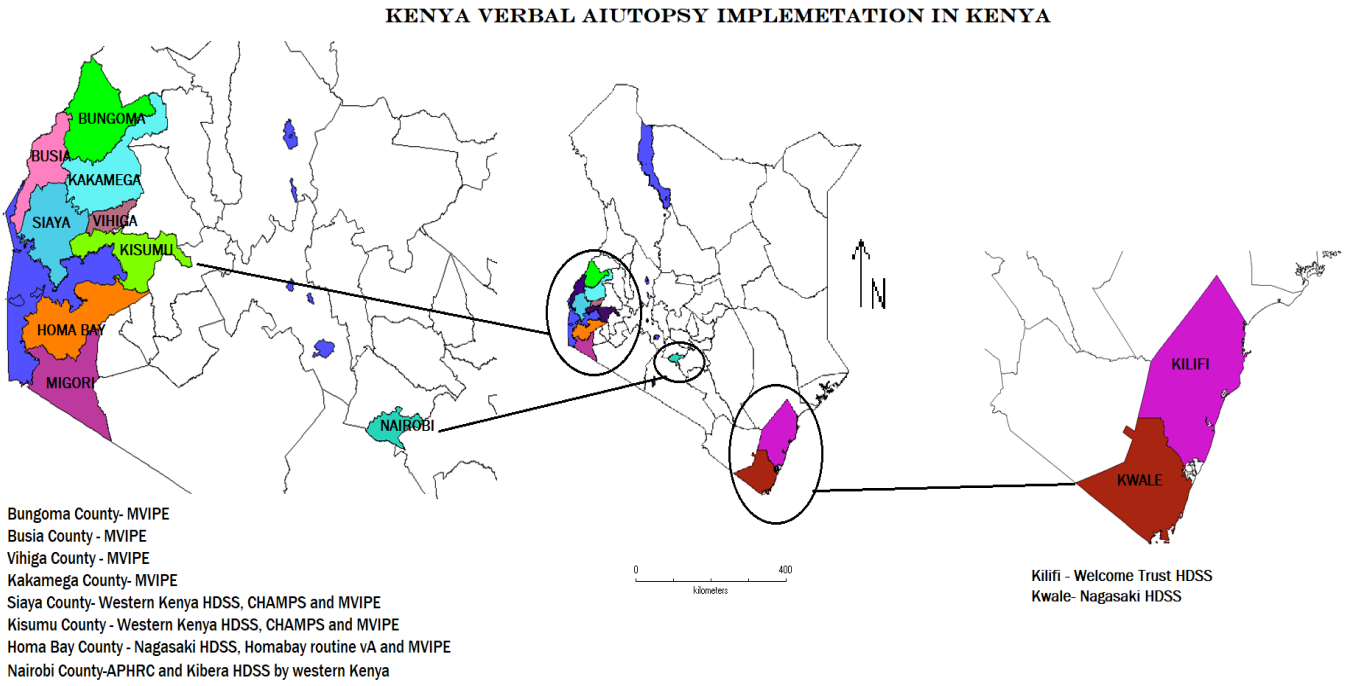
Republic of Kenya

Ministry of Health

Landscape Assessment of Verbal Autopsy (VA) implementation in Kenya



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Foreword

Accurate and reliable vital health statistics (on births, deaths, and the causes of death) generated by a well-functioning system are fundamental for appropriate health policy, planning and programming. Civil registration and vital statistics (CRVS) system, plays an important role of generating data on births, deaths and marriages for good governance, health outcomes and monitoring of sustainable development goals (SDGs). [1]

Medical certification of cause of death is key in providing measurements of disease burden and health outcomes. In the current health set up, not all deaths have medical certification of cause of death, therefore verbal autopsy is a feasible compliment. In Kenya verbal autopsy has primarily been used in research settings and there are efforts to integrate it into civil registration systems for community-based deaths.

This landscape assessment on verbal autopsy implementation aimed at providing a baseline information on; the current status of verbal autopsy, identify the approaches used, the achievements and challenges and make recommendations for strengthening verbal autopsy implementation in Kenya. The information generated from this assessment will provide evidence to support improved coordination, implementation, partnership and linkage of verbal autopsy. The assessment was done using a cross-sectional study design targeting seven implementing partners identified through INDEPTH Network and medical research organizations in Kenya.

The study established that there was no uniformity and legal framework to facilitate verbal autopsy implementation in Kenya. Furthermore, there was weak collaboration and linkage amongst stakeholders which may affect the ability to share information, innovations and best practices. Moreover, there was no standardized curriculum for training on verbal autopsy being used by stakeholder, minimal engagement of experts in training and coding on causes of death. There is need to investment in the ICT infrastructure and systems; where different stakeholders are implementing independently and there is no system of integration in place.

This report therefore provides evidence to facilitate the stakeholders to develop a road map for a sustainable implementation of verbal autopsy in Kenya. It is my appeal to development partners and all stakeholders to use the evidence generated from this report to strengthen our Vital Health statistics especially ensuring that all deaths are recorded with cause or probable cause of death.

Dr Patrick Amoth –

Director General – Ministry of Health

Acknowledgment

[1] (Organization, n.d.)

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Abbreviations and Acronyms

APHRC	African Population and Health Research Center
CHA	Community Health Assistant
CHAMPS	Child Health and Mortality Prevention Surveillance
CHV	Community Health Volunteer
COD	Cause of Death
CRVS	Civil Registration and Vital Statistics
HDSS	Health Demographic Surveillance System
KCSE	Kenya Certificate of Secondary Education
MVIPE	Malaria Vaccine Implementation and Evaluation Program
NGAOs	National Government Administrative Officers
ODK	Open Data Kit
UHDSS	Urban Health Demographic Surveillance System
US CDC	United States Centers for Disease Control and Prevention
USSD	Unstructured Supplementary Service Data
VA	Verbal Autopsy
WHO	World Health Organization
SDG	Sustainable Development Goals
MCCD	Medical certification of cause of death
WHO	World Health Organization

1.0 INTRODUCTION

The availability of accurate, timely and reliable vital statistics (on births, deaths, and the causes of death) generated by a well-functioning vital statistics system are the foundation of rational health and public policy, more so in an ever-changing global health ecosystem. Civil registration and vital statistics (CRVS) systems, plays an important role in generating data for good governance, health outcomes and monitoring of sustainable development goals (SDGs) [2]. Globally, death registration has risen gradually to around 50%. This represents a critical deficiency in national civil registration and vital statistics (CRVS) systems, which main aim is to register all births and deaths in populations[3].

