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### Evaluation Plan For A Mortality Surveillance System In Northwest Syria

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# Evaluation plan for a mortality surveillance system in Northwest Syria

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## **Abstract**

**Introduction:** Cause-specific population mortality data is one of the most useful metrics used to monitor and evaluate the severity of a crisis. However, the unique context of fragile and protracted armed conflicts creates obstacles for establishing a mortality surveillance system. When CRVS are not feasible, VA can be used to generate high-quality mortality rate estimates. There is currently little documentation of implementation and evaluation of mortality surveillance systems in conflict settings, and guidance for both is extremely limited. This thesis aims to contribute to these two knowledge gaps by providing an evaluation plan for a mortality surveillance system in Northwest Syria that uses VA as the main method for data collection.

**Methods:** The evaluation will be conducted post implementation and will assess the mortality surveillance system's effectiveness, performance, and value through seven of the system's attributes – timeliness, representativeness, acceptability, flexibility, stability, simplicity, and usefulness. Data will be collected through in-depth interviews, surveys, and document reviews.

**Discussion and Limitations:** The unique context of fragile and protracted armed conflicts introduced limitations to the evaluation as gold standards for surveillance are not feasible in these settings. These limitations were accounted for in the evaluation plan by modifying the CDC and ECDC's surveillance system evaluation guidelines.

**Conclusions:** The execution of this evaluation plan could result in highly valuable information about both the mortality surveillance system and the evaluation plan. Findings could help guide improvements to the mortality surveillance system in Northwest Syria and could also help guide stakeholders in similar contexts implement their own mortality surveillance systems. Next steps include assessing the function and feasibility of the evaluation plan itself and developing standardized interviews, surveys, and processes for document review.

## **Abbreviations**

CDC	Center for Disease Control and Prevention
CRVS	Civil and vital registration systems
ECDC	European Center for Disease Control and Prevention
HIS Unit	Health Information System in Northwest Syria
IDP	Internally displaced people
IGO	Inter-governmental organization
IHME	Institute for Health Metrics and Evaluation
NGO	Non-governmental organization
ODK	Open Data Kit
PHMRC	Population Health Metrics Research Consortium
VA	Verbal autopsy
WHO	World Health Organization

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## **Introduction**

Cause-specific population mortality data is one of the most useful metrics for monitoring and evaluating the severity of a crisis, yet it is also one of the most complex to collect (Sphere Association, 2018). This data is used by governments, implementers (i.e., IGOs, international and local NGOs), and donors to inform the humanitarian response, including resource prioritization and allocation, detection of emerging health threats, and advocacy (Cecchi, 2018; Fottrell, 2009). However, the unique context of fragile and protracted armed conflicts, such as those in Syria, Somalia, etc., create obstacles for data collection and impede conflict response, prevention, and reconstruction. Weakened health systems and civil infrastructure, ongoing conflict, and large forcibly displaced populations make it challenging to establish the mortality surveillance systems which are used to generate highly valuable mortality estimates (Bowden, Braker, Checchi, & Wong, 2012). There is currently limited documentation of mortality surveillance systems in conflict settings, and as such, best practices have yet to be defined. Similarly, few evaluations of mortality surveillance systems in conflict settings have been documented and guidance on how to conduct these evaluations is extremely limited.

Civil and vital registration systems (CRVS) provide the most timely and accurate source of death registration and often include cause of death data (Flaxman et al., 2015). Fragile and protracted armed conflict settings lack the infrastructure to support a reliable CRVS, however, and therefore an alternative system to generate cause-specific mortality data must be established. Methods that have been used to compensate in other contexts include retrospective household surveys, prospective community surveillance, key informant interviews, and verbal autopsies (VA) – all of which have the potential to be feasible in fragile or conflict settings and can be used in varying combinations (Cecchi, 2018). The use of these methods in fragile or conflict

settings could generate important population mortality estimates in areas where this information would have otherwise been impossible to collect.

