Improving Non-Communicable Disease (NCD) Care Through Expansion of Lwala's Health Services in Rural Kenya

February 16, 2019
Vanderbilt University's
Global Health Case Competition
Case Document

Table of Contents

*Terms written in green throughout the document are defined in the glossary.

2018-2019 VIGH Case Competition

Background & Introduction

Kenya, a country in East Africa, is home to a diverse array of ethnicities and cultures. Substantial crises, including increased HIV prevalence, maternal death, malnutrition, child mortality, educational barriers, and financial instability, have impacted health outcomes across the country. The child mortality rate in rural Kenya is 12 times higher than that of the United States, with roughly 8% of children dying before their 5th birthday due to malaria, pneumonia, malnutrition, and diarrhea.[1] Along with these substantial problems, there has been a sharp increase in HIV transmittance, especially among youth. Approximately 97 infants are infected with HIV each day, creating devastating consequences for Kenya.[1] Left untreated, HIV develops into AIDS, resulting in the inability to fight infections. Specifically, Migori County, has had the highest rates of maternal and child mortality and HIV prevalence in Kenya. Approximately 6 in 100 newborns die in the first few months and 82 out of 1,000 children will die before they turn 5 years old.[2] Malaria, respiratory illness, diarrhea and anemia are the largest causes of child mortality, while the leading cause of maternal death stems from obstetric hemorrhage.[2] In Migori County, there is only one nurse per 1,478 people and one doctor per 24,000 people.[2] These severe challenges to health infrastructure make debilitating health crises hard to surmount.

Figure 1: Life in Lwala

Lwala Community Alliance ("Lwala") is a non-profit community-led organization in Migori County that has brought over 60,000 people together to bridge the substantial gap in healthcare access and solve many of the health problems that Kenya continues to battle.[3]

---

[1] Rogers A, Mbeya J. Lwala Community Alliance 2017 Annual Report. Lwala Community Alliance

[2] Community-led Maternal and Child Health. Lwala Community Alliance; 2018.

[3] Starnes JR, Chamberlain L, Sutermaster S, Owuor M, Okoth V, Edman W, et al. Under-five mortality in the Rongo Sub-County of Migori County, Kenya: Experience of the Lwala Community Alliance 2007-2017 with evidence from a cross-sectional survey. Plos One. 2018 Jul;13(9)

Founded by Drs. Milton and Fred Ochieng', brothers from the community, Lwala is committed to improving prevailing conditions through active participation and involvement.[4] They impart change within Migori county, working side by side with local government health centers in order to collect data and provide on-site training and coaching. Their plan to scale-up services has resulted in incredible healthcare growth and incorporates three main strategies: direct service delivery, government technical assistance, and peer replication.[5]

- **Primary care**: The Lwala Community Hospital is directly managed by Lwala Community Alliance, in partnership with the Ministry of Health. It stands as a center of excellence in primary health care delivery that Lwala uses as an example for government facilities. The hospital is staffed with clinicians ready to treat and care for individuals with illnesses such as malaria, respiratory infections, parasites, HIV, and TB. The hospital partners with the Kenyan Ministry of Health to provide HIV testing and primary care.[2] Additionally, the hospital plays an indispensable role in maternal and child reproductive healthcare through prenatal care, assistance in delivery, and family planning services.[5]

- **Government Health Facilities:** Lwala supports an additional seven government facilities and plans to partner with more in future years. Lwala also trains and recruits facility management committees. Within these government health facilities, Lwala has implemented a Quality Improvement Initiative with a Quality Improvement Assessment Tool that measures the performance level of each of these government health facilities and consists of a patient satisfaction survey, staff satisfaction survey, a clinical quality assessment, and case observation guidelines. This creates an efficient feedback mechanism by which the health facilities are consistently growing and improving.[4]

- **Community Health Workers:** By recruiting traditional midwives and training them to be professional Community Health Workers (CHWs), over the past ten years, Lwala has improved child and maternal mortality rates, prenatal care, and nutrition. CHWs are paid, trained, and supervised individuals providing health support to the community through the following two outreach efforts.

