
Major procedure = a procedure which requires regional/general anesthesia	Qalin culus = qaabka qalinka oo u bahana wada suuxin ama qayb			
Minor procedures = dressings, wound care, punctures, suturing and I&D	Qalin fudud = dhaymo, daryeel nabar, in la daboolay, la tolay			

H5.2. Cost of care: *[only if H5.1 is major or minor procedure]*

How much did you spend on the surgery?
 Khaash intee leeg ayaa kaga baxay qalinka?

	Problem 1	Problem 2	Problem 3

H5.3. Money for healthcare: *[only if H5.1 is major or minor procedure]*

Did you raise money for surgery?
 Miyaad u unursatay lacag qalinka

	Problem 1	Problem 2	Problem 3
Yes (had to use money for surgery)	Haa		
No (did not have to pay money for surgery)	Maya		

H5.4. Raising money for healthcare: *[only if H5.3 is yes]*

How did you raise money for surgery? Check all that apply
 Side baad uso unursatay lacagta qalinka

		Problem 1	Problem 2	Problem 3
Own savings	Lacag kayd ah			
Loans from relatives	Amash xigda ah			
Medical insurance program	Barnamijka caymiska ee caafimaadka			
Job paid for it	Ma mushaharka shaqada aad ka bixisay			
Loans from banks or other institutions	Amash bangi ama hay'ad kale			
Loans from moneylenders	Amah aad kaso qaadatay ganacsato			
Sold assets	Ma waxa aadiisay Hantidaada			

H5.5 Assets sold for surgery: *[only if "sold assets" on H5.4 is checked]*

What assets did you sell to pay for surgery?
 Meacaad hanti u libisay si aad iskaga bixiso qalinka

		Problem 1	Problem 2	Problem 3
Chickens or ducks	Digaag			
Small animals (goats/sheep)	Adhi (fiyo, idjo)			
Large animals (cows, buffaloes, camels)	Xoolo sida/ lo qeel iyo dibi			
Bicycle	Baaskiied			
Motorcycle or motor-scooter	Dhugdhuuglay			
Radio or TV	Raadiyow ama telefishin			
Refrigerator	Talaagad			
Washing machine	Qaasalad			
Car or tractor	Baabuur ama cafoqaf			

H5.6. Did paying for this surgery affect your household's ability to pay for other household needs? *[such as food, water, clothing, medicine]*

Lacagta aad ku bixisay qalinka miyeey saamayn ku yeelatay baahiyaha gurigaaga? (sida cunada, biyaha, dharka iyo dawacoyinka)

[only answer if child HAD surgery, major or minor]

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

Household Code: _____

Respondant: HH / C1 / C2

H6.1. Reason for not having surgical care: *[Answer if they did NOT get surgery or did NOT go to healthcare facility]*

What was the main reason not to go to a health facility to see a doctor/nurse or not to have an operation or dressings?
 Maxay tahay sababta ugu weyn ee aanad u tagin xarun caafimaad si aad u aragto dhakhtar, kalsooye/ kalsoo caafimaad adoon qalin galeen ama legu dhayeen

[If the person went to a traditional healer ask why (s/he didn't go to a health care facility and mark that as the answer. If the person was referred but did not go to the referral hospital, mark the answer why (s/he did not go here.)]

		Problem 1	Problem 2	Problem 3
No money for health care	Ma haysto lacag aan ku lago xarun caafimaad			
No (money for) transportation	Ma haysto lacag aan ku rraaco gaadiid			
No time	Waxa aan u wayay waqtii			
Fear / no trust	Cabsi/ ka/ sooni darro			
Not available (facility/personnel/equipment)	Lama helin adeeg/qolka/ qalab			
No need	Looma baahna			

H7.1. Disability:

Does this problem still impact your daily life?

Miyeey la hada dhibaataadan weli saameyn ku leedahay nolol maalmeedkaaga?

		Problem 1	Problem 2	Problem 3
The condition is not disabling	Xaaladu maha wax naafo sababaya			
I feel ashamed	Waan ka xishooday			
I'm not able to work like I used to	Ma awoodo inaan socdo sidaaadan hore ugu socan jiray			
I need help with transportation	Waxaan u bahanyi in layga caawiyoo kharshaka gaadidka			
I need help with daily living	Waxaan u bahanyi caawin maalin kasata			

[Disability: a physical problem that impacts your life, or makes it difficult to carry out your daily activities.]

ASK IF THE PERSON HAD ANOTHER PROBLEM REGARDING THIS ANATOMICAL LOCATION. IF SO, GO TO THE FOLLOWING ROW PROBLEM 2 OR 3, TO REGISTER THIS PROBLEM. IF HERE ARE NO OTHER PROBLEMS REGARDING TO THIS LOCATION YOU CAN GO TO THE FOLLOWING ANATOMICAL LOCATION. IN CASE OF MORE THAN 3 PROBLEMS, MARK THE ONES WHICH ARE MOST RESENT AND MOST RELEVANT FOR THE RESPONDENT]

1.1 DEFINITION

1.1.1. Meningomyelocele (Child was born with a wound or swelling on the back)

Pathology from clinical exam

	Problem 1	Problem 2	Problem 3
Meningomyelocele			

Household Code: _ _ _ _ _

Respondant: HH / C1 / C2

I. ABDOMEN

H. Abdomen:

Have you ever had a wound, bum, mass, deformity, inability to urinate, bleeding from your bottom, abdominal delivery, or an operation on your abdomen?

Weelgaa nabar ma yeelatay ama ma gubtay ama fix ma kasoo baxday, qaab badal ma ku dhacay jidhkaaga kadiddu ma kugu adkaatay, dhiiga ma kaayimi dabade, lagu qalay ilmo ama qalin ma lagu sameeyay calooshada

Yes	Haa
No	Maya

[If there were/are no problems with this anatomical section you can continue with the following. If the person had a problem with this anatomical section you question first on problem 1 all the questions on this page and go further if there are more problems]

H.1.1 Show picture portfolio

Pathology selected from picture

Umbilical hernia	Problem 1	Problem 2	Problem 3
Patent urachus			

I2.1. Abdomen specifics:

Tell me what problem you have had
Ii sheeg waxa dhabsato ah oo kasoo gaadhay

Wound injury related	Nabar la xidhiidh dhaawaca	Problem 1	Problem 2	Problem 3
Wound not injury related	Nabar aan la xidhiidhin dhaawaca			
Burn	gubasho			
Mass or growth (solid)	Mass ama komaanka (reducible/ilicsan)			
Mass or growth (soft/reducible)	lagu dhusho qalooqaan			
Deformity congenital	Qaab badal oo qofku ku dhacay			
Deformity acquired	Qaab badal oo ku dhacay qofka marku dhahshay kadid			
Abdominal distention or pain	Dibiro caloosha ah / xanuun			
Inability to urinate	Miyu kaji sira			
Bleeding (per rectum)	Miyu dhiig ka yimaada xage danbe			
Bleeding (per penis)	buuryada miyu dhiig ka yimaada			
Obstructed delivery	Dhalmadi oo adkaatay			

I2.1.1 Type of injury / accident:

Did the problem started after an injury or accident? What kind of accident?

Dhibaataadani ma waxay kugu bilaab markay dhaawaca mise shilka kadib? Was Nooc muu aha shilku?

[Pick the one that best describes the injury / accident. Pedestrian and bicycle crash definition: there was no motorized vehicle involved. All can be intentional or unintentional]

No, it was not due to an injury / accident	Maya maha wax la xidhiidha dhaawaca / shilka	Problem 1	Problem 2	Problem 3
Car, truck, bus crash	Baabuur yar, gaari xamuul ah, shil bus			
Motorcycle crash	shil mooto			
Pedestrian, bicycle crash	Shilka ka dhaca wadooyinka laga taalabo			
Gunshot	Toogasho			
Stab / slash / cut / crush	Mindi / xaqiin / jirrid / burburin			
Bite or animal attack	Qaniinyo / weerar xaywaan			
Fall	Dhicid			
Open fire / explosion	dab kacay / qarax			
Hot liquid / hot object	dareere kulul / shayga kulul			

I3.1. Timing:

When did this problem start?

Goormay dhibaataadan kugu bilaab matsay?

In the last month	Bishi hore gudaheeda	Problem 1	Problem 2	Problem 3
During the past 12 months but longer than a month ago	Sandi hore dhexdisa in kabadan bil			
Between 1 and 3 years ago (after drought began)	Inta u dhaxaysa 1 ila 3 sano abaarti hore inta aanay bilaabmin			
Between 3 and 7 years ago (before drought, after last election)	3 ila 7 sano ka hore amab abaarati ka hor, ama doorshadi kadib			
More than 7 years ago (before last election)	In ka badan 7 sano ka hor (dorarshadi hore)			

Household Code: _ _ _ _ _

Respondant: HH / C1 / C2

I3.1.1 At this moment:

Do you have this problem now (or during the last week)?

Ila hadda dhibaataadi mayku hadda ama inta laguda jiro toddobaadkii la soo dhafshay?

Yes	Haa	Problem 1	Problem 2	Problem 3
No	Maya			

I4.1. Healthcare sought:

Did you go to a health facility or see a doctor/nurse for this problem?

Mead u tagtay xarun caafimaad ama aad aragto dhakhtar / kakaalaye caafimaad dhibaataadan?

Yes	Haa	Problem 1	Problem 2	Problem 3
No	No			

I4.1.1. Traditional Healer:

Did you go to a traditional healer, traditional doctor, witch doctor or bone setter for this problem?

Mead u tagtay xarun dawo dhaqameed ama dhakhtar qadhaan ama kaalaye shi u xal ugu helo dhibaataadan lafaha?

Yes	Haa	Problem 1	Problem 2	Problem 3
No	No			

I5.1. Type of healthcare received:

[Only when 'Yes' to I4.1]

What kind of treatment did you receive?

Was maxay nooca daweynta aad heshay?

None / No surgical care	Waxba / muujin darjeel qalinn	Problem 1	Problem 2	Problem 3
Major procedure = a procedure which requires regional/general anesthesia	Qalin culus = qaabka qalinka oo u bahana wada suuxin ama qyib			
Minor procedures = dressings, wound care, punctures, suturing and I&D	Qalin fudud = dhaymo, darjeel nabar, in la daboolay, la tolay			

I5.2. Cost of care: *[only if I5.1 is major or minor procedure]*

How much did you spend on the surgery?

Kharash intee leeg ayaa kaga baxay qalinka?

Problem 1	Problem 2	Problem 3

I5.3. Money for healthcare: *[only if I5.1 is major or minor procedure]*

Did you raise money for surgery?