VA are especially valuable tools for collecting mortality data from crisis-affected populations where the majority of deaths occur outside of health facilities (Thomas, D'Ambruso, & Balabanova, 2018; WHO, 2021). They are also useful for generating high-quality age- and sex- specific estimates of mortality rates which can be used to inform evidence-based decision-making in fragile and protracted armed conflict settings (WHO, 2021). In the case of Mogadishu, Somalia, VA were conducted among internally displaced people (IDP) living in camps during the 2017 drought and health emergency to determine mortality rates for children aged 6-59 months (Seal et al., 2021). Some studies have even shown that VA can provide population-level cause of death information that is of similar quality to death certification in hospitals (Murray et al., 2014). After recognizing the important gap that VA can fill, the World Health Organization (WHO) created a VA working group in 2013 that has since published multiple versions of VA standards and instruments, with the most recent version rolled out in 2022 (<https://www.who.int/standards/classifications/other-classifications/verbal-autopsy-standards-ascertaining-and-attributing-causes-of-death-tool>). The Institute for Health Metrics and Evaluation (IHME) has also developed additional VA tools based on WHO standards, including the validated Population Health Metrics Research Consortium (PHMRC) shortened questionnaire and SmartVA-Analyze application (<https://www.healthdata.org/verbal-autopsy/tools>).

According to the Center for Disease Control and Prevention (CDC), “the purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively” (CDC, 1988). Evaluations of



surveillance systems become especially useful when the surveillance systems are implemented using new methods or in new settings. This thesis will provide an evaluation plan for a mortality surveillance system in Northwest Syria that uses VA as the main method for data collection. In providing this evaluation plan, I hope to fill the two important knowledge gaps previously mentioned. In addition to its guidance on the process of conducting mortality surveillance system evaluations in conflict settings, findings generated from the use of this evaluation plan could help build documentation of mortality surveillance systems in these challenging environments.

## **Project Overview**

This evaluation plan was developed for a mortality surveillance system in Northwest Syria that aims to generate high-quality age- and sex- specific estimates of mortality rates, including cause-specific mortality. Northwest Syria comprises parts of Idlib, Aleppo, Hama, and Latakia governorates, and is mostly controlled by opposition forces. This region is home to 4.4 million people, with nearly two-thirds being IDP (UN OCHA, 2022). More than a decade of conflict has caused widespread destruction of the health system, which acts independently of any government (Sider, 2021).