The scarcity of current, complete, and accurate primary data on causes of death in most of sub-Saharan Africa restricts the ability of countries to measure progress against many of the Sustainable Development Goal targets, measure the impact of programmatic interventions, prioritize and plan to address their health needs, and achieve the goals of the Africa Agenda 2063 hence missing out on the benefits of an efficient CRVS system.

In 2018, Kenya national death registration coverage was 40.5% which is significantly low, with some counties recording as low as 4.1% [4] . This means approximately 60% of deaths are un-accounted for. In addition, approximately 59% of the registered deaths have medical certification of cause of death whereas the remaining have no probable cause of death. The Ministry of Health therefore recommends use of VA as a complement to Medical certification of cause of death (MCCD), to provide critical vital statistics information where routine systems are otherwise lacking [5]

Verbal autopsy (VA) is a method for interviewing the caregiver of a deceased person, using a standard questionnaire, to capture signs and symptoms experienced by the deceased prior to death, resulting in a probable cause of death. The process has emerged as the leading method targeted to enhance mortality surveillance efforts among more than half the world's population for which low quality or no mortality data are available. A number of countries, such as India, Bangladesh, Brazil, Sri Lanka, China, and Tanzania, have already incorporated verbal autopsy into their routine health surveillance systems and the World Health Organization (WHO) has called for its greater use to monitor the levels and trends of causes of death within populations. [6]

There are also efforts to integrate verbal autopsy into civil registration systems for community-based deaths; however, there is no evidence in Kenya for successful implementation of verbal

[2] WHO.CRVS Assessment,2020

[3] L. Hussain-Alkhateeb et al.,2019 Enhancing the value of mortality data for health systems: adding Circumstances Of Mortality CATegories (COMCATs) to deaths investigated by verbal autopsy

[4] Kenya Vital Statistics Report, 2018

[5] Kenya Verbal Autopsy Standards and Guidelines, 2019

[6] (*Demographic and Health Surveys Program. Afghanistan Mortality Survey 2010 Verbal Autopsy Data. Calverton, Maryland, USA, 2011. Available at Https://Dhsprogram.Com/Data/Dataset/Afghanistan_Special_2010.Cfm. Accessed 8 Dec 2017.*, n.d.; Gaete-Darbó et al., 1964; Streatfield et al., 2014)

autopsy within a non-research, community-based setting and in the context of a country's legal civil registration and vital statistics (CRVS) system.[7]

1.1 General objective

The aim of this assessment was to undertake a comprehensive landscape assessment on verbal autopsy with a view to understand the characteristics of past or current verbal autopsy implementation in Kenya.

1.1 Specific objective

1. To evaluate the current status of the Verbal Autopsy in Kenya
2. To identify the approaches of verbal autopsy implementation in Kenya
3. To identify the achievements and challenges of verbal autopsy implementation in Kenya
4. To make recommendations for strengthening verbal autopsy implementation in Kenya

1.2 Purpose

This Landscape assessment report on Verbal Autopsy implementation provides a baseline information on the current status of Verbal Autopsy in Kenya. The information generated from this assessment will provide evidence to support improved coordination, implementation, partnership and linkage of verbal autopsy in Kenya. The assessment sought to answer the following questions:

1. What is the status of the Verbal Autopsy practices in Kenya?
2. What are the various approaches of verbal autopsy implementation in Kenya? (what, by who, where and how)
3. What are the achievements and challenges of verbal autopsy implementation in Kenya?
4. How can the results of this assessment be used to strengthen verbal autopsy implementation in Kenya?

[7] (Nichols et al., 2018)

2.0 METHODOLOGY

This section highlights the method that is used to identify stakeholders, define the tools used to collect information and analysis procedures used to extract data.

2.1 Assessment Design

This Verbal Autopsy landscape assessment was done using a cross-sectional study design. It was conducted between June and November 2020 through virtual forums by engaging key stakeholders.

The assessment was conducted in three (3) phases;

a. Phase 1- inception and questionnaire development involved:
    i. Mapping the stakeholders currently implementing VA.
    ii. Engagement of stakeholders to develop the standardized questionnaire.
    iii. Pre-test the developed questionnaire.
    iv. Stakeholders agreed to include and target all Verbal Autopsy implementing partners.
b. Phase 2 - Data collection involved:
    i. Conducting the virtual key informants' interviews where the sessions were recorded.
c. Phase 3 - Data extraction and analysis involved:
    i. Data extraction, validation, analysis and report writing.

2.1.1 PHASE 1: Inception and questionnaire development

There was a process of stakeholders mapping that was done through a consultative process through the INDEPTH Network and research organizations in Kenya.

The following VA stakeholders were identified within the Country:

1. KEMRI Welcome Trust HDSS in Kilifi County
2. Nagasaki HDSS in Mbita and Kwale Counties
3. African Population Health and Research Center (APHRC) HDSS sites in Nairobi County
4. Western Kenya HDSS sites in Siaya and Nairobi County
5. Malaria Vaccine Initiative Program Evaluation (MVIPE) in Busia, Bungoma, Kakamega, Vihiga, Siaya, Kisumu, Homabay and Migori counties.
6. Child Health and Mortality Prevention Surveillance (CHAMPS) in Kisumu and Siaya Counties
7. Homabay routine VA Implementation Project in Rachuonyo North sub-county

All the above stakeholders were assessed except for CHAMPS.

The team that was undertaking this landscape assessment undertook desk review of key international and in-country publications. Based on the findings from the desk review, the team developed a questionnaire. The assessment questionnaire was developed using virtual meetings and the questions were agreed upon through consensus. The questionnaire was structured

according to thematic areas supporting the objective of the assessment where it was pretested using a peer to peer expert review method.

A google form version of the questionnaire was developed for data extraction and analysis processes.

The finalized validated questionnaire is available in the appendix I

2.1.2 PHASE 2: Data collection

The Stakeholders build consensus to target all VA implementing partners in Kenya for the interviews. The key informants (VA champions) were identified and contacted to schedule appropriate time for the interview.