Miyaad u urursatay lacag qalinka

Yes (had to use money for surgery)	Haa	Problem 1	Problem 2	Problem 3
No (did not have to pay money for surgery)	Maya			

I5.4. Raising money for healthcare: *[only if I5.3 is yes]*

How did you raise money for surgery? Check all that apply

Side baad uso urursatay lacagata qalinka

Own savings	Lacag kayd ah	Problem 1	Problem 2	Problem 3
Loans from relatives	Amah xigada ah			
Medical insurance program	Bismayika caymiska ee caafimaadka			
Job paid for it	Ma mushaharka shaqada aad ka bixisay			
Loans from banks or other institutions	Amah bangi ama hay'ad kale			
Loans from moneylenders	Amah aad kasoo qaadatay ganacsato			
Sold assets	Ma waxa aadiibay Hantidada			

I5.5. Assets sold for surgery: *[only if 'sold assets' on I5.4 is checked]*

What assets did you sell to pay for surgery?

Maaxaad hanti u ibisay si aad iskaaga bixiso qalinka

Chickens or ducks	Digaag	Problem 1	Problem 2	Problem 3
Small animals (goats/sheep)	Adhi (Riyo, ido)			
Large animals (cows, buffaloes, camels)	Xoolo sidaj to qeel iyo dibi			
Bicycle	Baaskiilad			
Motorcycle or motor-scooter	Dhuqduhlay			
Radio or TV	Raadiyow ama telefeshin			
Refrigerator	Talaagad			
Washing machine	Dasaalad			
Car or tractor	Baabuur ama cagaagaf			

Household Code: _ _ _ _

Respondant: HH / C1 / C2

I5.6. Did paying for this surgery affect your household's ability to pay for other household needs? *[such as food, water, clothing, medicine]*
 Lacagta aad ku bilsay qallinka miyey saamayn ku yeelatay baahiyaha gurigaaga? (sida cunsada biyaha dharka iyo daawooyinka)
[only answer if child HAD surgery, major or minor]

	Yes	Haa	Problem 1	Problem 2	Problem 3
	No	Maya			

I6.1. Reason for not having surgical care: *[Answer if they did NOT get surgery or did NOT go to health care facility]*
 What was the main reason not to go to a health facility to see a doctor/nurse or not to have an operation or dressings?
 Maxay tahay sababla ugu weyn ee aanad u tagin xarun caafimaad si aad u aragto dhakhtar, kallealiye/kallealiso caafimaad, adoon qalin geleen ama lagu dhayeen
[If the person went to a traditional healer ask why (s)he didn't go to a health care facility and mark that as the answer. If the person was referred but did not go to the referral hospital, mark the answer why (s)he did not go here.]

		Problem 1	Problem 2	Problem 3
No money for health care	Ma haysto lacag aan ku lago xarun caafimeed			
No (money for) transportation	Ma haysto lacag aan ku rraaco gaadiid			
No time	Waxa aan u wayay waqt			
Fear / no trust	Cabsi / kai sooni darta			
Not available (facility/personnel/equipment)	Lama helin adeeg / qofka / qalab			
No need	Looma baahna			

I7.1. Disability:
 Does this problem still impact your daily life?
 Miyay ita hada dhibaatanadii weli saameyn ku leedahay nolol maalmeedkaaga?

		Problem 1	Problem 2	Problem 3
The condition is not disabling	Xaaladu maha wax naafo sababaha			
I feel ashamed	Waan ka xishoonay			
I'm not able to work like I used to	Ma awoodo inaan socdo sidaadan hore ugu socan jiray			
I need help with transportation	Waxaan u bahansay inayga caawiyoo kharshaka gaadidka			
I need help with daily living	Waxaan u bahansay caawin maalin kasata			

[Disability: a physical problem that impacts your life, or makes it difficult to carry out your daily activities.]
ASK IF THE PERSON HAD ANOTHER PROBLEM REGARDING THIS ANATOMICAL LOCATION. IF SO, GO TO THE FOLLOWING ROW PROBLEM 2 OR 3. TO REGISTER THIS PROBLEM. IF THERE ARE NO OTHER PROBLEMS REGARDING TO THIS LOCATION YOU CAN GO TO THE FOLLOWING ANATOMICAL LOCATION. IN CASE OF MORE THAN 3 PROBLEMS, MARK THE ONES WHICH ARE MOST RESENT AND MOST RELEVANT FOR THE RESPONDENT

- 2.1 DEFINITION
- 2.1.1. Umbilical hernia [Congenital defect in umbilical cicatrix (without) reducible swelling - palpation]
- 2.1.2. Patent urachus [Congenital urinary leakage from the umbilicus - inspection]

Pathology from clinical exam

	Problem 1	Problem 2	Problem 3
Umbilical hernia			
Patent urachus			

Household Code: _ _ _ _

Respondant: HH / C1 / C2

J. GROIN / GENITALIA / BUTTOCKS (TAB: Survey Part III)

J1. Groin / genitalia / buttocks:
 Have you ever had a wound, bum, mass, deformity, leaking of urine or feces, bleeding from your bottom, bleeding from your penis, or an operation on your groin, genitalia or buttocks?
 Weligaa nabad ma yeelatay ama ma gubtay ama fix ma kasoo baxday, isku furan ma kugu dhacay, dhiig ma kaymi xaga danabe, ama dhiig ka yimi buuryada, ama qalbi lagu sameeyay sarcanta

	Yes	Haa
	No	Maya

J1.1 Show picture portfolio
 Pathology selected from picture

	Problem 1	Problem 2	Problem 3
Hypospadias			
Hydrocele			
Chordee			
Inguinal hernia			
Undescended testes			

J2.1. Groin / genitalia specific:
 Tell me what problem you have had
 ii sheeg waxa dhibaato ah oo keso gaadhay:

		Problem 1	Problem 2	Problem 3
Wound due to an injury	Nabar la xidhiidha dhaawaca			
Wound not due to an injury	Nabr aan la xidhiidhin dhaawaca			
Bum	Sabasho			
Mass or growth (solid) [testicular cancer or hydrocele/cystocele]	Fixkorysyo oo ad kaagay sida kansarka ku dhaca xiyaha ama fix biyoodka ku dhaca xiyaha			
Mass (soft or reducible) [inguinal hernia]	Bog dhaca			
Deformity congenital	Qaab badaln oo qofku ku dhacay			
Deformity acquired	Qaab badaln oo qofku ku dhaca marku dhacay			
Leaking of urine or feces (like fistula)	Duysyo kaadida ama saxarada (sida fistula)			
Bleeding (per rectum)	Miyuu dhiig ka yimaada xaga dabada			
Bleeding (from the penis)	Buuryada miyuu dhiig ka yimaada			

[Deformity: An abnormal tissue arrangement, malformation]
Congenital: The person is born with the problem. Think about: born without anus, hypospadias, meatal stenosis, undescended testes, chordee, etc.
Acquired: The person got the problem later in life

J2.1.1 Type of injury / accident:
 Did the problem started after an injury or accident? What kind of accident?
 Dhibaatanadii ma waxay kugu bilaab matay dhaawaca mise shika kadib? Waa Noo muu aha shiku?

		Problem 1	Problem 2	Problem 3
No, it was not due to an injury / accident	Maya maha wax la xidhiidha dhaawaca / shika			
Car, truck, bus crash	Baabuur yar - gaari xamuul ah, shil bus			
Motorcycle crash	shil mooto			
Pedestrian, bicycle crash	Shika ka dhaca wadooyinka laga taalabo shil baaskilad			
Gunshot	Toogasho			
Stab / slash / cut / crush	Mindi / xaqtin / jarrid / burburin			
Bite or animal attack	Daniinyo / weerar xayawaan			
Fall	Dhoof			
Open fire / explosion	dab kacay / qarax			
Hot liquid / hot object	dareere kulul / shayga kulul			

[Pick the one that best describes the injury / accident. Pedestrian and bicycle crash definition: there was no motorized vehicle involved. All can be intentional or unintentional.]

J3.1. Timing:
 When did this problem start?
 Goorma dhibaatanadii bilaab matay?

		Problem 1	Problem 2	Problem 3
In the last month	Bishi hore gudaheeda			
During the past 12 months but longer than a month ago	Sandi hore dhexdisa in kabadan bil			
Between 1 and 3 years ago (after drought began)	Inta u dhaxaysa 1 ila 3 sano abaarti hore inta aanay bilaabmin			
Between 3 and 7 years ago (before drought, after last election)	3 ila 7 sano ka hore amab abaarti ka hor, ama doorshadi kadib			
More than 7 years ago (before last election)	In ka badan 7 sano ka hor / dorashadi hore			

Household Code: _____

Respondant: HH / C1 / C2

J3.1.1 At this moment:
Do you have this problem now (or during the last week)?
Ila hada dhiba'adi mayku hadda ama inta laguda jiro/dobaadkii la soo dhafsay?

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

J4.1. Healthcare sought:
Did you go to a health facility or see a doctor/nurse for this problem?
Maad u tagtay xarun caafimaad ama aad aragto dhakhtar / kalkaalaye caafimaad dhiba'adadan?

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

J4.1.1. Traditional Healer:
Did you go to a traditional healer: traditional doctor, witch doctor or bone setter for this problem?
Maad u tagtay xarun dawo dhaqameed ama dhakhtar dhaqan ama faalaye: si u xal ugu helo dhiba'adadan lafaha?

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

J5.1. Type of healthcare received: [Only when 'Yes' to J4.1]
What kind of treatment did you receive?
Waa maxay nooca daweeyinta aad heshay?

		Problem 1	Problem 2	Problem 3
None / No surgical care	Waxba / mujirn daryeel qalin			
Major procedure = a procedure which requires regional/general anesthesia	Qalin culus = qaabka qalinka oo u bahana wada suuxin ama qayb			
Minor procedures = dressings, wound care, punctures, suturing and I&D	Qalin fudud = dhaymo, daryeel nabar, in la daloolay, la tolay			

J5.2. Cost of care: [only if 5.1 is major or minor procedure]
How much did you spend on the surgery?
Kharash intee leeg ayaa kaga baxay qalinka?