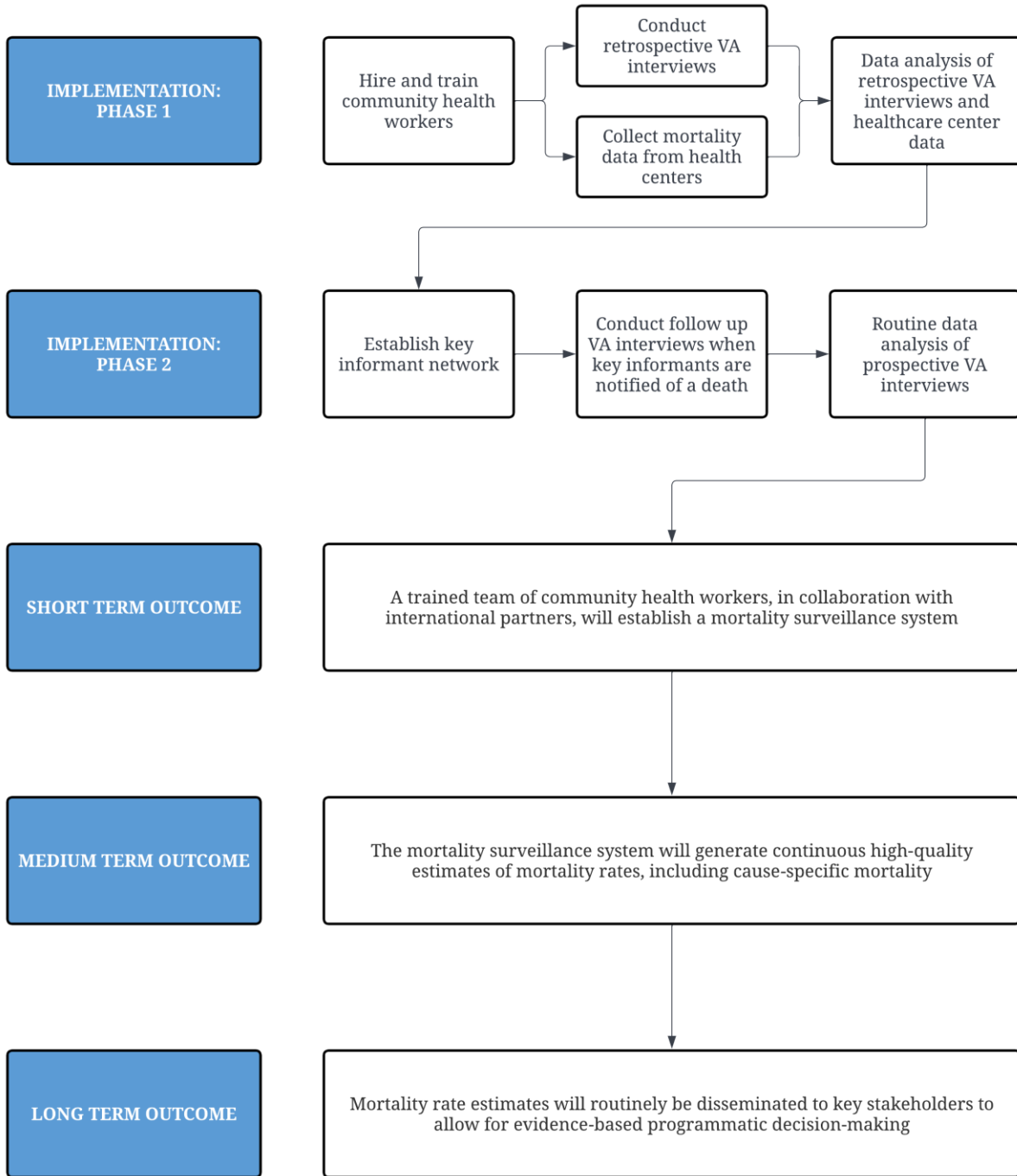
Key implementing partners for this project include the Health Information System in Northwest Syria (HIS Unit) and Physicians Across Continents. The HIS Unit was established in 2018 and leads the process of collecting health-facility based mortality data in Northwest Syria (<https://hisunit.org/>). Although this mortality data is highly valuable, it is likely that many deaths in Northwest Syria do not occur in health facilities and therefore are not captured with the current mortality data collection system. The implementation of a mortality surveillance system that uses VA as the main method for data collection could help to address the challenge of

capturing deaths that occur outside of health facilities. This form of mortality surveillance system could also importantly be able to help estimate the excess deaths due to COVID-19 in Northwest Syria.

There will be two phases to this project. In phase one, we will conduct retrospective VA interviews and we will also collect health-facility based mortality data from healthcare centers. This mortality data will be synthesized to establish baseline age- and sex- specific mortality rates, including cause-specific mortality rates. In phase two, we will build a mortality surveillance system to prospectively collect data, part of which will entail establishing key informant networks and conducting VA interviews. Key informants are responsible for notifying VA interviewers of deaths in their community, and as such are often well-trusted members or leaders in the community. In the context of Northwest Syria, key informants could include imams, community health workers, or family group leaders. Upon the successful implementation of the mortality surveillance system, mortality rate estimates will be generated and disseminated to key stakeholders to allow for evidence-based programmatic decision-making. Figure 1 provides a visual representation of the flow of activities and outcomes for this project.