  - **Maternal and Child Health**: CHWs actively work with pregnant woman in their homes, providing maternal counseling, nutrition education, and delivery assistance. Additionally, they follow-up with counseling sessions and other educational materials on infant care, breastfeeding, and contraception. In the period from 2011 to 2017, skilled deliveries in Lwala communities increased from 26% to 97%, compared to the county average of 53%.[1] Moreover, in an effort to reduce child mortality, these CHWs screen children for common diseases and provide treatment methods at home, which has lead to a 64% reduction in child deaths. These workers also vaccinate children to prevent early childhood mortality.[1]

---

[4] Lwala Community Alliance [Internet]. Lwala Community Alliance. [cited 2018Nov4]. Available from http://lwalacommunityalliance.org/
[5] Ochieng' M. Lwala Insider Report Q3 2018. Lwala Community Alliance; 2018.

- ○ **Nutrition**: CHWs screen families that are at risk for malnutrition, enrolling such individuals in agricultural, gardening, and nutrition training. Acute malnutrition is treated immediately with intense clinical training, hospitalization, and therapeutic food. CHWs then follow up daily after hospitalization to provide more nutritious food and create a long-term food security program for malnourished individuals and households.

Figure 2: Community Health Workers meet with a new mom

Figure 3: DIG Agricultural training

- ● **Sanitation**: Village-level Water, Sanitation, and Hygiene (WASH) community teams and members have constructed latrines and secured water sources to reduce the spread of waterborne illness. In 2017, 96.1% of people in the Lwala communities treated their water before drinking and over 300 latrines were built.[1]

- ● **HIV education:** In addition to primary care, there are robust educational programs and informative community-based efforts to teach HIV positive individuals ways to avoid further infections. The HAWI program helps individuals living with HIV to seek counseling and support.[1]

  - ○ **HAWI: HIV and Water, Sanitation, & Hygiene Integrated Care:** Meaning "good luck" in the local language, Dholuo, HAWI combines the HIV initiatives and WASH programs mentioned above. Minimizing risk of infections for individuals living with HIV is important since they have depressed immune systems and trouble warding off infections. HAWI uses the WASH program methods to decrease the risk of infection from diseases such as diarrhea and malaria that

are associated with poor sanitation. The model, consisting of the four key components below, encourages proactive engagement from the community to address these issues.[4]

- **Community Health Worker Monitoring**: Each HIV-positive individual is partnered with a CHW who acts as a counselor to provide psychosocial support and guidance during monthly home visits. Community Health Workers utilize the WASH program by encouraging participants to use chlorine treatment packets to purify water. Each packet is distributed during facility visits and community gatherings and can last a month. Water filters can also be purchased at the Lwala Community Hospital.[4]

- **Support Groups**: HAWI psychosocial support groups meet monthly so that individuals living with HIV can seek peer support and education. There are currently 40 HAWI psychosocial support groups with over 983 members.[4]

- **Community-Led Total Sanitation**: This program promotes WASH programs within the village. First, local leaders are trained on Water, Sanitation, and Hygiene and then promote these practices within their communities. The leaders organize "Action Days" to build latrines and handwashing locations for those individuals who cannot build their own.[4]

- **Water Infrastructure:** In villages that are Open Defecation Free, water points are rehabilitated. There are two completed water rehab projects where hand dug wells were converted to hand pump wells in order to protect water sources from contamination.[4]

Country Profile

Population, Climate, Geography

Kenya is located along the equator in Sub-Saharan Africa next to two large bodies of water, Lake Victoria and the Indian Ocean, giving it warm and humid coastal areas. Its interior largely consists of temperate savannah grasslands, forests in the western territory, and more arid regions in the North and East. The climate of Kenya supports a diverse population of wildlife, many of which are protected territories, reserves, and national parks.[6,7]

Kenya has a population of approximately 48 million representing a diverse number of the major ethnic, racial, and linguistic groups of Africa including many Bantu-speaking tribes and the Nilotes.While the official languages of Kenya are English and Swahili, the diverse ethnic groups of Kenya speak multiple indigenous languages.[8] Luo is the language spoken by most of the people in the Migori region, where Lwala is located.

---

[6] "Kenya Geography." [Internet]. WorldAtlas. Available from: https://www.worldatlas.com/webimage/countrys/africa/kenya/keland.htm
[7] "Kenya" [Internet]. Wikipedia. Available from: https://en.wikipedia.org/wiki/Kenya

Due to a falling mortality rate and high birth rate, Kenya has undergone rapid population growth in recent history. The population is quite young. The median age being 19.7 years old and over 40% of the population under 15 years old.[8] Only 7% of the population is over 55 years old.[8] Christianity is the major religion of Kenya with 83% of the population identifying as such, followed by 11.2% identifying as Muslims.[8] Indigenous religions are largely not practiced and some have been adapted to Christianity mostly in rural areas.[10] The main religion in the Lwala communities is Seventh Day Adventist.