		Problem 1	Problem 2	Problem 3
Yes (had to use money for surgery)	Haa			
No (did not have to pay money for surgery)	Maya			

J5.3. Money for healthcare: [only if 5.1 is major or minor procedure]
Did you raise money for surgery?
Miyaaad u unursatay lacag qalinka

		Problem 1	Problem 2	Problem 3
Yes (had to use money for surgery)	Haa			
No (did not have to pay money for surgery)	Maya			

J5.4. Raising money for healthcare: [only if J5.3 is yes]
How did you raise money for surgery? Check all that apply
Side baad uo unursatay lacag qalinka

		Problem 1	Problem 2	Problem 3
Own savings	Lacan ka'yid ah			
Loans from relatives	Amash xigada ah			
Medical insurance program	Barnamijka caymiska ee caafimaadka			
Job paid for it	Ma mushaharka sheqada aad ka bidisay			
Loans from banks or other institutions	Amash bangi ama hay'ad kale			
Loans from moneylenders	Amash aad kaso qaaday garacado			
Sold assets	Ma waxa aad bidisay Hantidaada			

J5.5 Assets sold for surgery: [only if 'sold assets' on J5.4 is checked]
What assets did you sell to pay for surgery?
Maaxaad hanti u libisay si aad iskaga bixiso qalinka

		Problem 1	Problem 2	Problem 3
Chickens or ducks	Digaag			
Small animals (goats/sheep)	Adhi [Riyo, iddi]			
Large animals (cows, buffaloes, camels)	Xoolo xidid lo geel iyo dibi			
Bicycle	Baaski'ad			
Motorcycle or motor-scooter	Dhugdhuglay			
Radio or TV	Raadiyow ama telefishin			
Refrigerator	Talaagad			
Washing machine	Qasaalad			
Car or tractor	Baabuur ama cagaaf			

Household Code: _____

Respondant: HH / C1 / C2

J5.6. Did paying for this surgery affect your household's ability to pay for other household needs? [such as food, water, clothing, medicine]
Lacagta aad ku bidisay qalinka miyey saamayn ku yeelatay baahiyaha gurigaaga? (sida cunsada, biyaha, dharka iyo daawooyinka)
[only answer if child HAD surgery, major or minor]

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

J6.1. Reason for not having surgical care: [Answer if they did NOT get surgery or did NOT go to healthcare facility]
What was the main reason not to go to a health facility to see a doctor/nurse or not to have an operation or dressings?
Maxay tahay sababta ugu weyn ee aanad u tegin xarun caafimaad si aad u aragto dhakhtar. Kalkaalaye/kalkaaliso caafimaad adoon qalin geleen ama lagu dhayeen
[If the person went to a traditional healer ask why (s)he didn't go to a health care facility and mark that as the answer. If the person was referred but did not go to the referral hospital, mark the answer why (s)he did not go here.]

		Problem 1	Problem 2	Problem 3
No money for health care	Ma haysto lacag aan ku tago xarun caafimaad			
No (money for) transportation	Ma haysto lacag aan ku raaco gaadid			
No time	Waa aan u wayay wadgi			
Fear / no trust	Cabsi/feeli sooni darto			
Not available (facility/personnel/equipment)	Lama helin adeeg/qofkii/qalab			
No need	Looma baahna			

J7.1. Disability:
Does this problem still impact your daily life?
Miyay ilaa hada dhiba'adadan weii saameyn ku leedahay nolol maalmoodkaaga?

		Problem 1	Problem 2	Problem 3
The condition is not disabling	Xaaladu maha wax nafo sababaya			
I feel ashamed	Waan ka xishoonaya			
I'm not able to work like I used to	Ma awoodo inaan socdo sideadan hore ugu socan jiray			
I need help with transportation	Waxaan u bahansay in laayo caawiyo kharshaka gaadidka			
I need help with daily living	Waxaan u bahansay caawin maalin kasata			

[Disability: a physical problem that impacts your life, or makes it difficult to carry out your daily activities.]

[ASK IF THE PERSON HAD ANOTHER PROBLEM REGARDING THIS ANATOMICAL LOCATION. IF SO, GO TO THE FOLLOWING ROW, PROBLEM 2 OR 3, TO REGISTER THIS PROBLEM. IF THERE ARE NO OTHER PROBLEMS REGARDING TO THIS LOCATION YOU CAN GO TO THE FOLLOWING ANATOMICAL LOCATION. IN CASE OF MORE THAN 3 PROBLEMS, MARK THE ONES WHICH ARE MOST PRESENT AND MOST RELEVANT FOR THE RESPONDENT]

- 3.1. DEFINITION
- 3.1.1. Hypospadias (Congenital location of urethral meatus on the penile ventral surface - inspection, palpation)
- 3.1.2. Congenital Chordee (pre circumcision) (Congenital ventral or dorsal curvature of the penile shaft - inspection, palpation)
- 3.1.3. Hydrocele (Congenital fluid containing) swelling around the testes or groin)
- 3.1.4. Undescended testis (Congenital absence of the testis in the scrotum - palpation)
- 3.1.5. Inguinal/inguinoscrotal hernia (Congenital groin or inguinoscrotal swelling, reducible ± silk glove sign - palpation)

	Problem 1	Problem 2	Problem 3
Hypospadias			
Hydrocele			
Chordee			
Inguinal hernia			
Undescended testes			

Household Code: _____

Respondant: HH / C1 / C2

K. EXTREMITIES

K1. Extremities:

Have you ever had an injury, burn, wound, mass, deformity, broken bone, or an operation on your hands, feet, arms, or legs?
Weliga ma ku dhacay naber ama ma gubalay, fikma kaso baxaday, laf ma ku jabtay ama malagu sa meeyay qalin lugahaga ama gaamahaaga

[If there were/are no problems with this anatomical section you can continue with the following. If the person had a problem with this anatomical section you question first on problem 1 all the questions on this page and go further if there are more problems]

K1.1.1 Show picture portfolio
 Pathology selected from picture

	Problem 1	Problem 2	Problem 3
Congenital clubfoot			
Polydactyl			
Syndactyl			

K2.1. Extremity location:

On what part of your body did the problem occur?
 Oo qayb tee bay kaga dhacday dhibaataadu jidh kaaga ?

		Problem 1	Problem 2	Problem 3
Thumb / Hand	Sulka/gacanta			
Lower arm	Gacanta qaarka hose			
Upper arm	Gacanta qaarka are			
Foot	luga			
Lower leg	Lugate qaarka hose			
Upper leg	Lugate qaarka sare			

[If the problem is right and left, make two separate tabs to document the problem.]
[If the problem is based on a joint you need to choose the most proximate location to the abdomen.]
For example: an elbow fracture is documented as the upper arm, a knee skin contracture is documented as the upper leg.]

K3.1. Extremity specifics:

Tell me what problem you have had.
 Ii sheeg waxa dhibaato ah oo kaso gaadhay?

		Problem 1	Problem 2	Problem 3
Wound injury related	dhaawac nabarka la xiriira			
Wound not injury related	dhaawaca aan dhaawac la xiriira			
(Recurrent) drainage / discharge	(Dagaanaayeen qoyas) dheecaan / dheecaan			
Bum	Guba			
Mass growth	Fih koryas			
Deformity congenital	Qaab badaln oo qofku ku dhacay			
Deformity acquired	Qaab badaln oo qofku ku dhac marku dhacsho			

[(Recurrent) drainage / discharge from small sore or opening in the skin: a high suspicion for osteomyelitis, infected bone deformity. An abnormal tissue arrangement, malformation]
Congenital: The person is born with the problem. Think about: clubfoot, congenital dislocation of the hip, absent radius, absent tibia/fibula, shortened femur.
Acquired: The person got the problem later in life. Think about: broken bones and scar contractures]

K3.1.1 Type of injury / accident:

Did the problem started after an injury or accident? What kind of accident?
 Dhibaataadani ma waxay kugu bilaab malay dhawaca mise shilka kade? Wasa hooc ma aha shilku ?
[Pick the one that best describes the injury / accident. Pedestrian and bicycle crash definition: there was no motorized vehicle involved. All can be intentional or unintentional.]

		Problem 1	Problem 2	Problem 3
No, it was not due to an injury / accident	Maya maha wax la xidhiidha dhawaca / shilka			
Car, truck, bus crash	Baabuur yar, gari xamuul ah, shil bus			
Motorcycle crash	shil mooto			
Pedestrian, bicycle crash	Shilka ka dhaca wadooyinka laga taalabo, shil baaskilad			
Gunshot	Toogasho			
Stab / slash / cut / crush	Mindi /xaqin / jarrid / burburin			
Bite or animal attack	Qaninyo / weerat xaywaan			
Fall	Dhicid			
Open fire / explosion	dab kacay / qarax			
Hot liquid / hot object	dareere kulul / sheyga kulul			

Household Code: _____

Respondant: HH / C1 / C2

K4.1. Timing:

When did this problem start?
 Sooma dhibaataadii bilasb malay?

		Problem 1	Problem 2	Problem 3
In the last month	Bishi hore qudaheeda			
During the past 12 months but longer than a month ago	Sandi hore, dhexdise in kabadan bil			
Between 1 and 3 years ago (after drought began)	inta u dhaxaysa 1 ila 3 sano abaari hore inta aanay bilaabmin			
Between 3 and 7 years ago (before drought, after last election)	3 ila 7 sano ka hore amaabaarati ka hor, ama doorshadi ka dib			
More than 7 years ago (before last election)	In ka badan 7 sano ka hor [dogaahadi hore]			

K4.1.1 At this moment:

Do you have this problem now (or during the last week)?
 Ila hadda dhibaataadii mayku hadda ama inta taguda jiro dhibaadkii la soo dhacay?

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

K5.1. Fracture:

Did you break a bone or dislocate a joint?
 Maka jabtay laf ama ma iska shaafaday kalgaoyiska

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

K6.1. Healthcare sought:

Did you go to a health facility or see a doctor/nurse for this problem?
 Maad u tagtay xarun caafmaad ama aad aragto dhakhtar /kaikaaliye caafmaad dhibaataadan ?

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

K6.1.1. Traditional Healer:

Did you go to a traditional healer, traditional doctor, witch doctor bone setter for this problem?
 Mead u tagtay xarun dawo dhacameed ama dhakhtar dhaqan ama faaliye, sii u xal ugu helo dhibaataadan lafaha ?

		Problem 1	Problem 2	Problem 3
Yes	Haa			
No	Maya			

K7.1. Type of healthcare received:

What kind of treatment did you receive?
 Wasa maxay nooca daweynta aad ku heshay? *[Only when 'Yes' to K6.1]*

		Problem 1	Problem 2	Problem 3
None / No surgical care	Waxba / mujirin daryeel qallin			
Major procedure = a procedure which requires regional/general anesthesia	Qalin culus = qasbka qalinka oo u bahana wada suuxin ama qayb			
Minor procedures = dressings, wound care, punctures, suturing and I&D	Qalin fudud = dhaymo, daryeel naber, in la daloolay, la tolay			

K7.2. Cost of care: [only if K7.1 is major or minor procedure]

How much did you spend on the surgery?
 Kharash intee leeg ayaa kaga baxay qalinka?