VA interviews will be conducted on mobile devices using the IHME's PHMRC shortened VA questionnaire, with the Open Data Kit (ODK) Collect system being used for data collection. Results from these surveys will be uploaded onto the HIS Unit's Kobo server to then be analyzed using SmartVA Analyze.

Figure 1. Activity Flow Chart



## Methods

### *Purpose of Evaluation & Evaluation Questions*

This evaluation provides the opportunity to evaluate strengths and limitations of a mortality surveillance system in a setting such as Northwest Syria, where there is no functioning government and aid organizations are responsible for collecting important population counts. The main goals of this evaluation are to assess the effectiveness, performance, and value of the mortality surveillance system.

The evaluation was designed with guidance from the CDC's and the European Center for Disease Control and Prevention's (ECDC) guidelines for evaluating surveillance systems (CDC, 1988; ECDC, 2014). Between the two organizations' guidelines, 14 surveillance system attributes are suggested for evaluation. The CDC notes, however, that as all surveillance systems differ in methods, scope, purpose, and objectives, only the most relevant attributes should be selected. This evaluation will aim to assess the following seven surveillance system attributes:

1. Timeliness
2. Representativeness
3. Acceptability
4. Flexibility
5. Stability
6. Simplicity
7. Usefulness

These seven attributes were chosen because they represent the most critical aspects of the mortality surveillance system that will enable it to meet its objective of generating continuous, high-quality estimates of mortality rates for Northwest Syria. Attributes not selected for this

evaluation include sensitivity, specificity, positive and negative predictive value, validity, completeness, and data quality. Sensitivity, specificity, positive and negative predictive value, and validity were omitted due to the lack of true mortality data for the population under surveillance in Northwest Syria. Completeness was not included because the nature of the ODK Collect system does not allow for data fields to be skipped during interviews. Data quality encompasses validity and completeness and therefore was not chosen for the previously mentioned reasons.

A series of questions were developed to guide the assessment of the surveillance system attributes (see Table 1).

Table 1. Detailed Evaluation Questions

<b>Detailed Evaluation Questions</b>	
<b>Effectiveness</b>	<b>1. Timeliness</b> 1.1 What is the average amount of time it takes to register a death into the system (i.e. the time between the occurrence of a death and inputting the VA interview into SmartVA Analyze)? 1.2 What are the barriers, if any, to achieving more timely death registration?
	<b>2. Representativeness</b> 2.1 What proportion of the population is covered by the mortality surveillance system? 2.2 Does the proportion of the population covered by the mortality surveillance system accurately reflect characteristics of the entire population (e.g., age, socioeconomic status, geographic location, living arrangement, IDP status)?
<b>Performance</b>	<b>3. Acceptability</b> 3.1 What is the household participation rate in VA interviews (i.e. the percent of households where interview was not declined)? 3.2 Why do households choose not to participate in or complete VA interviews? 3.3 Do participants (e.g., staff, key informants, community members) have any safety concerns about involvement in the mortality surveillance system?
	<b>4. Flexibility</b> 4.1 How well can the mortality surveillance system adapt to changing needs or operating situations (e.g. its ability to cope with an increase in violence or mortality, change in weather, change to VA tools, availability of new technology, change in funding)? 4.2 If there was a change in needs or operating situation, what was the additional cost in time, personnel, or funds?
	<b>5. Stability</b> 5.1 Is the mortality surveillance system reliable (i.e. the ability to collect, manage, and provide data without failure)? 5.2 Is the mortality surveillance system available (i.e. the ability to be operational when needed)? 5.3 What are the greatest challenges to mortality surveillance system reliability and availability?
	<b>6. Simplicity</b> 6.1 What training is required for interviewers? 6.2 What are the methods for managing VA interview data (i.e. transferring, entering, cleaning, storing, backing up)? 6.3 What extent of data analysis is required? 6.4 What are the methods for generating and disseminating mortality reports? 6.5 How much time is spent on system maintenance? 6.6 Are mortality surveillance system tools easy to use (i.e. Kobo server, ODK Collect system, IHME VA questionnaire, SmartVA Analyze)?
	<b>7. Usefulness</b> 7.1 How often are mortality rates calculated and disseminated to stakeholders? 7.2 Is the data generated from the mortality surveillance system being used? 7.3 Who uses data generated from the mortality surveillance system? 7.4 How is the data generated from the mortality surveillance system used? 7.5 What actions are taken as a result of data generated from the mortality surveillance system?
	<b>Value</b>