Migori county borders Lake Victoria on its Western front and it's capital is Migori Town. The coastal location and high altitude of Migori County gives it a pleasantly temperate climate in the heart of the African tropics and sugar belt wetlands of Western Kenya.[9] Migori's climate is characterized by two seasons marked by rainfall. The first, the "long rains," spans from March to May, while the second, the "opon," spans from September to November, with dry months lying between the rainy seasons. Average temperatures range from 74 to 87 degrees Fahrenheit.[9] Migori has one main highway, the A-1 road, which passes from Rongo to Isebania to the neighboring country of Tanzania. This is the only paved road in Migori that is up to bitumen standard. A quarter of the rest of the roads are gravel and the majority are earth roads.[9]

Education and Economy

In 2016, Migori was home to 1,126,300 inhabitants and is projected to grow to 1.3 million people by 2019. This area represents one of the most diverse ethnoracial and linguistic populations in the former Nyanza Province.[9,10] Education rates vary among the population: 15% of residents have either a secondary level of education or above, 65% of residents have completed primary school, and 20% have no formal education at all.[10] Approximately two thirds of people in Migori country live in rural areas. Paid employment is at 9% for residents with either no formal education or only a primary education and 22% for those with a secondary level of education. The overall employment rate in Migori is 12.3%, a little over half that of Kenya at large.[10] The Migori poverty rate was estimated at 45.8% in 2006.[11]

Health

Migori County has by higher rates of maternal and child mortality compared to the rest of Kenya. Half of children are delivered without skilled personnel, 6 in 100 die within the first month of life, and 82 in 1,000 die before their first birthday.

---

[8] "Kenya Demographics Profile 2018." [Internet]. IndexMundi. Available from: https://www.indexmundi.com/kenya/demographics_profile.html

[9] Finding Kenya. "Migori County Touring Guide." [Internet]. Finding Kenya. Available from: https://www.findingkenya.com/migori-county-touring-guide

[10] Kenya National Bureau of Statistics. "Exploring Kenya's Inequality." [Internet] Kenya National Bureau of Statistics and the Society for International Development - East Africa. Available from: https://www.knbs.or.ke/download/migori-county/

[11] KNOEMA. "Migori." [Internet]. Knoema. Available from: https://knoema.com/atlas/Kenya/Migori

Furthermore, almost half of infants are delivered without a skilled attendant, further increasing the risks of both mother and infant during childbirth.[12] The health professional concentration of Migori is low, with one nurse per 1,478 people and one physician per 24,000.[12] In Lwala's catchment region, child under-five mortality has fallen from 104.8 per 1,000 live births between 1999 and 2006, to 53 per 1,000 following the establishment of the Lwala Community Alliance in 2007, a testament to the strides made in improving the health outcomes of the region. That number has continued to fall, measured at 29.5 deaths per 1,000 in 2017. Similarly, with Lwala, skilled delivery has reached over 97% of births, a substantial increase from 26% in 2010 when Lwala first began collecting this data.[12] The leading causes of under-five mortality are malaria (19%), respiratory infection (13%), and anemia (11%). Multiple factors are associated with under-five mortality including multiple gestation pregnancies, birth during the long rain season, and short birth spacing.[11] One of the leading causes of maternal death is obstetric hemorrhage, which contributes to approximately 25% of maternal deaths globally, and can better treated when a woman is birthing in a hospital setting.[10]

Noncommunicable Diseases

According to the World Health Organization, noncommunicable diseases (NCDs) are chronic diseases that last for long periods of time across one's life span. NCDs are often due to genetic, environmental, physiological, and behavioral factors and tend not to be the result of infectious agents. Cardiovascular disease, cancers, chronic respiratory diseases, and metabolic diseases, such as diabetes, are several main kinds of NCDs.[12]

Traditionally thought to be diseases of the "rich," the prevalence of NCDs in developing countries is on the rise.[13] Of the 14 million annual deaths attributed to NCDs, 85% occur in developing countries. NCDs are the cause of approximately 31% of deaths in Kenya, or approximately 370,000 deaths, 50% of hospital admissions, and 40% of hospital deaths.[13,14] Though most deaths are still due to communicable diseases, two NCDs, ischemic heart disease and cerebrovascular disease, are ranked fourth and fifth respectively as leading causes of deaths among Kenyans in 2016.[15] Mortality and morbidity of NCDs continues to rise.