	Problem 1	Problem 2	Problem 3

K7.3. Money for healthcare: [only if K7.1 is major or minor procedure]

Did you raise money for surgery?
 Miyaad u urursatay lacag qalinka

		Problem 1	Problem 2	Problem 3
Yes (had to use money for surgery)	Haa			
No (did not have to pay money for surgery)	Maya			

Household Code: _____

Respondant: HH / C1 / C2

K7.4. Raising money for healthcare: *[only if K7.3 is yes]*
 How did you raise money for surgery? Check all that apply
 Side baad ucu urursatay/lacagata qalinka

		Problem 1	Problem 2	Problem 3
Own savings	Lacag kayd ah			
Loans from relatives	Amaah xigtada ah			
Medical insurance program	Barnamijka caymiska ee caafmaadka			
Job paid for it	Ma mushaharka shaqada aad ka bixisay			
Loans from banks or other institutions	Amaah bang ama hay'ado kale			
Loans from moneylenders	Amah aad kaso qaadatay ganacsato			
Sold assets	Ma waxa aad bixisay Hantidaada			

K7.5 Assets sold for surgery: *[only if "sold assets" on K7.4 is checked]*
 What assets did you sell to pay for surgery?
 Maaxaad hanti u bixisay si aad iskaga bixiso qalinka

		Problem 1	Problem 2	Problem 3
Chickens or ducks	Digaag			
Small animals (goats/sheep)	Adhi [Riyo, Ido]			
Large animals (cows, buffaloes, camels)	Xodo sida/lo geel iyo dibi			
Bicycle	Baskilad			
Motorcycle or motor-scooter	Dhugdhuglay			
Radio or TV	Radio/ow ama telefishin			
Refrigerator	Talagad			
Washing machine	Qasalad			
Car or tractor	Baabuur ama cafcagaf			

K7.6. Did paying for this surgery affect your household's ability to pay for other household needs? *[such as food, water, clothing, medicine]*
 Lacagta aad ku bixisay qalinka miyeey saamayn ku yeelatay baahiyaha gurigaaga? *[sida cunada, biyaha, dharka iyo daawooyinka]*
[only answer if child HAD surgery, major or minor]

		Problem 1	Problem 2	Problem 3
Yes	Ha			
No	Maya			

K8.1. Reason for not having surgical care: *[Answer if they did NOT get surgery or did NOT go to healthcare facility]*
 What was the main reason not to go to a health facility to see a doctor/nurse or not to have an operation or dressings?
 Maxay tahay sababta ugu weyn ee aanad u tagin xarun caafmaad si aad u aragto dhakhtar, kakaasiye/kalkaaliso caafmaad adoon qalin galeen ama lagu dhayeen
[If the person went to a traditional healer ask why (s)he didn't go to a health care facility and mark that as the answer.
If the person was referred but did not go to the referral hospital, mark the answer why (s)he did not go here.]

		Problem 1	Problem 2	Problem 3
No money for health care	Ma haysto lacag aan ku lago xarun caafmaad			
No (money for) transportation	Ma haysto lacag aan ku rraaco gaadiid			
No time	Waxa aan u wayay waqtii			
Fear / no trust	Cabsi/ kal sooni damo			
Not available (facility/personnel/equipment)	Lama helin adeegy/ qadki / qalab			
No need	Looma baahna			

K9.1. Disability:
 Does this problem still impact your daily life?
 Miyay ila hada dhibaataadan well saameyn ku leedahay nolol maalmoodkaaga?

		Problem 1	Problem 2	Problem 3
The condition is not disabling	Xaaladu maha wax naafto sababaha			
I feel ashamed	Waan ka irshooyaa			
I'm not able to work like I used to	Ma awoodo inaan soo doo sidaadan hore ugu socan jiray			
I need help with transportation	Waxaan u bahansay inayga caawyo kharshaka gaadidka			
I need help with daily living	Waxaan u bahansay caawin maalin kasata			

[Disability: a physical problem that impacts your life, or makes it difficult to carry out your daily activities.]

[ASK IF THE PERSON HAD ANOTHER PROBLEM REGARDING THIS ANATOMICAL LOCATION. IF SO, GO TO THE FOLLOWING COLUMN, PROBLEM 2 AND/OR 3, TO REGISTER THIS PROBLEM. IF THERE ARE NO OTHER PROBLEMS REGARDING TO THIS LOCATION YOU CAN GO TO THE FOLLOWING ANATOMICAL LOCATION. IN CASE OF MORE THAN 3 PROBLEMS, MARK THE ONES WHICH ARE MOST RESENT AND MOST RELEVANT FOR THE RESPONDENT]

Pathology from clinical exam:

	Problem 1	Problem 2	Problem 3
Congenital clubfoot			
Polydactyl			
Syndactyl			

Household Code: _____

Respondant: HH / C1 / C2

Thank you very much for answering these questions. Let me check everything.
 Aad baad u mahadsantahay sida aad uga jawaabtay dhamaan su'aalaha aan ku weydiiyay oo dhan aan yara hubiyay dhamaanfood

[Go over all the tabs to ensure that you have everything. Ask the questions again which you accidentally skipped.

I checked the full Survey, there is no data missing:

_____ [date] _____ [name] _____ [signature of interviewer]

I see that I have everything that I need, your survey is complete. Thanks again on behalf of the research team. Do you have questions for me? You are always welcome to contact us. Have a nice day.

Siday ila muuqato dhamaan waxi aan rabay waan helay xog ururinti aan kuweydiinay wa dhamaatay. mar labaad waax ku mahad naqay. qolada wada cimbi'adhiisten. Miyaad rabta in aad iwaydiiso wax su'aal ah markasta oo aad u bahalo waad ila lo xidhiidkarta main wagaasna

[Give or refer to the letter with the (contact) information about the survey.] [TIME: ___ hour ___ min]

If you wish to make a comment for this interview you can do that below:

Household Code: _ _ _ _ _

Respondant: HH / C1 / C2

THE FOLLOWING QUESTIONS IN SECTION E, F, G, H, J, K ARE TO BE ASKED TO THE TWO HOUSEHOLD MEMBERS OF THE FAMILY WHO WERE RANDOMLY SELECTED FOR THE INTERVIEW.

CHILD RESPONDENT: Survey 2

E. GENERAL INFORMATION (Survey 2)

[TIME: ___ hour ___ min]

E1. Child ID number: [example: 1025 2]

E2. Sex:

Male	Lab
Female	Dhedg

E3. Age (as at last birthday)

Good morning/evening. My name is _____ I work for Edna Adan Hospital in Hargeisa. We are working with the Ministry of Health [show the information letter]. We are trying to find out if there are enough doctors in this area, specifically if there are enough surgeons. A surgeon is a medical doctor who cures patients by taking care of wounds and broken bones or cutting out masses. Sometimes surgeons must put you to sleep to do these things, and other times they must only numb the hurt body part. To find out if there are enough doctors taking care of these problems in your village, we'd like to ask you some questions. We will ask you questions about your health, such as whether you have ever had wounds, broken bones, or masses. By asking you these questions, we hope that we can help make more skilled doctors available in your village. We won't be offering medical care right now, but we hope that the information you provide will help create improved services in the future. This survey will take about 30 minutes. All of your responses will be confidential. You have the right to not participate in the survey, or to stop during the interview. We have an information sheet for you, and we will obtain your consent to participate. Do you have any questions at this moment?

Subax: Wanaagsan/Galab Wanaagsan. Magacaygu Waa _____ Waxaan Ka shaqeynaa dhakhtarka Edna Adan ee kuyala Hargeisa, waxa aanu ka sameynayna cimi basadiis oo aanu ka wadishaqeyno waaarada caafimaadka. (Tus warqadda), waxaan isku dayaynaa inaan ogaano haddii ay jiraan dhakhsatir ku filan wadanka Somaliland walba kuwa qalinka sameeyna inay yihiin kuwo filan dalka oo daboolkara baahida taala. Dhakhtarka qalinku waa dhakhtarka kudaweyna xanuunka ubaahan qalinka oo walba sigaara looqo taberay (Sida kaboolka lafaha, goyna fiixaha iyo qabsinada), marka qalinnada la sameeyno waxay kugu sameynayaa si fiican lagu qalo in laguwada seexyo ama meesha laga jarayo wax la kabaub yeeyo.

Si aan xog filan uuga helna inay joojaan dhakhsatir ku filan oo qalinka iyo baahiyaha caafimaadka ee loo qabo dhakhsatirta qalinka magacadiina iyo wadankaba waxaan si xushmadleh kaaga codsanaynaa adiga iyo xafadada dalka kula degen qaarood in aad waayidno suuqo ku saabsaan caafimaadka sida in qof idinka mid ah waligaa dhawac ama nabad kugu dhacay, laf ka jabtay ama fiyo kasoo baxeen. Su'aashan aan inii weydiiyo waxaan rejeeynaa inaad faa'iido doontaan mustaqbalka in magaaladaada iyo dalbaha helo dhakhsatir xirfad leh wakhtigan la jooja ama hada wax caafimaad ah ma fidineyno kaliya waxaan qoreynaa xog xogtaas aad nasiiisan waxay idinka caawin doontaa in la inuu abuurin wax qabad caafimaad oo wanaagsan inaad heshaan.

Xog uuurintani waxay qaadan doontaa mud dhan 30 daqiiqo. Jawaabaha aad nasiso dhamaantood waxay noqonayaa sir labadeena inaga dhaxaysa. Kaqayb qaadayaashadaada xog uuurintan waxa mudawadnimoo wax lacag ah lagugu masiisyo lagaagamina qadayo wakhtigaad rabtidan waad joojin kartaa waxa aan haya waraqa ay ku qoran yihiin hamaan macluumaadka oo dhamai waxa kale oo aanu u baahanahay saxeesha ah inaad ogiisatay ka qayb qaadashaa haddii ead qabto wax su'aal ah waad na waydin karta imakaba?

E4. Informed consent: Would you like to participate in this survey? OR

Is it okay for your son/daughter to participate in this survey?

Maasad ogoshay in aad naqila qayb qaadato xog uuurintan? caadi ma tahay inay naqila qayb qaatat inankaga iyo inantaaduba xog uuurintan?

Yes	Haa
No, what is the reason? (no time / no willingness / no reason / no seen benefit / other: explain...)	(Umahyo waqti / ma doonyo / Bila sabab / waxa faldid ah iguma jiro / Fahfahin kale

[For minors (individuals under age 18), this consent E4 is obtained from a guardian/parent. Without informed consent you cannot proceed. Make sure the person understands the purpose of this survey. If they don't want to participate, ask why and mark this.]

E.5 Minor assent:

Would you like to participate in this survey?

Maasad ogoshay in aad naqila qayb qaadato xog uuurintan?

Yes	Haa
No, what is the reason? (no time / no willingness / no reason / no seen benefit / other: explain...)	(Umahyo waqti / ma doonyo / Bila sabab / waxa faldid ah iguma jiro / Fahfahin kale
Surrogate consent only	ogoolaan shaha Wakiilka kaliya

[Surrogate consent only: this can be used in case of a child under 12 years of age, who is not around for the interview. The guardian/parent can answer all the questions for the child. When the child is around, the permission to participate (assent) is asked and only with the assent of the child the interview is held together with the guardian/parent. For children over the age of 12 the guardians/parent can be around for the interview depending on the wish of the child.]