## *Design and Data Collection*

This evaluation was designed to be conducted after the implementation of the mortality surveillance system and should be repeated in the following years as necessary. In-depth interviews with project management and staff will be conducted to collect qualitative data concerning timeliness, acceptability, flexibility, stability, and simplicity. Qualitative surveys will be sent to stakeholders to collect data on usefulness. Document reviews will be conducted to collect quantitative data to assess timeliness, representativeness, acceptability, and usefulness. The documents that will be reviewed include VA interviews, SmartVA Analyze reports, mortality reports generated from mortality surveillance system data, and reports from other organizations in Northwest Syria. An evaluation matrix was developed using the ALNAP Evaluation of Humanitarian Action Guide for reference (see Table 2) (ALNAP, 2016). The evaluation matrix provides a detailed plan for how to answer each evaluation question, and it can also serve as the basis for an evidence table which can be used to synthesize findings (ALNAP, 2016). Each row of the matrix represents an evaluation question and columns address evaluation design topics such as indicators, data sources, and data collection methods.

Table 2. Evaluation Matrix

Research Questions		Indicators	Data Source	Methods
<b>Timeliness</b>				
1.1	What is the average amount of time it takes to register a death into the system?	-Date of death -Date of SmartVA Analyze input	-VA interview -SmartVA Analyze reports	-Document review
1.2	What are the barriers, if any, to achieving more timely death registration?		-Staff	-Qualitative interview
<b>Representativeness</b>				
2.1	What proportion of the population is covered by the mortality surveillance system?	-Total number of individuals covered by mortality surveillance system -Population of Northwest Syria	-Program documents -Reports from other organizations collecting population counts	-Document review
2.2	Does the proportion of the population covered by the mortality surveillance system accurately reflect characteristics of the entire population?	-Demographics for population covered by mortality surveillance system -Demographics of Northwest Syria population	-Program documents -Reports from other organizations collecting population counts	-Document review
<b>Acceptability</b>				
3.1	What is the household participation rate in VA interviews?	-Number of interviews declined -Total number of interviews attempted	-VA interview -SmartVA Analyze report	-Document review
3.2	Why do households choose not to participate in or complete VA interviews?		-Staff -Community members if available	-Qualitative interview
3.3	Do participants have any safety concerns about involvement in the mortality surveillance system?		-Staff -Community members if available	-Qualitative interview
<b>Flexibility</b>				
4.1	How well can the mortality surveillance system adapt to changing needs or operating situations?		-Staff	-Qualitative interview
4.2	If there was a change in needs or operating situation, what was the additional cost in time, personnel, or funds?		-Staff	-Qualitative interview
<b>Stability</b>				



5.1	Is the mortality surveillance system reliable?		-Staff	-Qualitative interview
5.2	Is the mortality surveillance system available?		-Staff	-Qualitative interview
5.3	What are the greatest challenges to mortality surveillance system reliability and availability?		-Staff	-Qualitative interview
<b>Simplicity</b>				
6.1	What training is required for interviewers?		-Staff	-Qualitative interview
6.2	What are the methods for managing VA interview data?		-Staff	-Qualitative interview
6.3	What extent of data analysis is required?		-Staff	-Qualitative interview
6.4	What are the methods for generating and disseminating mortality reports?		-Staff	-Qualitative interview
6.5	How much time is spent on system maintenance?	-Percent of time/number of hours at work spent on maintenance	-Staff	-Qualitative interview
6.6	Are mortality surveillance system tools easy to use?		-Staff	-Qualitative interview
<b>Usefulness</b>				
7.1	How often are mortality rates calculated and disseminated to stakeholders?	-Frequency of mortality reports	-Mortality reports	-Document review
7.2	Is the data generated from the mortality surveillance system being used?		-Stakeholders	-Qualitative survey
7.3	Who uses data generated from the mortality surveillance system?		-Stakeholders	-Qualitative survey
7.4	How is the data generated from the mortality surveillance system used?		-Stakeholders	-Qualitative survey
7.5	What actions are taken as a result of data generated from the mortality surveillance system?		-Stakeholders	-Qualitative survey