The main causes of NCDs in Kenya are high tobacco and unhealthy alcohol use, lack of physical activity, and unhealthy diets, which may be the effects of spreading globalization. Additionally, as life expectancy rises, NCDs have become primary causes of death. Nine percent of women and 3% of men between the ages of 15-49 have been diagnosed with

---

[12] Lwala Community Alliance. "Community-led Maternal and Child Health." LWALA.
[13] Starnes R., Chamberlain L., Sutemaster S., Owuor M., Okoth V., Edman W., and Moon T. "Under-five mortality in the Rongo Sub-County of Migori County, Kenya: Experience of the Lwala Community Alliance 2007-2017 with evidence from a cross-sectional survey." [Internet]. PLOS ONE. Available from https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0203690
[14] World Health Organization. "Noncommunicable diseases." [Internet]. World Health Organization. Available from: http://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
[15] World Health Organization. "UN, Kenyan government take broad-based approach to fighting NCDs." [Internet]. World Health Organization. Available from: http://www.who.int/nmh/events/2014/kenya-ncd-prevention/en/

high blood pressure and 1% of both sexes have been diagnosed with diabetes.[16] These diagnoses increase with age and are more common in urban areas. It may be possible there are gaps between diagnosis and disease prevalence, even with the rising rates of NCDs.[16] Approximately 32.3% of school aged children and 53% of college aged students have smoked in their lifetime, and this rate continually rises. In the adult population, approximately 26% are regular smokers.[17] Alcohol consumption is also a major cause of NCDs in Kenya, as 42% of the population has had an at least one alcohol-related incident within the past year. Although 72% of children are deemed physically active, rural children are more active than urban resident children. Migori is a more rural region than most of Kenya, but physical activity levels are still falling from generation to generation.[17]

In the former Nyanza Province, within which Migori County lies, only 7.8% of women have had a health professional perform examinations for breast cancer and 12.9% have done self examinations. Only 13.1% of women have had cervical cancer exams and 3.4% of men have had prostate cancer examinations. Hypertension diagnosis by providers number at 7.3% for women and 4.3% for men and diabetes diagnoses at 0.7% and 1.6%. 83% of Nyanza women and 80% of men are uninsured.[18] At the Lwala facility, 234 cases of hypertension, 126 cases of diabetes, 102 cases of asthma, 51 cases of epilepsy, and 1 case of mental disease was seen between January and October of 2018.

Migori county also has a high rate of HIV, 14.7%, which is three times higher than the rest of Kenya and one of the highest rates in Kenya. Children make up 12% of the population living with HIV.[19] Rates of diabetes have been found to be higher in people living with HIV than in the general population, which may be a considerable risk factor in the Lwala catchment region.[20] HIV treatments alter blood cholesterol levels, increase blood glucose levels, and may lead to the development of diabetes. Additionally, certain diabetes medications can cause complications with HIV regimens.[21] Inflammation related to HIV leads to early development of cardiovascular disease.

---

[16] Mwangi M. *Government in new drive to beat non-communicable diseases*. [Internet]. Daily Nation. Available from:
https://www.nation.co.ke/news/Non-communicable-diseases-cause-most-deaths-in-Kenya/1056-4350706-10ruy1tz/index.html
[17] Institute for Metrics and Evaluation. "Kenya." [Internet]. University of Washington. Available from:
http://www.healthdata.org/kenya
[18] Kenya National Bureau of Statistics and ICF International. "2014 Demographic and Health Survey Key Findings." [Internet]. Available from https://www.dhsprogram.com/pubs/pdf/sr227/sr227.pdf
[19] Yonga G. *Case Kenya Study:- NCD Situation*. [Internet] Aga Khan University. Available from:
http://nationalacademies.org/hmd/~/media/Files/Activity%20Files/Global/ControlChronicDiseases/Sess2Sp2Yonga.pdf
[20] Kenya National Bureau of Statistics. "Kenya Demographic and Health Survey 2014." [Internet] Available from
http://www.nutritionhealth.or.ke/wp-content/uploads/Downloads/Kenya%20Demographic%20and%20Health%20Survey%20KDHS%20Report%202014.pdf
[21] National AIDS Control Council. "Migori County HIV & AIDS Strategic Plan." [Internet] Available from https://nacc.or.ke/?mdocs-file=3775&mdocs-url=false

Problem Statement

Rural Kenya faces many challenges to healthcare access for both communicable and non-communicable diseases (NCDs). Lwala has worked to combat this issue, but as the epidemiological transition continues to sweep across the area, the organization must shift its focus to encompass all the most pressing health issues.