The following questions are general questions, later on I will ask more about your health.

Su'aalaha soo socdaa waa su'aalaha guud kadibna waxaanu wax badan ka weydii doona xalada caafimaad.

Household Code: _ _ _ _ _

Respondant: HH / C1 / C2

B4: GPS coordinates of household

[At this time record the GPS coordinates of the household, please record here the village cluster number and household code for identification purposes]

Cluster # [from SOSAS survey]	
Household code [from SOSAS survey]	
GPS coordinates [from cell phone]	_____

Appendix B: Somaliland hospital capacity assessment

1. GENERAL INFORMATION						
1.1. Enumerator Name:						
1.2. Today's date (DD/MM/YYYY):						
1.3. Region / City:						
1.4. Hospital name						
1.5. Hospital address						
1.6. Name of Hospital Director						
1.7. Evaluator's Name:						
1.8. Evaluator's Position						
1.9. Evaluator email						
1.10. Evaluator cell						
1.11. Type of Hospital: <input type="checkbox"/> Public/ Government <input type="checkbox"/> Private <input type="checkbox"/> NGO/charity <input type="checkbox"/> Faith-based						
1.12. Which level of healthcare facility do you consider yourself to be? <input type="checkbox"/> Community Facility <input type="checkbox"/> 1 st Level Hospital <input type="checkbox"/> 2 nd Level Hospital <input type="checkbox"/> 3 rd Level Hospital <input type="checkbox"/> National Children's Hospital						
2. INFRASTRUCTURE						
2.1. How often is electricity available? <input type="checkbox"/> 0 (Never) <input type="checkbox"/> 1-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-99% <input type="checkbox"/> 100% (Always)						
2.2. How often do you rely on a generator? <input type="checkbox"/> 0 (Never) <input type="checkbox"/> 1-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-99% <input type="checkbox"/> 100% (Always)						
2.3. How often is running water available? <input type="checkbox"/> 0 (Never) <input type="checkbox"/> 1-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-99% <input type="checkbox"/> 100% (Always)						
2.4. How often is internet available? <input type="checkbox"/> 0 (Never) <input type="checkbox"/> 1-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-99% <input type="checkbox"/> 100% (Always)						
2.5. How often is a phone or cell phone available? <input type="checkbox"/> 0 (Never) <input type="checkbox"/> 1-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-99% <input type="checkbox"/> 100% (Always)						
2.6. How often is oxygen available? <input type="checkbox"/> 0 (Never) <input type="checkbox"/> 1-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-99% <input type="checkbox"/> 100% (Always)						
2.7. How many functional hospital beds are there? #						
2.7a. If any, how many beds are reserved only for children? #						
2.8. How many functional operating rooms are there? #						
2.9. How many functional anesthesia machines are available in the ORs? #						
2.10. What type of anesthesia is available at this facility? (check all that apply) <input type="checkbox"/> Local <input type="checkbox"/> General						
2.11. How many functional ventilators are available in the ORs? #						
2.12. What is the method of record keeping in your hospital? <input type="checkbox"/> Electronic <input type="checkbox"/> Paper <input type="checkbox"/> Both <input type="checkbox"/> None						
3. SERVICE DELIVERY						
3.1. How big of a population does this facility serve? (catchment area) #						
3.2. On average, how many patients do you admit per month? #						
3.2a. On average, how many pediatric* patients do you admit per month? #						
3.3. Over the past 6 months, what was the average number of operations performed per month? #						
3.3a. Over the past six months, what was the average number of pediatric* operations performed per month? #						
3.4. Over the past 6 months, what was the average number of laparotomies performed per month? #						
3.5. Over the past 6 months, what was the average number of C-sections performed per month? #						
3.6. Over the past 6 months, what was the average number of open fracture repairs performed per month? #						
3.8. What is the average number of post-operative, in-hospital deaths per month? #						
3.9. How many surgeons work in this facility? #						
3.9a. How many pediatric** surgeons work in this facility? #						
3.10. How often is a non-surgeon available to perform surgery for 24 hours a day? (e.g. GPs, health officers, etc.)? <input type="checkbox"/> Never <input type="checkbox"/> Sometime s <input type="checkbox"/> Always						
3. SERVICE DELIVERY (cont.)						
3.11. How often is a non-anesthesiologist available to perform anesthesia for 24 hours a day? (e.g. GPs, health officers, etc.)? <input type="checkbox"/> Never <input type="checkbox"/> Sometime s <input type="checkbox"/> Always						

3.12. How many anesthesiologists work in this facility?	#												
3.12a. How many pediatric** anesthesiologists work in this facility?	#												
3.13. How many anesthesiologists work at this facility?	#												
3.14. How many obstetricians work at this facility?	#												
3.15. How many nurses are employed by this facility?	#												
3.16. How many administrative staff are employed by this facility?	#												
4. FINANCIAL													
4.1. What is your total annual hospital budget?	\$												
4.2. How much of your annual hospital budget is allotted to surgery and anesthesia?	<input type="checkbox"/> 0 (None) <input type="checkbox"/> 1-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-99% <input type="checkbox"/> 100% (All) <input type="checkbox"/> N/A												
4.3. How do patients pay for services? (check all that apply)	<input type="checkbox"/> OOP <input type="checkbox"/> Insurance <input type="checkbox"/> Government <input type="checkbox"/> NGO <input type="checkbox"/> Charity												
4.3a. For ONE patient receiving surgery, what percentage of their entire stay is paid OOP, insurance, government, NGO, or charity?	<table> <tr> <td>_____</td> <td>% OOP</td> </tr> <tr> <td>_____</td> <td>% Insurance</td> </tr> <tr> <td>_____</td> <td>% Government</td> </tr> <tr> <td>_____</td> <td>% NGO</td> </tr> <tr> <td>_____</td> <td>% Charity</td> </tr> <tr> <td>= 100</td> <td>% Total</td> </tr> </table>	_____	% OOP	_____	% Insurance	_____	% Government	_____	% NGO	_____	% Charity	= 100	% Total
_____	% OOP												
_____	% Insurance												
_____	% Government												
_____	% NGO												
_____	% Charity												
= 100	% Total												
4.4. What is the average out-of-pocket cost to a patient for a C section?	\$												
4.5. What is the average out-of-pocket cost to a patient for an open fracture repair?	\$												
4.6. What is the average out-of-pocket cost to a patient for a laparotomy?	\$												
4.7. What is the average out-of-pocket cost to a patient for surgery-associated lodging per day?	\$												
4.8. What is the average cost of transportation to and from the hospital for...													
A patient/family coming from IN TOWN	\$												
A patient/family coming from OUT OF TOWN	\$												

[Go over all the questions to ensure that you have everything. Ask the questions again which you accidentally skipped. I checked the full Survey, there is no data missing:

_____ [date] _____ [name] _____ [signature of interviewer]

Please add any other information you feel is important for the study to know about your hospital

Appendix C: Somaliland pediatric surgical record review tool

1. HOSPITAL INFORMATION	
1.1. Hospital name:	1.1a. SITE #
1.2. Name of Enumerator:	
1.3. Today's date (DD/MM/YYYY) _____ / _____ / _____	

(Complete this section for each individual pediatric surgical record)

2. PATIENT DEMOGRAPHICS		<i>If information is unknown or not available, check this box per question</i>
2.1. Patient study ID:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (SITE #) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (PARTICIPANT #)	
2.2. Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown	2.3. Age: _____ YEARS _____ MONTHS _____ DAYS	
2.4. Village/town of origin:		

3. SURGERY INFORMATION		<i>If YES, complete the rest of section 3. If NO, give reason then answer 3.2, 3.3, and 3.5a. only</i>
3.1. Did patient receive surgery? <input type="checkbox"/> YES <input type="checkbox"/> NO: _____		
3.2. Date admitted to surgical ward (DD/MM/YYYY) _____ / _____ / _____		
3.3. Date released from surgical ward (DD/MM/YYYY) _____ / _____ / _____		
3.4a. Surgical condition:		
3.4b. Surgical procedure performed:		
3.5. Date of surgery (DD/MM/YYYY) _____ / _____ / _____		
3.6. What anesthesia used during the surgery? <input type="checkbox"/> General <input type="checkbox"/> Regional <input type="checkbox"/> Local <input type="checkbox"/> None		
3.7. Provider of surgery: <input type="checkbox"/> Nurse <input type="checkbox"/> Pediatric surgeon <input type="checkbox"/> Physician <input type="checkbox"/> Surgeon <input type="checkbox"/> Other (describe on back)		
3.8. Provider of anesthesia: <input type="checkbox"/> Anesthesiologist <input type="checkbox"/> Clinical officer <input type="checkbox"/> Anesthetist <input type="checkbox"/> Other (describe on back) <input type="checkbox"/> Nurse		
3.9. Outcome of surgery <input type="checkbox"/> Alive (answer 4.7a only) <input type="checkbox"/> Death (answer 3.8b, c, and d only) <input type="checkbox"/> Unknown (skip to section 4)		
3.9a. If alive, state outcome <input type="checkbox"/> Went home <input type="checkbox"/> Transferred to different hospital <input type="checkbox"/> Transferred to other ward (within hospital, describe on back)		
3.9b. If death, state outcome <input type="checkbox"/> Death during surgery <input type="checkbox"/> Death post-surgery <input type="checkbox"/> Other (describe on back)		
3.9c. If death, cause of death:		
3.9d. If death, date of death (DD/MM/YYYY) _____ / _____ / _____		

4. ADMISSION INFORMATION		<i>If YES, complete the rest of section 4. If NO, skip to section 5</i>
4.1. Does this surgery record have admissions information included? <input type="checkbox"/> YES <input type="checkbox"/> NO		
4.2. Date of admission (DD/MM/YYYY) _____ / _____ / _____		
4.3. Ward admitted to:		
4.4. Date of release (DD/MM/YYYY) _____ / _____ / _____		
4.5. Released to: <input type="checkbox"/> Home <input type="checkbox"/> Surgical ward <input type="checkbox"/> Other ward (describe on back)		
4.6. Admission diagnosis:		

5. FINANCIAL INFORMATION <i>only complete if patient received surgery</i>	
5.1. What was the cost of this surgery? \$ _____	<input type="checkbox"/> USD <input type="checkbox"/> Sh (select ONE only)
5.2. How did the patient (or patient family) pay for the surgery?	<input type="checkbox"/> OOP <input type="checkbox"/> Government <input type="checkbox"/> Did not pay <input type="checkbox"/> NGO <input type="checkbox"/> Other (describe on back)

[Go over all the tabs to ensure that you have everything. Fill the questions again which you accidentally skipped.