The interviews were conducted by MOH supported by KEMRI-CDC through virtual calls based on agreed time and day per key informant, thus was done within one month. This approach was in adherence to COVID-19 protocols.

During the interviews, the key informants were able to identify other key stakeholders to be interviewed (snowballing).

2.1.3 PHASE 3: Data extraction and analysis

The data was extracted from audio recordings, notes from interviewers and hard copy questionnaire data, transcribed into the google form developed.

During the data extraction, data from audio recordings and notes were used to validate the data collected using the hard copy questionnaire. The validation process was done through virtual consensus meeting among the interviewers.

The analysis process involved downloading data in csv form and organizing it into thematic areas of the questionnaire. There was a structured way of analysis the data and developing a structured report.

2.2 Choice of the assessment method

The choice of the virtual interview was informed by the following;

1. The need to enlist experts in verbal autopsy both in-country and outside-country to enrich the assessment process.
2. Use of virtual method is less costly but most effective in the COVID-19 period.
3. The need to adopt a methodology that adheres to COVID-19 protocols

2.3 Limitations of the assessment

1. Intermittent internet connections affected the key informant interview sessions hence prolonging durations of the interview.

2. Difference in time zones led to having longer completion time of all the interviews and restricted scheduling time in-order to be in sync.
3. COVID-19 pandemic working protocols led to delays of the project activities as laid out in the initial workplan. (Appendex 2)

3.0 RESULTS

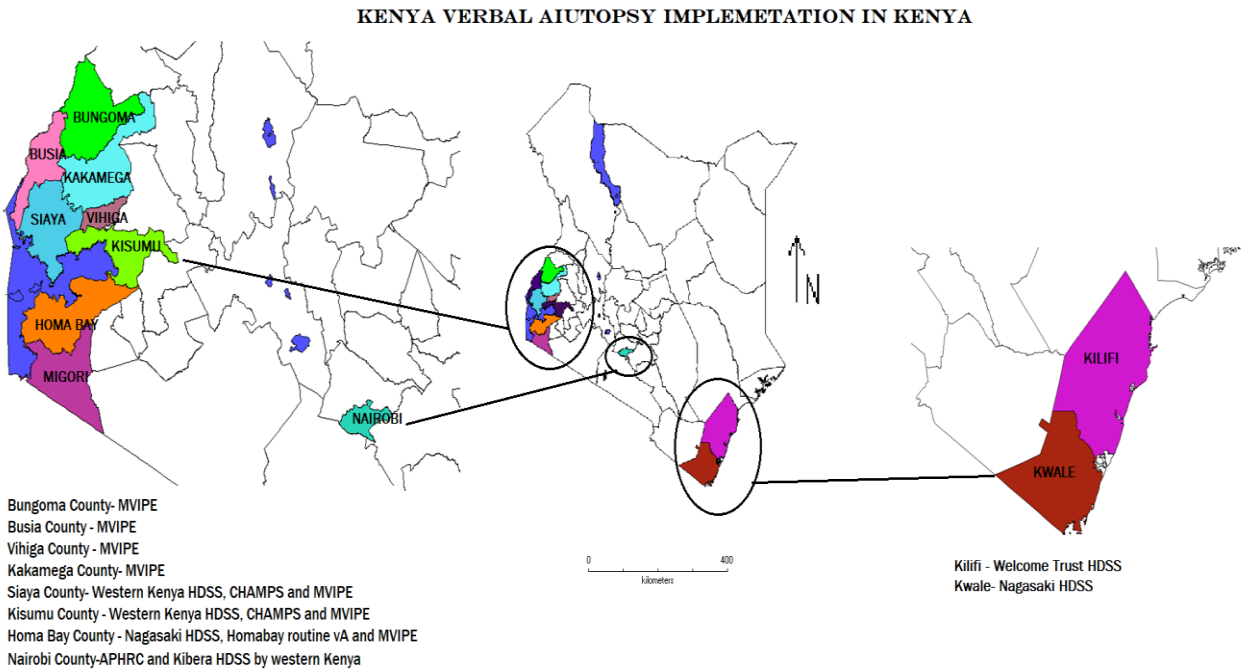


Figure 1: Map showing HDSS/MVIPE sites in Kenya

This chapter presents the results of the landscape assessment of verbal autopsy implementation in Kenya. The results are presented in key thematic areas as per the objectives.

1. **To evaluate the current status of the Verbal Autopsy in Kenya**
   Overview

3.1 Overview

The overview of the verbal autopsy implementation are as follows;

Kilifi Health and Demographic Surveillance Site (KHDSS): The project was established in 2000 by Kenya Medical Research Institute (KEMRI), the Wellcome Trust and the University of Oxford in Kilifi county. Their focus areas are routine surveillance for the HDSS study area residents; tracking inpatients care in Kilifi County Hospital from admission until discharge and tracking women during pregnancy till birth. They conduct Verbal Autopsy for all deaths that occur within the study area as part of mortality surveillance. The population under surveillance is approximately 280,000 within an area of 900km^2 served by Kilifi County hospital. [8]

Nagasaki HDSS: The project was established by Nagasaki University Institute of Tropical Medicine and Kenya Medical Research Institute (NUITM-KEMRI) Project. The HDSS is implemented in two sites; Mbita sub-county in Homabay County in 2008 and Kwale county in 2011. The main objective of the HDSS is to provide a platform for population-based research on relationships between diseases and socio-economic and environmental factors, and for the evaluation of disease control interventions. The conduct verbal autopsy for all deaths within the

[8] (Scott et al., 2012)

study area. Kwale site covers an area of 360km^2 while Mbita site covers an area of 160km^2; with an approximate population of 70,000 for each site. [9]

Nairobi Urban Health And Demographic Surveillance Site(NUHDSS): The project was established by African Population and Health Research Centre (APHRC) in 2002.Their scope is to provide a platform to investigate the long-term social, economic and health consequences of urban residence, and to serve as a primary research tool for intervention and impact evaluation studies focusing on the needs of the urban poor. The verbal autopsy component of the project was started in 2003 where it covered all deaths. It is implemented in two (2) sites; Korogocho and Viwandani slums in Nairobi County with an approximate population of 85,0000 per site each within an area of 2km^2. [10]