While Lwala has made great strides with regards to healthcare access in rural southwestern Kenya, the organization is looking to build upon their current successes in treating and preventing communicable diseases. The Ministry of Health has invited Lwala to scale their operations throughout the entirety of Migori county in order to mitigate the burden of the advent of NCDs across a larger area. Lwala has historically used a three pronged approach of direct service delivery, government technical assistance, and peer replication to scale their operations. *The challenge is to propose a viable way for Lwala to rapidly and sustainably grow in order to reduce NCD levels in Kenya*.

Your Task

Develop a strategy to increase non-communicable disease prevention and treatment efforts at Lwala Community Hospital. This strategy could serve as a model to scale-up prevention and treatment in the region.

Expanding Lwala's medical coverage to non-communicable diseases is a complex and nuanced process that will reach over 150,000 people across 12 health facilities. Lwala is seeking proposals that offer solutions for incorporating treatment and prevention of NCDs into Lwala's existing structure in order to apply for a three-year grant of $600,0000. These proposals will need to offer an interdisciplinary and sustainable solution. The most effective solution to this problem will encompass economic, political, and social aspects of the issue in addition to public health considerations. Your team is charged to create a grant proposal that is actionable, realistic, and prioritized. The proposal should include a timeline that considers both immediate implementation and long-term sustainability needs. Please remember to thoroughly justify your decisions, plans, and priorities.

As you develop your proposal, consider possible ways to incorporate NCD treatment and prevention into Lwala's existing framework. To optimize effectiveness, consider possible expansion in areas of individualized client support, transportation, training facilities and equipment, quality improvement, and data collection. Any suggested training improvements will need to consider recruitment, scope of practice, and sustainability as well as cultural nuances. Quality improvement and data collection will need to address cellular service and Wi-Fi access. Also consider what other similar organizations have done successfully and unsuccessfully in similar settings.

Your team should prepare an 10-minute oral presentation with supporting slides outlining your plan for Lwala. Strong presentations will include elements such as a timeline or Gantt chart, a logical framework (LogFrame), and a budget. Effective presentations will not exceed 10 presented slides (excluding citations). Additional appendix slides may be included for judges' reference, but should not be presented orally. All members of your group should be present for

the final presentation and be prepared to respond to questions from the judging panel, though it is not a requirement that all group members speak. There will be 5 minutes of questions from the judging panel immediately following your presentation. Remember to cite all sources that were consulted on a single slide at the end of your presentation. Please bring four physical copies of your slide deck to the presentation for the judges to have in hand. Email your saved slide deck to vigh.ghcc@gmail.com before 5PM on February 15th, 2019. No late entries will be accepted.

Representatives from Lwala Community Alliance, including the Kenyan Managing Director, will use the judging rubric (see page 15) to review all proposal presentations on February 16th, 2019 to determine which teams will move forward to the final round.

Glossary

Bitumen standard- A bitumen standard road is one that has been paved with bitumen, a dark colored or black amorphous material that may be solid, semi-solid, or viscous, most often used in construction and often termed as asphalt in the United States. Different countries and regions have different standards for bitumen.