### ***Dissemination plan***

Findings from this evaluation will be disseminated to all stakeholders (e.g., community members, key informants, staff, IGOs, and international and local NGOs) through appropriate methods in a timely manner. The intended audience will be considered when selecting the report format and mode of communication. Report formats to be developed include a technical report, executive summary, community brief, and PowerPoint presentation. Modes of communication of the reports may include emails, in-person or online meetings, and website postings.

### **Discussion and Limitations**

The implementation of a VA-based mortality surveillance system in Northwest Syria could help generate cause-specific population mortality data. This data could be useful for monitoring and evaluating the severity of the crisis and for informing the humanitarian response. Additionally, the execution of this evaluation plan could help ensure that the mortality surveillance system is operating efficiently and effectively. Its execution could also help fill two important knowledge gaps – the lack of documentation of mortality surveillance systems in conflict settings and the lack of guidance on the process of conducting mortality surveillance system evaluations in conflict settings.

However, significant challenges stemming from operating in a non-permissive environment could limit the implementation of this mortality surveillance system. Two of these challenges could include the loss of access to affected populations and the use of its data to cause harm. It is also possible that affected populations may report false information out of concern for their own safety. Additionally, many best practices for conducting surveillance often found in epidemiology literature are not feasible in this setting. For example, gold standards for counting

and reporting deaths do not exist, and a highly mobile population makes denominators challenging to determine.

These limitations of surveillance systems in conflict settings were acknowledged and accounted for in the development of this evaluation plan. This occurred through the modification of the CDC's and ECDC's surveillance system evaluation guidelines. These adaptations were made so that the evaluation plan could better suit the unique requirements for mortality surveillance system evaluations in conflict settings. For example, as previously mentioned, several surveillance system attributes recommended by the CDC and ECDC were not included in this evaluation plan due to the lack of true mortality data in Northwest Syria.

Another important limitation to this evaluation is the absence of community participation in interviews and surveys. This decision was made in part due to the difficulty of accessing affected populations, as well as out of respect for community members and the desire to avoid overburdening a population that has experienced high levels of trauma. VA interviewers and key informants will be relied upon to help provide the community perspective when evaluating the acceptability of the mortality surveillance system. If community members are available and willing to participate in qualitative interviews, however, their contribution to the acceptability evaluation will be welcomed.

Finally, this evaluation plan will be modified as the implementation plan is further developed, and more details become available. Changes to the permissiveness of the environment, logistical challenges, and data security precautions will also impact the evaluation plan and alter what is feasible and appropriate. Examples of potential modifications include changes to the data collection methods and sources of data, the timing of the evaluation, and the dissemination plan for evaluation findings.

## **Conclusion**

The execution of this evaluation plan could result in highly valuable information about both the mortality surveillance system and the evaluation plan itself, which could be useful for a large group of stakeholders, including governments, implementers (i.e., IGOs, international and local NGOs), and donors. Findings from the results of the evaluation plan concerning the effectiveness, performance, and value of the mortality surveillance system could help guide improvements to the original system in Syria. It could also help guide stakeholders in other fragile and protracted armed conflicts implement their own mortality surveillance systems. Important next steps also include assessing the evaluation plan itself to document its function and feasibility and to inform future evaluations of mortality surveillance systems in these unique settings. Additional research should include developing standardized interviews, surveys, and processes for document review.

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