I checked the full Survey, I have filled it out as completely as possible:

_____ [date] _____ [name] _____ [signature of interviewer]

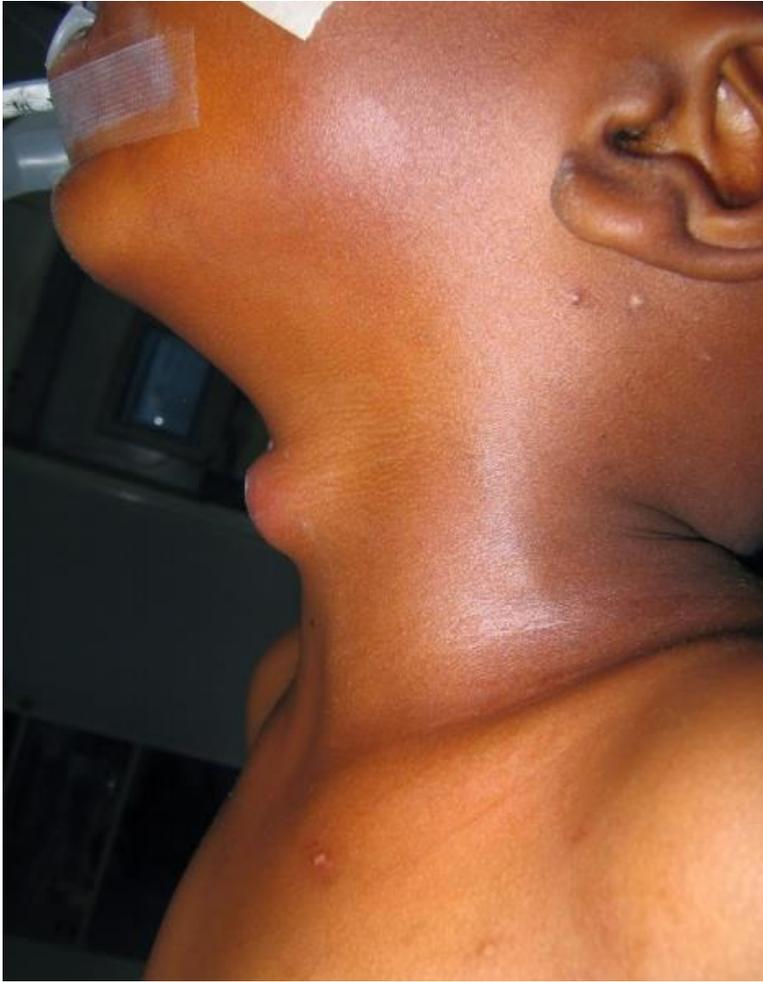
Appendix D: Pediatric surgical portfolio

HEAD FACE NECK

Hydrocephalus



Thyroglossal Cyst



Cleft Lip



Cleft lip and palate



Cystic Hygroma



BACK
Meningomyelocele



ABDOMEN
Umbilical Hernia





Patent Urachus





GROIN GENITALIA

Hypospadias





Hydrocele



Chordee



Inguinal hernia



Undescended Testes



EXTREMITIES

Polydactyl



Club foot



Syndactyl





Appendix E: Surgical condition coding

surgical condition, original	surgical condition, coded	procedure category
abscess	abscess	PED
abscess of ankle	abscess	PED
abdominal abscess	abscess	PED
abscess	abscess	PED
appendicular abscess	abscess	PED
arm abscess due snake bite	abscess	PED
dental abscess	abscess	PED
elbow abscess	abscess	PED
foot abscess	abscess	PED
hand abscess	abscess	PED
head abscess	abscess	PED
left femoral abscess	abscess	PED
leg abscess	abscess	PED
leg abscess	abscess	PED
right inguinal abscess	abscess	PED
shoulder abscess	abscess	PED
skull abscess	abscess	PED
Tb complicated abscess	abscess	PED
wrist abscess	abscess	PED
pottecker abscess	abscess	PED
pre-sacral abscess	abscess	PED
right arm abscess	abscess	PED
tight abscess	abscess	PED
unilateral left leg swelling	abscess	PED
lymphadenopathy	adenopathy	PED
bilateral left eye surgery	amblyopia	OPHTH
squint (cross eyed)	amblyopia	OPHTH
appendicitis	Appendicitis	PED
appendicitis	Appendicitis	PED
amorectal malformation	arm	PED
anal imperforated	arm	PED
anal imperforation	arm	PED
anal polyp	ARM	PED
anal stenosis	arm	PED
hypospadias	ARM	URO
hypospadias	ARM	URO
hypospadias	ARM	URO
imperforated anus	arm	PED
perforated anus	arm	PED
perianal fistula	ARM	PED
chronic displace left elbow	arm	ORT
	dislocation	
dislocation left elbow vs	arm	ORT
	dislocation	
bladder stone	bladder stone	URO
bladder stone, circumcision	bladder stone	URO
bladder stone	bladder stone	URO
u bladder calculi	bladder stone	URO
foot bunion	bunion	ORT
burn	Burn	PED
burn contracture	Burn	PSU
burn contracture: 2 fingers	Burn	PSU
burn wound, open	Burn	PED
bilateral congenital cataract	cataract	OPHTH
bilateral eye cataract	cataract	OPHTH
bilateral trauma cataract	cataract	OPHTH
cataract trauma	cataract	OPHTH
l eye cataract	cataract	OPHTH
l eye trauma cataract	cataract	OPHTH
r eye capsulotomy	cataract	OPHTH
r eye cataract	cataract	OPHTH
r eye decision(?) cataract	cataract	OPHTH
r eye repairing + trauma cataract	cataract	OPHTH
r eye trauma cataract	cataract	OPHTH
r trauma cataract	cataract	OPHTH
right eye trauma cataract	cataract	OPHTH
obstruction of bile duct	cholecystitis	PED
chordee	chordee	URO
circumcision	Circumcision	URO
circumcision	Circumcision	URO
bilateral cleft lip	CL	PSU
bilateral complete cleft lip	CL	PSU

cleft lip	CL	PSU
cleft lip bilateral	CL	PSU
cleftlip	CL	PSU
complete cleft lip	CL	PSU
incomplete right cleft lip	CL	PSU
incomplete lip	CL	PSU
right incomplete cleftlip	CL	PSU
right cleftlip	CL	PSU
right complete cleft lip	CL	PSU
right incomplete defect	CL	PSU
unilateral cleft lip	CL	PSU
bilateral cleft lip and palate	CL CP	PSU
cleft lip and palate	CL CP	PSU
cleft lip palate	CL CP	PSU
cleft palate cleft lip	CL CP	PSU
cleftlip cleft palate	CL CP	PSU
cleftlip palate	CL CP	PSU
cleftpalate	CL CP	PSU
cleftpalate cleftlip	CL CP	PSU
complete bilateral cleft lip and palate	CL CP	PSU
congenital flat foot	Clubfoot	ORT
r foot deformity	Clubfoot	ORT
atl clubfoot	Clubfoot	ORT
bilateral clubfoot	Clubfoot	ORT
club foot	Clubfoot	ORT
club foot 2nd to polio	Clubfoot	ORT
clubfoot bilateral	Clubfoot	ORT
clubfoot unilateral	Clubfoot	ORT
l clubfoot	Clubfoot	ORT
(r) hand burn contracture	Contracture	PSU
4 finger contracture	Contracture	PSU
5 finger contracture	Contracture	PSU
axillary contraction	Contracture	PSU
axillary contracture	Contracture	PSU
axillary contracture	Contracture	PSU
axilla contracture	Contracture	PSU
burn contracture	contracture	ort
contracture	Contracture	PSU
elbow contracture	Contracture	PSU
finger contracture	Contracture	PSU
finger contracture	Contracture	PSU
finger contracture 2nd to burn	Contracture	PSU
fingers contracture	Contracture	PSU
foot contracture	Contracture	PSU
gramscaband []	Contracture	PSU
hand contracture	Contracture	PSU
hand contracture	Contracture	PSU
r axilla contracture	contracture	PSU
bilateral cleft palate	CP	PSU
bilateral cleft palate	CP	PSU
cleft palate	CP	PSU
cleftlip palate	CP	PSU
incomplete cleft palate	CP	PSU
unilateral cleft palate	CP	PSU
cystic	cyst/mass	PED
abdominal cyst	cyst/mass	PED
abdominal mass	cyst/mass	PED
abscess of the left leg	cyst/mass	PED
abscess of the left leg tabia	cyst/mass	PED
abscess appendicular	cyst/mass	PED
abscess left leg tie	cyst/mass	PED
arachnoid cyst (r)	cyst/mass	NSU
duplication cyst with twisted bowel	cyst/mass	PED
forearm mass	cyst/mass	PED
granuloma	cyst/mass	PED
mass	cyst/mass	PED
neck cyst	cyst/mass	PED
neck lymphoid	cyst/mass	PED
neck mass	cyst/mass	PED
neuroblastoma	cyst/mass	PED
r eye cyst	cyst/mass	OPHTH
scalp hemangioma	cyst/mass	PED
scalp inflammatory tumor	cyst/mass	PED
small mass	cyst/mass	PED
tibia tumor	cyst/mass	ORT
chesting tube	empyema	PED
empyema of the left lung	empyema	PED
lung empyema	empyema	PED
plural effusion	empyema	PED
cervical encephalocele	encephalocele	NSU
congenital encephalocele	encephalocele	NSU