Cerebrovascular disease- Cerebrovascular disease refers to a group of diseases that affect cerebral circulation and/or the brain blood vessels. This may result from strokes which can damage blood vessels supplying the brain or high blood pressure (hypertension) which can also change the shape and properties of blood vessels.
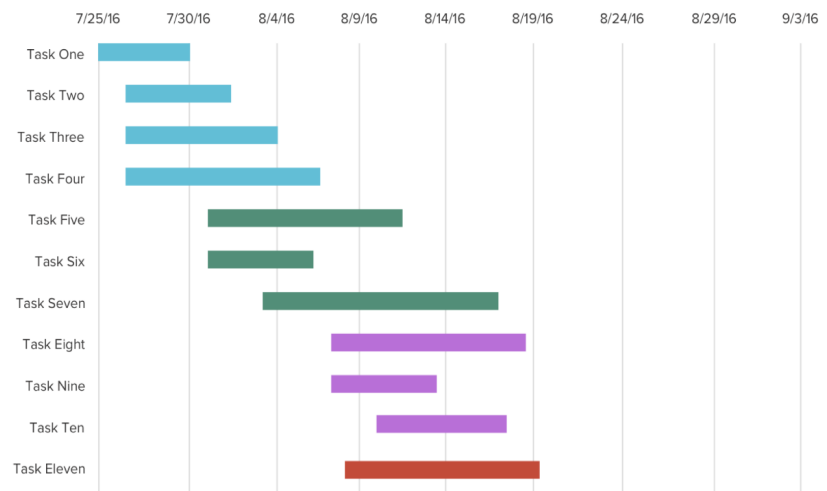
Child mortality rate- The child mortality rate is the number of children who die by the age of five, per thousand live births per year. In 2015, the world average was 43 (4.3%), down from 91 (9.1%) in 1990.

Communicable diseases- A communicable disease is one that is spread from one person to another through a variety of ways that include: contact with blood and bodily fluids; breathing in an airborne virus; or by being bitten by an insect.

Community Health Workers- Lwala Community Health Workers play a key role in disease prevention by providing health education at the household and community level for immunizations, reproductive health, water sanitation and hygiene among others. CHWs also provide referrals, community mapping services and WASH promotion, contraceptive services, and conduct household follow-ups with the use of mobile phones to remind clients to comply with treatment including scheduled visits like antenatal (ANC) and postnatal care (PNC).

Epidemiological transition- The epidemiologic transition is that process by which the pattern of mortality and disease is transformed from one of high mortality among infants and children and episodic famine and epidemic affecting all age groups to one of degenerative and man-made diseases (such as those attributed to smoking) affecting principally the elderly.

Gantt chart- To the right is an example of a Gantt chart, which illustrates a project schedule and shows the dependency relationships between activities and current schedule status. Note dates across the top and tasks on the left axis. The colored lines indicated when tasks will occur.

Ischemic heart disease- Ischemic heart disease refers to a disease in which the delivery of blood to the heart is obstructed, usually due to the buildup of plaque in arteries supplying the heart such as the coronary arteries. This is also called coronary heart disease.

Logical framework (LogFrame)- Below is an example of a LogFrame, which outlines elements of the project.

Project Description	Indicators	Source of Verification	Assumptions
Overall objective: The broad development **benefit** to which the project contributes – at a national or sectoral level	Measures the extent to which a contribution to the overall benefit has been made. Used during evaluation. However, it is often not appropriate for the project itself to try and collect this information.	Sources of information and methods used to collect and report it (including who and when/how frequently).	
Purpose: The development **outcome** at the end of the project – more specifically the expected benefits to the target group(s)	Helps answer the question 'How will we know if the purpose has been achieved'? Should include appropriate details of quantity, quality and time.	Sources of information and methods used to collect and report it (including who and when/how frequently)	Assumptions (factors outside project management's control) that may impact on the purpose-objective linkage
Results: The direct/tangible results (**products**, good and services) that the project delivers, and which are largely under project management's control	Helps answer the question 'How will we know if the results have been delivered'? Should include appropriate details of quantity, quality and time.	Sources of information and methods used to collect and report it (including who and when/how frequently)	Assumptions (factors outside project management's control) that may impact on the result-purpose linkage
Activities: The **tasks** (work programme) that need to be carried out to deliver the planned results (optional within the matrix itself)			Assumptions (factors outside project management's control) that may impact on the activity-result linkage

Maternal mortality rate- The Maternal Mortality Rate refers to the death of a woman during pregnancy or within 42 days of termination of pregnancy, irrespective of the duration or site of pregnancy from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. It is abbreviated as MMR and is represented as a rate per 100,000 women.

Non-communicable diseases (NCDs)- NCDs, also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behaviours factors.

World Bank- The World Bank is not a bank in the ordinary sense, but a unique partnership to reduce poverty and support development and is a vital source of financial and technical assistance to developing countries around the world.