Malaria Vaccine Impact Program and Evaluation (MVIPE): This evaluation project started in 2019, and is being implemented in collaboration with Centers for Disease Control and Prevention (CDC) and the Kenya Medical Research Institute (KEMRI). The main focus is to evaluate the impact of RTS,S/AS01 on all-cause mortality in children aged 5-39 months, malaria mortality, and rate of hospitalization with malaria (as an indicator of severe malaria) and the gender-specific effect of RTS, S/AS01 on all cause child mortality. The evaluation is being carried out in eight counties in the western part of Kenya namely; Busia, Bungoma, Kakamega, Vihiga, Siaya, Kisumu, Homabay and Migori counties. [11]

Western Kenya HDSS: This project is run by The KEMRI Center for Global Health and Research Health (KEMRI-CGHR) Health and Demographic Surveillance Site (HDSS). It was founded in 2001 as a platform for collecting general demographic and health information (such as population age structure and density, fertility rates, birth and death rates, in- and out-migrations, patterns of health care access and utilization and the local economics of health care) as well as disease- or intervention-specific information. The project conducts verbal autopsy on all deaths in the demographic surveillance area. The project is implemented in: Siaya County (Rarieda , Alego-usonga and Gem sub-counties) and Nairobi County (Kibra sub-county). In Siaya county the estimated population was 260,000 within an approximated area of 700km^2, while In Nairobi the estimated population was 32,000 within approximated area of 2.5m^2. [12]

HOMABAY CRVS PROJECT: This was a pilot project that was established by KEMRI/CDC in collaboration with Bloomberg philanthropies and Homabay County in 2016 to 2019. It was carried out in Rachuonyo North sub-county, serving as the first model on implementing and supporting routine Verbal Autopsy through community health strategy. The estimated population covered was 200,539 within an approximate area of 435km^2 .

2. To identify the approaches of verbal autopsy implementation in Kenya

[9] (Wanyua et al., 2013)
[10] (Beguy et al., 2015)
[11] ("Efficacy and Safety of RTS,S/AS01 Malaria Vaccine with or without a Booster Dose in Infants and Children in Africa: Final Results of a Phase 3, Individually Randomised, Controlled Trial.," 2015)
[12] (Odhiambo et al., 2012)

3.2 Verbal Autopsy implementation

Community death identification, notification and reporting:

Kilifi Health and Demographic Surveillance Site (KHDSS): Field workers visits every household after every three months, within which they also capture and notify deaths. The facility maternity or inpatient teams also capture deaths that happen in the facility and it falls under HDSS area, the data is synchronized to VA database.

Nagasaki HDSS: Deaths are identified by field workers through routine HDSS surveillance every three months. The local authorities also notify the surveillance team about community deaths.

Nairobi Urban Health and Demographic Surveillance Site (NUHDSS): Field workers visits every household after every six months, within which they also capture and notify deaths using the routine HDSS surveillance.

Malaria Vaccine Impact Program and Evaluation (MVIPE): Any time a death of an under five occurs, the Area CHV notifies the Lead CHV on the event in their respective villages. The Lead CHV then visits the House hold, verifies the death, send a USSD notification to data center and proceed to complete a death notification form within two weeks of death. The CHAs scan the locator forms which are sent to the data centre.

Western Kenya HDSS: Any time a death occurs, the village reporters fill death notifications forms which are submitted monthly to the respective supervisors. The forms are forwarded to the data centre for scanning.

Homabay CRVS project: CHVs record any deaths that occur in their respective villages using a death locator form which are submitted monthly to the CHEWs. The CHEWs then fill the information in to ODK.

VA Instruments used: All stakeholders use WHO VA 2016 tool apart from Kilifi HDSS which use WHO VA 2012 tool. Out of the six stakeholders, only MVIPE and Western Kenya HDSS modified their tools by including malaria vaccine questions for 5 to 48 months children and immunization questions for all children under 5 years respectively.

The Verbal Autopsy process: after notification of deaths, all sites provide an average of 21-30 days grieving period before visiting a household to conduct a Verbal Autopsy interview.

3.3 Human resource capacity and management:

The human resource involved in a VA implementation can be either project-based or government-based. The funding capacity for both categories may differ and thus influence the size of geographical area of

coverage, staffing capacity, ratio of supervisors to interviewers, education requirements for each cadre, amount of compensation and incentives provided and the roles that each cadre play in the processes.

Stakeholder	**Personnel and capacity building**
KEMRI Kilifi HDSS	**VA Interviewers: approximately** 5 to 6 out of 40 fieldworkers are trained to conduct Verbal Autopsy **Staffing:** HDSS employed staffs on contract **Education:** Kenya Certificate of Secondary Education **(**KCSE) C/C+ **VA Interviewers/population: 1/47,000 individuals, 5-6 in 900km2**
	VA Supervisor: HDSS Field supervisors **VA supervisors/Population:** 1/140,000 individuals, 2 in 900km2 **Supervision:** Have accompanied VAs since 2016, They are assigned work every day and are provided with vehicles and motorcycles to help in supervision and field work. They keep track of VA interviews that were not completed, refusals and where there were no appropriate respondents **Education: KCSE C/C+,** Institution provides diploma training for at least 3 willing staffs/fieldworkers. **Ration:** 2 supervisors for 6 interviewers but they also have other supervisory activities apart from VA.
	VA Training: **VA trainers:** VA coordinators **Additional facilitators:** clinicians when need be, to clarify medical conditions and symptoms **Training content/modules:** VA Questionnaire, Consent training, communication skills, general counselling and first aid measures. **Training/Refresher:** done once annually **Training period:** 1 week **Grief counselling done:** No
Nagasaki HDSS	**Education:** Post-secondary education alongside computer packages skills. **N/B:** Post -secondary education include Certificate, diploma and degree