congenital hydrocephalus + occipital encephalocele	encephalocele	NSU	abdominal obstruction	intestinal obstruction	PED
fiberial, occipital encephalocele, hydrocephalus	encephalocele	NSU	intestinal obstruction	intestinal obstruction	PED
occipital encephalocele	encephalocele	NSU	obstruction	intestinal obstruction	PED
occipital encephalocele, hydrocephalus	encephalocele	NSU	evacuation under anesthesia (exploratory surgery)	Intraabdominal abscess	UNKN OWN
left eyelid centropion?	Entropion	OPHTH	intenception	intussusception	PED
l eye d.c.r. - dacryocystorhinostomy	epiphora	OPHTH	intenception with	intussusception	PED
r eye d.c.r.	epiphora	OPHTH	intestinal intussusception	intussusception	PED
r eye lactation	epiphora	OPHTH	ankle keloid	keloid	PED
extra finger	extra digit	ORT	vaginal stigma	labial mass	PED
l eye chalazion - acne inside the eyelid	eye acne	OPHTH	patella abcess	leg abscess	PED
lip truama	face trauma	PED	lipoma	lipoma	PED
dispalced right tabia	fracture	PED	lipoma on chest	lipoma	PED
distal left radias faracture	Fracture	ORT	lyphoma of the hand	lipoma	PED
distal tibia fracture	Fracture	ORT	lypoma	lipoma	PED
elbow fracture	Fracture	ORT	lympoma of breast	mass	PED
femur fracture	Fracture	ORT	nasal mass	mass	ENT
fixation right tabia with pressure ulcers	fracture	ORT	r fibula mass	mass	ORT
fracture	Fracture	ORT	internal urethetomy, perineal veanastenosis	meatal stenosis	URO
fracture and epidural hematoma	Fracture	ORT	meatitis	meatitis	URO
fracture of left arm and left leg	Fracture	ORT	apper thoracic myelo	MMC	NSU
fracture of r femur	Fracture	ORT	lumber myelo	MMC	NSU
fracture of r humerous	Fracture	ORT	meningocele	MMC	NSU
fracture r tibia	Fracture	ORT	myelo	MMC	NSU
fracture trauma finger	Fracture	ORT	myelo hydrocephalus	MMC	NSU
humerous fracture	Fracture	ORT	myelo + hydrocephalus	MMC	NSU
left distal tabia fracature	Fracture	ORT	myelo and hydrocephalus	MMC	NSU
left leg fracture	fracture	ORT	myelo flacid	MMC	NSU
left ulnar and radial farcuture	Fracture	ORT	myelo hydrocephalus	MMC	NSU
left ulnar and radial fixation	Fracture	ORT	myelo motion	MMC	NSU
old fracture	fracture	ORT	mylomengencell	MMC	NSU
old fracture elbow	fracture	ORT	occipatal cranial meningocele, no hydrocephalus	MMC	NSU
old fracture r leg	fracture	ORT	sacral myelo	MMC	NSU
open fracture	fracture	ORT	spina bifida	MMC	NSU
pubic bone fracture	fracture	ORT	spina bifida, myelomeningocele	MMC	NSU
radial fracture	Fracture	ORT	spinal bafida	MMC	NSU
right arm fracture	Fracture	ORT	septodeformaly	nasal problem	ENT
Right femoral Ex	fracture	ORT	charonic oseteomayltis	osteomyelitis	PED
scgt	fracture	ORT	chronic osteomalytis in left tibia	osteomyelitis	PED
skull fracature	Fracture	ORT	chronic osteomyelitis of left tibia	osteomyelitis	PED
tibia fracture	Fracture	ORT	humerous osteomyelitis	osteomyelitis	ORT
ulna fracture	Fracture	ORT	knee osteomyelitis	osteomyelitis	PED
gall bladder stones	gall bladder stones	PED	oestomyelites	osteomyelitis	ORT
finger gangrene	gangrene	ORT	osteochandrame	osteomyelitis	ORT
finger gangrine	gangrene	ORT	osteomyelitis	osteomyelitis	ORT
necrotic of the right leg	gangrene	ORT	tympontitis + AT	otitis media	ENT
bilateral eye trab	glaucoma	OPHTH	peritonitis (abdomen infection)	peritonitis	PED
l eye trab - glaucoma	glaucoma	OPHTH	phymisis	phymosis	URO
r eye trab - glaucoma	glaucoma	OPHTH	urine retension	phymosis	URO
hand growth	hand mass	ORT	urine retention	phymosis	URO
hemogioma	hemangioma	PED	uritral stinosis	phymosis	URO
complicated head heamatoma since birth	hematoma	PED	right massive pnemothorax	pneumothorax	PED
hematoma	hematoma	PED	obestatric prolonged labour	prolonged labor	OBS
hematoma of the head	hematoma	PED	obstetric prolonged labour cpd	prolonged labor	OBS
hematoma, fracture	hematoma	PED	pregnancy	prolonged labor	OBS
hemaroid	hemorrhoid	PED	prolonged labour	prolonged labor	OBS
hemathorax	hemothorax	PED	pylori stenosis	pyloric stenosis	PED
hemothorax	hemothorax	PED	pyloric stenosis	pyloric stenosis	PED
Hirschsprung's disease	Hirschsprung's disease	PED	rectal polype	rectal polyp	PED
acquired hydrocephalus	Hydrocephalus	NSU	renal stone	renal stone	URO
congenital hydrocephalus	Hydrocephalus	NSU	hye catenisi papiloma right leg	cyst/mass	PED
developmentally disabled, head enlargement, acquired hydrocephalus	Hydrocephalus	NSU	deoreessed skull	skull fracture	NSU
hydrocephalus	Hydrocephalus	NSU	achilles tendon lengthening	spastic contracture	ORT
hydrocephalus (brain tumor)	Hydrocephalus	NSU	acq atl	spastic contracture	ORT
hydrocephalus shunt collapse	Hydrocephalus	NSU	atl	spastic contracture	ORT
hydrocephalus with downs syndrom	Hydrocephalus	NSU			
seizures 2nd to hydrocephalus	Hydrocephalus	NSU			
sepsis, hydrocephalus, dehydration	Hydrocephalus	NSU			
shunt failure	hydrocephalus	NSU			
shunt removal both sides	hydrocephalus	NSU			
ingrown fingernail	ingrown nail	PED			
biliteral hydrocel + inguanl hernia	inguinal hernia	PED			
compained inguanal hernia and hydrocell	inguinal hernia	PED			
hernia	inguinal hernia	PED			
hydrocell	inguinal hernia	PED			
inguanal hernia	inguinal hernia	PED			
r inguinal hernia	inguinal hernia	PED			
recurrent hernia	inguinal hernia	PED			

open atl	spastic contracture	ORT	r eye euiscesation(?) - removal of entire eye	trauma/wound /snake	OPTHO
parcial repture achils tendon	spastic contracture	ORT	r eye euiscesation(?) - removal of entire eye	trauma/wound /snake	OPTHO
short achilles 2nd to polio	spastic contracture	ORT	r eye foreign body	trauma/wound /snake	OPTHO
spleen hematoma	spleen injury	PED	r eye minor	trauma/wound /snake	OPTHO
tear of left tendon	tendon rupture	ORT	r eye minor excision	trauma/wound /snake	OPTHO
tender [tendon?] loose	tendon rupture	ORT	r eye repair	trauma/wound /snake	OPTHO
testicular torsion	testicular torsion	URO	r eye trauma	trauma/wound /snake	OPTHO
tonuge tie	tongue tie	ENT	r patella dz???	trauma/wound /snake	ORT
Addeno tonsillitis	tonsillitis	ENT	snake bite	trauma/wound /snake	PED
adenotonsillitis	tonsillitis	ENT	third degree burning	trauma/wound /snake	PED
tonsillitis	tonsillitis	ENT	tongue trauma	trauma/wound /snake	ENT
tonsillitis	tonsillitis	ENT	tongue wound	trauma/wound /snake	ENT
car accident (internal bleeding)	trauma/wound /snake	PED	tounge wound	trauma/wound /snake	ENT
club foot 2nd to burn	trauma/wound /snake	PSU	trauma	trauma/wound /snake	PED
dry 5 finger due to burning injury	trauma/wound /snake	PED	trauma head - laceration	trauma/wound /snake	PED
explonasion injury right hand	trauma/wound /snake	ORT	wound	trauma/wound /snake	PED
finger trauma	trauma/wound /snake	ORT	umbelical hernia	umbilical hernia	PED
finger wound	trauma/wound /snake	PED	AV1	unknown	ORT
foreign body	trauma/wound /snake	PED	bileteral triple developmental delay	unknown	ORT
forigan body	trauma/wound /snake	PED	fistula	fistula	PED
gangurne right limp	trauma/wound /snake	ORT	leg deformity	unknown	ORT
gangurne stean	trauma/wound /snake	ORT	lip swelling	unknown	UNKN OWN
gun shot	trauma/wound /snake	ORT	MA3	unknown	ORT
gunshot	trauma/wound /snake	ORT	MN3	unknown	ORT
hand trauma	trauma/wound /snake	ORT	pvs collection 2 om ??	unknown	PED
kidney injury	trauma/wound /snake	PED	revision of the posterio surgery	unknown	UNKN OWN
l eye corneal	trauma/wound /snake	OPTHO	l eye cepsution (?)	unknown	OPTHO
l eye corneal separation	trauma/wound /snake	OPTHO	r eye congenital	unknown	OPTHO
l eye foreign body	trauma/wound /snake	OPTHO	birth defect of left leg	unknown	ORT
l eye repairing	trauma/wound /snake	OPTHO	urethral stenosis	urethral stenosis	URO
laceration of tongue	trauma/wound /snake	ENT			
large wounf left arm	trauma/wound /snake	PED			
left humerus infection	trauma/wound /snake	ORT			
leg wound 2nd to burn	trauma/wound /snake	PED			
lingual tongue trauma	trauma/wound /snake	ENT			
massive third dgree burn	trauma/wound /snake	PED			
open wound	trauma/wound /snake	PED			
open wound axilla	trauma/wound /snake	PED			
open wound on the posterior chest	trauma/wound /snake	PED			
open wound/burn	trauma/wound /snake	PED			
open wound: foot, 2nd to burn	trauma/wound /snake	PED			
palm contracture 2nd to trauma	trauma/wound /snake	PSU			
r eye corneal foreign body	trauma/wound /snake	OPTHO			
r eye corneal laceration	trauma/wound /snake	OPTHO			
r eye corneal surgery	trauma/wound /snake	OPTHO			

Appendix F: Full list of surgical conditions, stratified by hospital (n=1255)