Works Cited

Finding Kenya. "Migori County Touring Guide." [Internet]. Finding Kenya. Available from: https://www.findingkenya.com/migori-county-touring-guide

Institute for Metrics and Evaluation. "Kenya." [Internet]. University of Washington. Available from: http://www.healthdata.org/kenya

"Kenya" [Internet]. Wikipedia. Available from: https://en.wikipedia.org/wiki/Kenya

"Kenya Demographics Profile 2018." [Internet]. IndexMundi. Available from: https://www.indexmundi.com/kenya/demographics_profile.html

"Kenya Geography." [Internet]. WorldAtlas. Available from: https://www.worldatlas.com/webimage/countrys/africa/kenya/keland.htm

Kenya National Bureau of Statistics. "Exploring Kenya's Inequality." [Internet] Kenya National Bureau of Statistics and the Society for International Development - East Africa. Available from: https://www.knbs.or.ke/download/migori-county/

Kenya National Bureau of Statistics. "Kenya Demographic and Health Survey 2014." [Internet] Available from

Kenya National Bureau of Statistics and ICF International. "2014 Demographic and Health Survey Key Findings." [Internet]. Available from https://www.dhsprogram.com/pubs/pdf/sr227/sr227.pdf

KNOEMA. "Migori." [Internet]. Knoema. Available from: https://knoema.com/atlas/Kenya/Migori

Lwala Community Alliance. "Community-led Maternal and Child Health." LWALA.

Lwala Community Alliance [Internet]. Lwala Community Alliance. [cited 2018Nov4]. Available from http://lwalacommunityalliance.org/

Mwangi M. *Government in new drive to beat non-communicable diseases*. [Internet]. Daily Nation. Available from: https://www.nation.co.ke/news/Non-communicable-diseases-cause-most-deaths-in-Kenya/1056-4350706-10ruy1tz/index.html

National AIDS Control Council. "Migori County HIV & AIDS Strategic Plan." [Internet] Available from https://nacc.or.ke/?mdocs-file=3775&mdocs-url=false

Ochieng' M. Lwala Insider Report Q3 2018. Lwala Community Alliance; 2018.

Rogers A, Mbeya J. Lwala Community Alliance 2017 Annual Report. Lwala Community Alliance Community-led Maternal and Child Health. Lwala Community Alliance; 2018.

Starnes JR, Chamberlain L, Sutermaster S, Owuor M, Okoth V, Edman W, et al. Under-five mortality in the Rongo Sub-County of Migori County, Kenya: Experience of the Lwala Community Alliance 2007-2017 with evidence from a cross-sectional survey. Plos One. 2018 Jul;13(9)

World Health Organization. "Noncommunicable diseases." [Internet]. World Health Organization. Available from: http://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

World Health Organization. "UN, Kenyan government take broad-based approach to fighting NCDs." [Internet]. World Health Organization. Available from: http://www.who.int/nmh/events/2014/kenya-ncd-prevention/en/

Yonga G. *Case Kenya Study:- NCD Situation*. [Internet] Aga Khan University. Available from: http://nationalacademies.org/hmd/~/media/Files/Activity%20Files/Global/ControlChronicDiseases/Sess2Sp2Yonga.pdf

Judging Rubric

Category	Possible Points
Justification (data and evidence) The proposed intervention… ● Accounts for education, economic, political, and cultural factors ● Is evidence-based ● Includes relevant data to support project ● Analyzed strengths, weaknesses, opportunities, and threats/challenges (SWOT analysis)	20
Creativity and Innovation The proposed intervention… ● Integrates multiple disciplines ● Uses resources creatively ● Reflects "outside-the-box" thinking ● Is culturally acceptable and relevant ● Is feasible with regard to financial, human resource, and time constraints ● Has potential for expansion and growth	25
Clarity and Organization The proposed intervention has… ● Clear definition of problem ● Outcomes are specific, measurable, achievable, realistic, and time-bound (SMART objectives) ● Plan for assessment and evaluation of goals and outcomes ● Logical implementation of activities	20
Case Specific Information The proposal addresses … ● How it will alleviate the critical global health issue ● How it will impact education, economics, politics, and culture of the Lwala community and surrounding region ● Feasibility of implementation ● Sustainability beyond funding period ● Cultural acceptability and involvement of local communities and leaders	25
Delivery (voice, body, eye contact) Presenters… ● Effectively use visual aids (PowerPoint, Prezi, etc.) ● Have a clear voice, appropriate use of body language, and make eye contact with audience/judges ● Demonstrate knowledge and command during Q & A session	10
Total possible points	100