	VA Interviewers: Field managers are the VA interviewers. They are approximately 4 in Kwale and 4 to 5 in Mbita Averagely 3 VAs per day for each interviewer **Staffing:** HDSS employed staffs on contract **VA Interviewers/population: 1/15,500 individuals, in kwale 4 in 360km2 and mbita 5 in 160km2**
	VA supervisor: HDSS Field supervisor **VA supervisors/Population: 1/70,000 individuals** **Education:** must have a minimum requirement of a bachelor's degree certificate **Ration:** 2 supervisors (1 for each site) **Supervision:** ✓ Oversees management of data from the database by checking for completeness check, tracking mourning period, do random repeat VAs (5 approximately monthly) and data cleaning. ✓ Accompanied VAs started but interfered with VA quality hence stopped. ✓ The Supervisors also have access to data and review it and then clean it before analysis is done. ✓ They also perform data validation manually for all data, and when overwhelmed they sample data to be reviewed and do follow up with Field Interviewers.
	VA Training: **VA trainers:** Clinician **Additional facilitators:** Not mentioned. **Training content/modules:** Use customized training tool that incorporates**;** training on clinical issues arising from VA, ICD 10 coding, consenting and approach to respondents, sensitivity training in conducting VA, VA Questionnaire interview process and question interpretation, communication skills and occasionally grief counselling. **Training/Refresher:** done twice annually; after conducting reviews and having meetings with the VA interviewers. **Training period:** Not mentioned **Grief counselling done: Yes, by clinician**

APHRC HDSS	**VA Interviewers:** Field supervisors are the VA interviewers who are approximately 8 in number. **Education**: minimum diploma or degree holder ?? holder **Staffing:** HDSS employed staffs on contract **VA Interviewers/population: 1/20,500 individuals**
	VA Supervisor: HDSS field coordinators who are also responsible for all HDSS operations **VA supervisors/Population: 1/165,000 individuals** **Staffing:** all employed staffs **Ration:** 1 supervisor for the 2 sites **Supervision** ✓ They do completeness checks for VAs done. ✓ They do supervised interviews only for new interviewers. ✓ Review all VA data from field before data is synced to the main database
	VA Training: **VA trainers:** Senior interviewers **Additional facilitators:** VA section head **Training content/modules:** Use VA training package as provided by WHO**;** incorporates training on research methodology, research ethics, grief counselling and management, VA Questionnaire modules and skip patterns, VA Questionnaire interview process and question interpretation and communication skills. **Training/Refresher:** done twice annually beginning of every round **Training period:** 5 days **Grief counselling done: Yes, during training**
MVIPE	**VA Interviewers:** CHAs are the VA interviewers who are approximately 98 in number, spread across 8 counties (4 in Nyanza and 4 in Western). **Education**: minimum requirement of Diploma holder in a public health related field. **Staffing:** Ministry of health staffs but given reimbursements for VAs done **VA Interviewers/population:** approximation is not feasible

	VA Supervisors: both the Team leads and regional Supervisors. **VA supervisors/Population:** approximation is not feasible **Staffing:** all employed staffs **Education:** minimum requirement of diploma holders **Ration:** 8 supervisors for all sites (2 regional supervisors and 6 team leads) **Supervision:** ✓ The regional supervisors do active follow up on pending VAs after doing completeness checks and follow up with their respective team leads in their regions. ✓ They ensure study CHAs update their logs accordingly for tracking, and they also perform accompanied interviews monthly for 10% of VAs done.
	VA Training: **VA trainers:** A pool of VA trainers from KEMRI-CGHR HDSS **Additional facilitators:** Study coordinator, data manager, regional coordinators and VA supervisors **Training content/modules:** Use VA training package as provided by WHO**;** incorporates training on research methodology, research ethics, consenting process, VA interview sensitivity training, VA overview, Roles of VA interviewer and VA supervisors, VA Questionnaire modules and skip patterns, VA Questionnaire interview process and question interpretation and communication skills. **Training/Refresher:** done once annually **Training period:** 5 days per region hence 10days for 2 regions (western and Nyanza) **Grief counselling done: Not yet done**
Western Kenya HDSS	**VA Interviewers:** Community VA Interviewers who are 3 in Siaya and 1 in Kibera. **Education:** minimum of KCSE Certificate with previous experience in HDSS or research settings with added advantage of counseling certificate **Average VAs per month**: Siaya 120 cases, Kibera 2 per week **Staffing:** all employed staffs **VA Interviewers/population: Siaya: 1/87,000, Kibera: 1/32,000**
	VA Supervisor: Trained staffs (HDSS field supervisors)

	Education: minimum of KCSE level with added advantage of counseling**,** have certificate in community health and at least 1-year experience in VA. **Ration: There is only 1 supervisor in** Siaya for the 3 interviewers, but none Kibera **VA supervisors/Population: 1/260,000 individuals** **Supervision:** ✓ They Help track and distribute work to interviewers; they maintain logs for ✓ Quality checks for both VA Questionnaires and other tools. ✓ They conduct accompanied interviews which can be a percentage or all but selection is random. Requirement is at least 1 accompanied interview per month. ✓ They also perform other work like death notification tracking.
	<u>VA Training:</u> **VA trainers:** A pool of VA trainers from KEMRI-CGHR HDSS **Additional facilitators:** Study coordinator, project Principal Investigator, data manager, data specialist and VA Field supervisors **Training content/modules:** Use VA training package as provided by WHO**;** incorporates training on research methodology, research ethics, consenting process, VA interview sensitivity training, VA overview, Roles of VA interviewer and VA supervisors, VA Questionnaire modules and skip patterns, VA Questionnaire interview process and question interpretation and communication skills. **Training/Refresher:** done twice annually; beginning of every round **Training period:** 5 days **Grief counselling done:** Yes, occasionally when need arises after review.

Homabay routine VA Implementation Project	VA Interviewers: CHEWs are the VA interviewers who are approximately 28 in number, spread across 1 Sub county in Rachuonyo North **Education**: minimum requirement of Diploma holder in a public health related field. **Staffing:** Ministry of health staffs but given reimbursements for VAs done VA Interviewers/population: **1/5800**

	VA Supervisors: 7 ward supervisors and 1 overall sub count Supervisor from Health Management Team **VA supervisors/Population:** 1/28,648 **Staffing**: all GOK employed staffs **Education:** minimum requirement of diploma holders Supervision: ✓ The ward supervisors do active follow up on pending VAs after doing completeness checks and follow up with their respective team leads in their regions. ✓ They ensure CHEWs update their logs accordingly for tracking, and they also perform accompanied interviews monthly for 10% of VAs done. ✓ Supervisors conduct supervised VAs using a tool called supervisory tool loaded into ODK.
	VA Training: **VA trainers:** A pool of VA trainers from KEMRI-CGHR HDSS **Additional facilitators:** Study coordinator, statistician, County and sub county HMT and focal persons, Homabay county director of health **Training content/modules:** Use VA training package as provided by WHO**;** incorporates training on research methodology, research ethics, consenting process, VA interview sensitivity training, VA overview, Roles of VA interviewer and VA supervisors, VA Questionnaire modules and skip patterns, VA Questionnaire interview process and question interpretation and communication skills. **Training/Refresher:** done once annually **Training period:** 5to 6 days **Grief counselling done: yes, done only once so far**

3.4 Source of funding and collaboration with other stakeholders

Kilifi Health and Demographic Surveillance Site (KHDSS) project is funded by KEMRI Wellcome Trust. They work with Kilifi county by sharing data and annual surveillance reports on children vaccination completeness and probable cause of death for all community deaths.