	Total % (n)	Awdal			Maroodi Jeex					Sahil		Sanaag	Togdheer	
		AH % (n)	BorRH % (n)	AHH % (n)	EAUH % (n)	GMH % (n)	HGH % (n)	HNH % (n)	MSH % (n)	BerRH % (n)	SDH % (n)	ERH % (n)	BurRH % (n)	DXH % (n)
Tonsillitis	18.33 (230)	99.24 (131)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.62 (3)	0.00 (0)	27.91 (96)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Trauma/wound/snake	11.24 (141)	0.00 (0)	44.44 (4)	6.06 (6)	2.31 (7)	0.00 (0)	18.38 (34)	0.00 (0)	19.19 (66)	0.00 (0)	81.25 (13)	50 (1)	26.32 (10)	0.00 (0)
Hydrocephalus	7.49 (94)	0.00 (0)	0.00 (0)	2.02 (2)	30.36 (92)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Cataract	6.69 (84)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	24.42 (84)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Fracture	6.45 (81)	0.00 (0)	33.33 (3)	14.14 (14)	0.33 (1)	0.00 (0)	21.62 (40)	33.33 (4)	4.94 (17)	66.67 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Cleft lip	4.14 (52)	0.00 (0)	0.00 (0)	8.08 (8)	14.52 (44)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Abscess	3.59 (45)	0.00 (0)	0.00 (0)	3.03 (3)	0.33 (1)	9.09 (10)	9.19 (17)	0.00 (0)	0.58 (2)	0.00 (0)	0.00 (0)	50 (1)	28.95 (11)	0.00 (0)
Unknown	3.43 (43)	0.00 (0)	0.00 (0)	2.02 (2)	1.32 (4)	27.27 (30)	0.00 (0)	0.00 (0)	2.03 (7)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
MMC	3.11 (39)	0.00 (0)	0.00 (0)	4.04 (4)	11.55 (35)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Cyst/mass	2.79 (35)	0.00 (0)	0.00 (0)	6.06 (6)	1.65 (5)	0.00 (0)	8.65 (16)	0.00 (0)	0.87 (3)	0.00 (0)	0.00 (0)	0.00 (0)	13.16 (5)	0.00 (0)
ARM	2.63 (33)	0.00 (0)	0.00 (0)	4.04 (4)	3.96 (12)	9.09 (10)	3.78 (7)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Circumcision	2.39 (30)	0.00 (0)	0.00 (0)	7.07 (7)	0.00 (0)	18.18 (20)	0.00 (0)	0.00 (0)	0.87 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Clubfoot	1.99 (25)	0.00 (0)	0.00 (0)	0.00 (0)	7.92 (24)	0.00 (0)	0.00 (0)	0.00 (0)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Contracture	1.91 (24)	0.00 (0)	0.00 (0)	1.01 (1)	7.59 (23)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Hematoma	1.67 (21)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	9.09 (10)	0.54 (1)	66.67 (8)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	2.63 (1)	0.00 (0)
Glaucoma	1.43 (18)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	5.23 (18)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Appendicitis	1.27 (16)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	9.09 (10)	3.24 (6)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Cleft lip/cleft palate	1.27 (16)	0.00 (0)	0.00 (0)	1.01 (1)	4.95 (15)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Cleft palate	1.27 (16)	0.00 (0)	0.00 (0)	9.09 (9)	2.31 (7)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Spastic contracture	1.12 (14)	0.00 (0)	0.00 (0)	1.01 (1)	4.29 (13)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Bladder stone	1.04 (13)	0.00 (0)	0.00 (0)	1.01 (1)	0.00 (0)	9.09 (10)	0.00 (0)	0.00 (0)	0.58 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Epiphora	0.96 (12)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	3.49 (12)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Osteomyelitis	0.96 (12)	0.00 (0)	22.22 (2)	1.01 (1)	0.00 (0)	0.00 (0)	1.62 (3)	0.00 (0)	1.45 (5)	0.00 (0)	0.00 (0)	0.00 (0)	2.63 (1)	0.00 (0)
Pyloric stenosis	0.96 (12)	0.00 (0)	0.00 (0)	3.03 (3)	0.00 (0)	0.00 (0)	4.86 (9)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Intestinal obstruction	0.88 (11)	0.00 (0)	0.00 (0)	1.01 (1)	0.33 (1)	0.00 (0)	4.86 (9)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Phimosis	0.88 (11)	0.00 (0)	0.00 (0)	6.06 (6)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	10.53 (4)	0.00 (0)
Fistula	0.8 (10)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	9.09 (10)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Inguinal hernia	0.8 (10)	0.00 (0)	0.00 (0)	2.02 (2)	0.00 (0)	0.00 (0)	2.7 (5)	0.00 (0)	0.00 (0)	33.33 (1)	0.00 (0)	0.00 (0)	5.26 (2)	0.00 (0)
Lipoma	0.72 (9)	0.00 (0)	0.00 (0)	2.02 (2)	0.33 (1)	0.00 (0)	3.24 (6)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Burn	0.56 (7)	0.00 (0)	0.00 (0)	3.03 (3)	1.32 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Encephalocele	0.56 (7)	0.00 (0)	0.00 (0)	0.00 (0)	2.31 (7)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Amblyopia	0.48 (6)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.74 (6)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Gangrene	0.48 (6)	0.00 (0)	0.00 (0)	1.01 (1)	0.00 (0)	0.00 (0)	2.16 (4)	0.00 (0)	0.00 (0)	0.00 (0)	6.25 (1)	0.00 (0)	0.00 (0)	0.00 (0)
Epyyema	0.4 (5)	0.00 (0)	0.00 (0)	2.02 (2)	0.00 (0)	0.00 (0)	1.08 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	2.63 (1)	0.00 (0)	0.00 (0)
Prolonged labor	0.4 (5)	0.76 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.08 (2)	0.00 (0)	0.00 (0)	0.00 (0)	6.25 (1)	0.00 (0)	0.00 (0)	50 (1)
Intussusception	0.32 (4)	0.00 (0)	0.00 (0)	2.02 (2)	0.00 (0)	0.00 (0)	0.54 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	2.63 (1)	0.00 (0)
Chordee	0.24 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.99 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Entropion	0.24 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.87 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Eye acne	0.24 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.87 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Hemothorax	0.24 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.62 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Ingrown nail	0.24 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.62 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Intraabdominal abscess	0.24 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.87 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Leg abscess	0.24 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.62 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Mass	0.24 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.87 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Arm dislocation	0.16 (2)	0.00 (0)	0.00 (0)	2.02 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Hemangioma	0.16 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.08 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

Hirschsprung's disease	0.16 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.08 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Peritonitis	0.16 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.08 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Spleen injury	0.16 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	1.08 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Tendon rupture	0.16 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.58 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Adenopathy	0.08 (1)	0.00 (0)	0.00 (0)	1.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Bunion	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.33 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Cholecystitis	0.08 (1)	0.00 (0)	0.00 (0)	1.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Extra digit	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	6.25 (1)	0.00 (0)	0.00 (0)	0.00 (0)
Face trauma	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.33 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Gall bladder stones	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Hand mass	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.33 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Hemorrhoid	0.08 (1)	0.00 (0)	0.00 (0)	1.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Keloid	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.33 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Labial mass	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	50 (1)
Meatal stenosis	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Meatitis	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Nasal problem	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Otitis media	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Pneumothorax	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	2.63 (1)	0.00 (0)
Rectal polyp	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	2.63 (1)	0.00 (0)
Renal stone	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.54 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Skull fracture	0.08 (1)	0.00 (0)	0.00 (0)	1.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Testicular torsion	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.54 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Tongue tie	0.08 (1)	0.00 (0)	0.00 (0)	1.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Umbilical hernia	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.54 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Urethral stenosis	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.29 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

Appendix G: Additional responses to household survey

HOUSEHOLD DEMOGRAPHIC INFORMATION (N=839)

<i>Respondent information</i>	%	n
Age (median, IQR)	34.08	(27.19, 39.83)
Gender		
Female	96.04	(807)
Male	3.96	(32)
HEALTH FACILITY INFORMATION		
Primary*		
Ability to afford transport		
Yes	13.94	(127)
No	3.14	(30)
Not applicable	72.70	(583)
Unknown/Missing	10.22	(99)
Secondary**		
Ability to afford transport		
Yes	30.78	(247)
No	3.71	(28)
Not applicable	14.85	(119)
Unknown/Missing	50.66	(445)
Tertiary***		
Ability to afford transport		
Yes	59.64	(519)
No	13.42	(109)
Not applicable	7.88	(71)
Unknown/Missing	19.06	(140)

*Primary health facility: Health facility without functioning operating room

**Secondary health facility: Health facility with functioning operating room

***Tertiary health facility: Health facility with functioning operating room and minimal one surgical specialists (Surgeons/Orthopedics/Gynecologist/Urologist)

CHILD DEMOGRAPHIC INFORMATION (N=1450)

	%	n
Education		
None (includes nursery)	63.94	(959)
Primary school	33.72	(453)
Secondary school (junior / senior)	1.61	(25)
Missing	0.72	(13)
Literacy if age ≥ 8		
No	24.80	(145)
Yes	74.61	(405)
Missing	0.59	(4)
Recovery from any illness		
Yes	92.85	(1327)
No	6.38	(107)
Missing	0.76	(16)

REASONS FOR DEATH, EXPLAINED (N=94)

	%	(n)
no reason/unknown	31.27	(30)
heart attack	6.18	(4)
diarrhea	5.48	(3)
stillborn	4.55	(5)
diabetes	3.36	(4)
stomach ache	2.85	(2)
cancer head	2.23	(1)
hypertension	2.23	(3)
stroke	2.15	(4)
delivery complications	2.10	(1)
drowning	2.10	(1)
pulmonary consolidation	2.10	(1)
cancer abdominal	1.91	(1)
asthma	1.82	(2)
cancer	1.82	(2)
gastritis	1.82	(2)
hepatitis B	1.79	(2)
labor	1.67	(1)
vomiting	1.67	(1)
measles	1.54	(2)
anemia	1.17	(1)
jaundice	1.17	(1)
scorpion bite	1.17	(1)
car accident	1.12	(1)
abdominal distension	0.91	(1)
abdominal problem	0.91	(1)
acute heart problem	0.91	(1)
cancer esophagus	0.91	(1)
cancer stomach	0.91	(1)
esophagus blockage	0.91	(1)
gun shot	0.91	(1)
hypersensitivity	0.91	(1)
hypertension and diabetes	0.91	(1)
mass abdomen	0.91	(1)
mass brain	0.91	(1)
old age	0.91	(1)
small intestine	0.91	(1)
tb	0.91	(1)
cholera	0.76	(1)
kidney problems	0.76	(1)
breast cancer	0.22	(1)
liver disease	0.22	(1)

REASONS FOR DEATHS IN CHILDREN, EXPLAINED (N=25)

	%	(n)
no reason/unknown	24.28	(8)
stillborn	16.17	(5)
diarrhea	13.53	(2)
drowning	7.47	(1)
labor	5.94	(1)
stomach ache	5.94	(1)
vomiting	5.94	(1)
anemia	4.17	(1)
jaundice	4.17	(1)
asthma	3.23	(1)
esophagus blockage	3.23	(1)
heart attack	3.23	(1)
cholera	2.7	(1)

ADDITIONAL RESPONSES FOR DEATHS, FINANCIAL INFORMATION (N=94)

FINANCIAL INFORMATION

Raised money for healthcare	% (n)
No	29.38 (28)
Yes	48.46 (51)

Missing	22.16 (15)
Money raised for healthcare**	
Own savings	38.3 (36)
Loans from relatives	14.89 (14)
Medical insurance program	0 (0)
Loans from moneylenders	2.13 (2)
Sold assets	3.19 (3)
Raised money for funeral	
Yes	56.77 (54)
No	34.76 (32)
Missing	8.47 (8)
Money raised for funeral**	
Loans from relatives	8.51 (8)
Medical insurance program	2.13 (2)
Loans from moneylenders	0 (0)
Sold assets	2.13 (2)
Cost of healthcare (USD)	242.86 (92.32, 481.55)
Cost of funeral (USD)	252.7 (117.81, 442.77)

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