Nagasaki HDSS: is funded by Nagasaki University and Japanese government. The project collaborates with the Kenya Medical Research Institute (KEMRI).

Nairobi Urban Health And Demographic Surveillance Site (NUHDSS) is funded by Use pooled funding from HDSS stakeholders to fund HDSS and its activities. The project collaborates and engages the County and national government during dissemination of results and sharing of HDSS results. They also work with the Community Advisory committee (where local administration officers are members) through sensitization of new projects, community mobilization and dissemination of results.

Malaria Vaccine Impact Program and Evaluation (MVIPE) is funded by WHO, Global Fund, and UNITAID. The project work within the government's community health structures to report deaths and implement verbal autopsy and collaborate with local administration and village leaders to improve overall death reporting. The projects also share mortality reports with the sub county Civil registration department for comparison and harmonization, in order to improve cause of death information.

Western Kenya HDSS is funded by Pooled funding availed through CDC, Washington University, CHAMPS, London School of Hygiene and Tropical Medicine, Henry Jackson Foundation, KEMRI, and other stakeholders that contribute from their project budgets. The project works with stakeholders like the community advisory board, county director of health. The project also collaborates with other contributing projects to HDSS work like MVIPE, CHAMPS, Homabay CRVS and Kilifi Wellcome trust.

Homabay CRVS project was funded by US CDC, CDC Foundation, Bloomberg Philanthropies. The project work within the government's community health structures to report deaths and implement verbal autopsy and collaborate with local administration and village leaders to improve overall death reporting. The projects also share mortality reports with the sub county Civil registration department for comparison and harmonization, in order to improve cause of death information.

3.5 Coordination and governance

VA reporting structure:

Kilifi Health and Demographic Surveillance Site (KHDSS

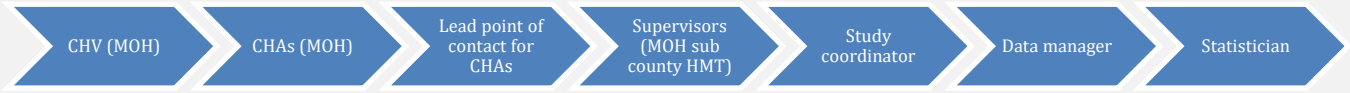
Nagasaki HDSS

Nairobi Urban Health and Demographic Surveillance System (NUHDSS)

Western Kenya HDSS

MVIPE

Homabay routine VA Implementation Project



3.6 Infrastructure and systems:

Stakeholder	Data system and platforms used
KEMRI Wellcome Trust Kilifi	**VA software:** Visual Basic VA application **VA Server:** SQL Server **Database:** SQL Server

	Data management software: STATA and SQL Server **Linkage to other systems:** No **unique ID:** HDSS ID **Experience with platform:** Easy to preload demographic information to VA questionnaire including unique identifier HDSS ID **How is data download:** data is pulled manually from SQL server via STATA codes **electronic data submission:** data is transferred when the windows-based netbooks are connected to the network and a synchronize button pressed. **Who does data analysis:** Full-time, project Statistician/Data analyst **COD Algorithm:** InterVA-4 **Database and application development** done by inhouse software programmer **Data analysis report dissemination:** Ongoing efforts to share data through integrated health management systems every 6months and train HRIOS on VA and give them access to de-anonymized datasets and other analytical datasets from HDSS.
Nagasaki HDSS	**VA software:** ODK Collect **VA Server:** ODK Aggregate **Database:** MySQL **Data management software:** STATA **Linkage to other systems:** No **unique ID:** HDSS ID **Experience with platform:** Remote data collection and timely submission of data **How is data download:** manually by using ODK Briefcase (no CLI) **electronic data submission:** yes, using ODK Collect **Who does data analysis:** Statistician and data analyst **COD Algorithm:** InterVA-4 **Database and application development:** Japanese firm contracted **Data analysis report dissemination:** Mortality analysis results and reports are shared with the managers and chief representatives in the Nairobi office for edits and review before dissemination.
APHRC	**VA software:** ODK Collect **VA Server:** ODK Aggregate cloud server **Database:** MySQL **Data management software:** not mentioned **Linkage to other systems:** No

	unique ID: HDSS ID **Experience with platform:** Difficulty in transitioning data from legacy systems into ODK platform in terms of data mapping; ODK platform needs investment in cloud hosting costs. **How is data download:** manually using ODK Briefcase (no CLI) **electronic data submission:** yes, after supervisor's review data, data is submitted electronically using ODK Collect **Who does data analysis**: Statisticians and data managers **COD Algorithm:** use InterVA4 but Maintain Physician coding (PCVA) for consistency purposes. **Database and application development:** done by inhouse software programmer **Data analysis report dissemination:** Mortality analysis results are posted and shared for public use through a micro data portal, where interested parties make an official request to APHRC in order to gain access to the data set needed.
MVIPE	**VA software:** ODK Collect **VA Server:** ODK Aggregate cloud **Database:** MySQL and CSV (Comma delimited file) **Data management software:** STATA/MS Access **Linkage to other systems:** No **unique ID:** Locator form file number **Experience with platform:** Ability to work well in a scaled-up environment/implementation **How is data download:** manually using ODK briefcase (no CLI) **electronic data submission:** done using ODK Collect **Who does data analysis:** Data manager who is also the study coordinator **COD Algorithm:** InterVA-5 **Database and application development:** Outsourced company QED **Data analysis report dissemination:** Data analysis mortality reports/results are disseminated to counties and sub counties through dissemination meetings held with the Health management Team.
Western Kenya HDSS	**VA software:** ODK Collect **VA Server:** ODK Aggregate cloud **Database:** SQL Server and PostgreSQL **Data management software:** STATA /R **Linkage to other systems:** No **unique ID:** HDSS ID, death notification file number

	Experience with platform: Ability to provide timely and reliable data submission and offline data collection **How is data download:** automated using ODK Briefcase Command Line Interface (CLI) **electronic data submission:** done using ODK Collect **Who does data analysis:** Data manager **COD Algorithm:** InterVA-5 **Database and application development:** done by in-house software programmer **Data analysis report dissemination:** Analysis results/mortality reports are shared with partners and local administration through disseminated meetings.
Homabay routine VA Implementation Project	**VA software:** ODK Collect **VA Server:** ODK Aggregate cloud **Database:** SQL SERVER **Data management software:** STATA and R **Linkage to other systems:** No **unique ID:** HDSS ID **Experience with platform:** Ability to provide timely and reliable data submission, can be used in scaled up environments, ability to collect data offline and submit remotely, cost effectiveness and thus easy to institutionalize. **How is data download:** automated using ODK Briefcase Command Line Interface (CLI) **electronic data submission:** done using ODK Collect **Who does data analysis:** Statistician **COD Algorithm:** InterVA-5 **Database and application development:** done by inhouse software programmer **Data analysis report dissemination:** Data analysis mortality reports/results are disseminated to counties and sub counties through dissemination meetings held with the Health management Team.

3.7 Lessons learnt:

From the landscape assessment the following lessons came up:

1. Verbal autopsies in Kenya is not implemented in a standardized way

2. The funding for verbal autopsy implementation was unpredictable and depends on external funding.
3. There is no established legal framework in the implementation of verbal autopsy in Kenya
4. Implementation of verbal autopsy in community setting is very critical for sustainability

3.8 Challenges

The following were the challenges that were observed and identified during the landscape assessment:

1. The identification of deaths was not standardized across the HDSSs.
2. Inadequate financial support affecting the sustainability of verbal autopsy implementation
3. High turnover of personnel involved in verbal autopsy implementation increasing the cost of training and re-training
4. Weak collaborations and linkage amongst stakeholders, this affects the ability to share information, innovations and best practices
5. The absence of a unified system on the implementation of verbal autopsy makes it difficult to share, analyze data and compare the mortality results
6. There were competing tasks among verbal autopsy implementers therefore compromising on the output and quality of data
7. High cost of Information Communication Technology investment (mobile devices, internet connectivity, servers, etc) hindered verbal autopsy implementation scale up
8. Lack of national standardized verbal autopsy curriculum
9. Minimum engagement of experts in verbal autopsy training and cause of death coding
10. Cultural beliefs and misconceptions affected the completeness of verbal autopsy questionnaire

3.9 Recommendations

1. The ministry of health to come up with implementation guidelines and standard operating procedures to support death identification and reporting
2. All players to operationalize the health sector partnership framework to address the weak linkages and collaborations among stakeholders
3. Verbal autopsy implementers should leverage on the existing national and county government structures to support verbal autopsy implementation and sustainability
4. The Ministry of Health in collaboration with Civil Registration Services to develop a legal framework for the integration of verbal autopsy results and civil registration statistics
5. Embed and operationalize verbal autopsy into community health strategy
6. The Ministry of Health to develop a national standardized verbal autopsy curriculum
7. Institutionalize verbal autopsy in all medical training institutions

8. Verbal autopsy stakeholders should undertake annual forums to disseminate results and share best practices
9. Verbal autopsy implementers should leverage on the existing national and county government Information Communication Technology structures and collaborations to support verbal autopsy implementation and sustainability
10. Verbal autopsy implementers should engage experts in verbal autopsy training and cause of death coding
11. Verbal autopsy implementers should continuously engage and dialog with the local communities

4.0 Conclusion

Mortality and cause of death statistics are critical for policy and programming in the health sector. Complete and accurate medical certification of Cause of deaths is key for vital statistics. In the absence of medical certification of cause of death, verbal autopsy is a feasible compliment when applicable legal frameworks, collaboration, integration, standardization and application of information technology is appropriately used. Therefore, there is need to strengthen the capacity of health system to support civil registration and vital statistics, mortality surveillance and verbal autopsy implementation; more so in the advent of emerging and re-merging medical conditions. There should be consideration to leverage on use of digital health solutions to strengthen the verbal autopsy process and management

Annex

Annex 1 Interview Guide

Landscape Assessment of Verbal Autopsy (VA) implementation in Kenya

The Ministry of Health and its stakeholders are planning to collect information as part of a landscape assessment of Verbal Autopsy implementations in Kenya. This information will be collected from Key stakeholders across the country. The information will provide a piece of baseline information on Verbal Autopsy implementation.

The availability of timely and reliable Vital statistics is a cornerstone in health systems strengthening especially in an ever-changing health ecosystem globally. The levels and causes of death in Kenya continue to limit efforts to build a solid evidence base for health policy, planning, and monitoring and evaluation. In settings where the majority of deaths still occur at home and where other routine data systems (e.g. civil registration, vital statistics, and medical certification of cause of death) do not function optimally, there is little chance that a death occurring away from health facilities will be recorded at all, let alone certified with a cause of death. Moreover, as established in Cap 149 of the laws of Kenya, the Civil Registration Services is mandated to register all births and deaths occurring in Kenya and those of Kenyan citizens occurring abroad.

Since 1971, registration of these events has been compulsory in Kenya however after 40 years, only 74% of all births and 40.5% of all deaths are registered as per 2018 annual reports. In these settings, verbal autopsy (VA), a process recommended by the World Health Organization (WHO), can be used to allow for the identification of causes of death. It can also support improved death registration practices if identified deaths information is shared with civil registration authorities. Verbal autopsy is also frequently used in research and disease-specific programmes.

The National Ministry of Health – the Division of Health Informatics, M&E and Research, through the CRVS Unit has identified your organization as a stakeholder with interest in Verbal Autopsy. It is in this respect that we welcome you to participate in an interview, with a desire to help understand VA practices in Kenya, as we seek collaboration to develop a standardized national model for VA for community deaths in Kenya. It would be ideal if you and/or representatives from your institution can participate in a discussion about VA practices your team is engaged in.

We would like to schedule a call with you over Zoom within the next two weeks, at your convenience. Below is a list of questions to guide our discussion with your team. Given the present status of operations, we will be glad to speak to you about these questions via phone/Zoom. We are highlighting those that may need advanced thought/data collection, but you do not need to send us responses in advance. Additionally, in advance of the discussion, we would welcome any information that we may review to learn more about your project before we speak. This could be various project documents or materials, SOPs, organograms, or whatever you are able to share that may be helpful.

Discussion Guide/Interview:

- Can you briefly tell us about your verbal autopsy work/efforts?
- When did your project begin?
- Does it have an end date?
- What is the overall objective of your project?/What are you trying to accomplish with verbal autopsy?
- Who provides funding for your work (including National and County government, training institutions, partners, as applicable)?
- Are you collaborating with the Government? Which department(s) in the Government?
- Do you work with County government? and how do you sensitize National government administrative officers (NGAOs) such as assistant chiefs, etc.
- Is this a research project or for routine implementation?
- What is the geographical scope of your project (e.g. entire county, multiple counties, etc.)
- Do you know the population size for the geographical area your project covers?
- What population does your project consider for VAs? (example: all deaths, <5, etc.)
- Do you do verbal autopsy on the whole population considered above or only a sample of these deaths?
- How many VAs do you do per year, on average, or how many did you manage to do last year (2019)?
- Which VA instrument do you use? Which version? Have you made any modification, etc.? Have you had any challenges with this instrument - if so, perhaps share on the call or through follow-up?
- How deaths are identified?
- After a death is identified, what happens next? Then what, etc.?
    - For follow up, if not already answered:

        - How are deaths reported for VA after they are identified? Who reports them? To where do they report them?
        - How follow up is done from reported deaths to conducting of VA?
        - Who conducts VA?
        - How are VAs tracked for completion?
        - Do you have business process maps for VA? If you have these, they would be helpful to see.
- What is the educational background/experience of VA interviewers?
- How many VA interviewers do you have?
- How many VAs does each interviewer do per month, on average (rough estimate)?
- Are the VA interviewers paid or volunteers? Are expenses covered? Are they otherwise incentivized?
- Who acts as VA Supervisors?
- How do they supervise VA? Describe all that's applicable.
    - For follow up, if not already answered:
        - Do they accompany VA interviewers for any interviewers? If so, what %?
        - Do they review the VA data? All or %?
        - Do they follow up to ensure VAs are completed?
- What is the educational background/experience of VA supervisors?
- How many VA supervisors do you have?
- How many VA interviewers do you have per VA supervisor?
- Are the VA supervisors paid or volunteers? Are expenses covered? Are they otherwise incentivized?
- How is the organization/project structured – is there an organogram available for VA personnel and departments? If you have this, it would be good to see.
- How is VA data collected? Which platform is used and why? What has your experience been like using this platform for VA?
- Is a unique identifier used? Is this a common/national ID or locally generated? Can this be linked with a common ID? What is this/how is it generated?
- How is VA data submitted once the interview is complete? Is this done manually or automatically, etc.?
- Where is VA data stored/hosted? Cloud or government server or other?
- How is data downloaded for analysis?
- Who analyzes the VA data?
- How is the VA data analyzed?/How is VA data used?
- How are VA result disseminated?
- Who develops and maintains the apps? Database? Do you have a trained programmer, etc.?
- What algorithms are used for Cause of Death and why?
- Is there linkage with CRVS and how? Are identified deaths registered? Are CODs shared?
- Is there linkage with MOH HIS? If so, how are these connected (manually or automated?)
- Plans for scale up? Institutionalization? Routine system integration?
- How do they train VA interviewers? How often? What materials do they use? Who leads the training? Modes of training?
- Do you include training for grief counseling?
- Do you have an M&E plan?

- Challenges and achievements/lessons learnt?
- Do you collaborate with other VA implementers in Kenya?
- Who else do you know doing VA in Kenya?
- Do you collaborate with other VA implementers outside of Kenya?
- Do they have thoughts about a central data repository?
- What documents/tools/instruments do you have that guide/facilitate your work?
- What national resources would be helpful, if any, for your VA work?

Would you find it helpful to collaborate more with VA stakeholders in Kenya? How might this be helpful? What types of collaboration would you like to see?

Assessment workplan:

The initial workplan on landscape assessment developed by the GGP project was to run through end of quarter 3 of 2020 . The assessment workplan involved the following phases;

a. Phase 1 involved:
    i. Mapping the stakeholders currently implementing VA.
    ii. Engagement of stakeholders to develop the standardized questionnaire.
    iii. Pre-test the developed questionnaire.
    iv. Stakeholders agreed to include and target all VA implementing partners.
b. Phase 2 involved:
    i. Conducting the virtual key informants interviews where the sessions were recorded.
c. Phase 3 involved:
    i. Data extraction, validation, analysis and report writing.

APPENDEX 2

These Gantt chart highlighting the implementation period is as below:

Deliverables and Milestones	**Responsible**	**2020**		
		Q2	**Q3**	**Q4**
Landscape Assessment/Stakeholder mapping of VA Practices in Kenya (Who is doing VA, where, with what tools and analysis methods, etc.)	MoH, KEMRI	X	X	

Year 2020	Q2			Q3			Q4		
Activity	**APRIL**	**MAY**	**JUNE**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
PHASE 1: Inception and questionnaire development									
PHASE 2: Data collection									

PHASE 3: Data extraction analysis report writing and dissemination									

Due to the limitations and delays brought about by COVID19 pandemic, the implementation duration was largely affected and made activities spill over to quarter 4 of 2020.

Deliverables and Milestones	**Responsible**	**2020**		
		Q2	**Q3**	**Q4**
Landscape Assessment/Stakeholder mapping of VA Practices in Kenya (Who is doing VA, where, with what tools and analysis methods, etc.)	MoH, KEMRI	X	X	X

Year 2020	Q2			Q3			Q4		
Activity	**APRIL**	**MAY**	**JUNE**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
PHASE 1: Inception and questionnaire development									
PHASE 2: Data collection									
PHASE 3: Data extraction, analysis, report writing and dissemination									