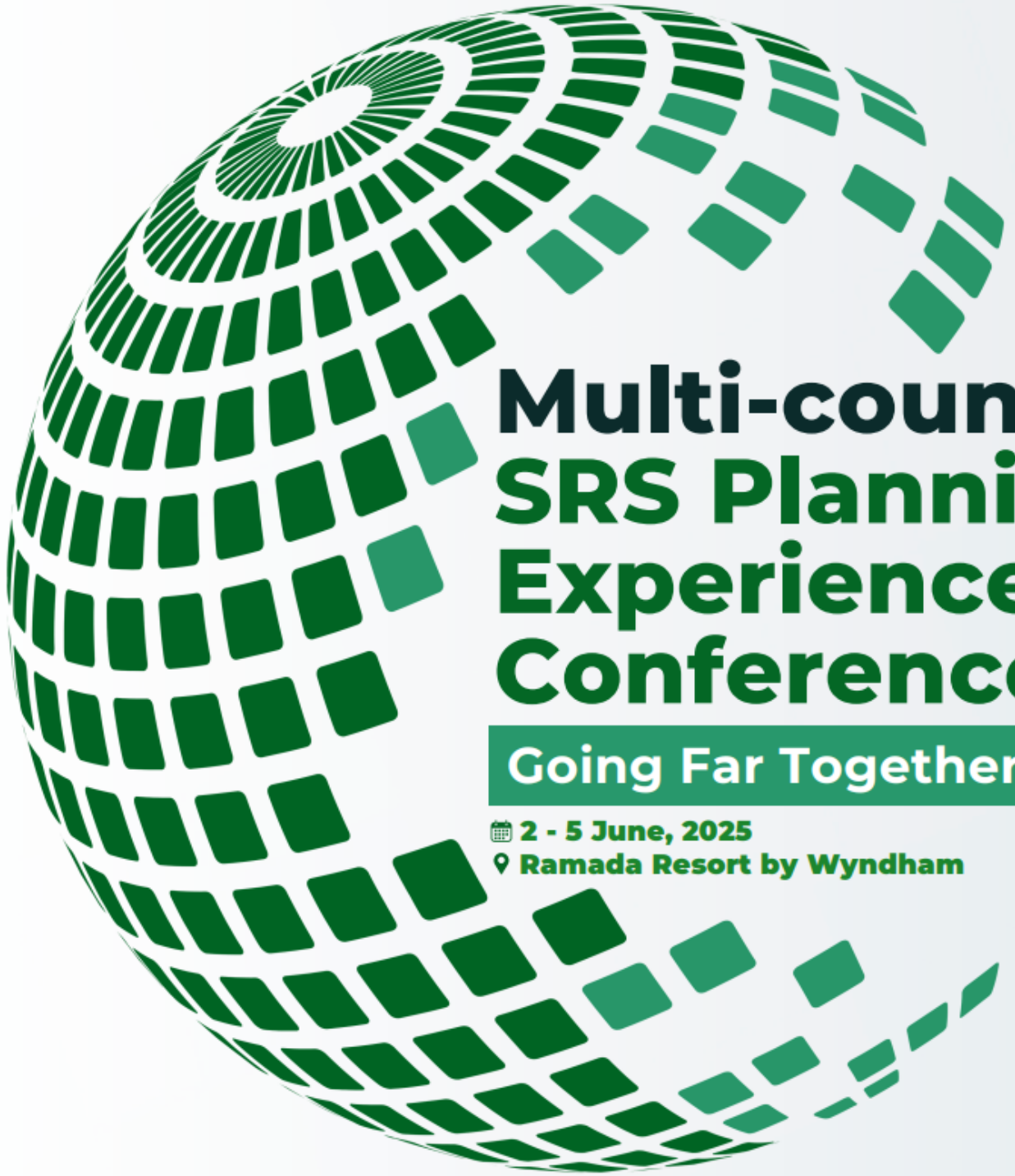


Multi-country SRS Planning and Experience-Sharing Conference

Going Far Together

2 - 5 June, 2025

Ramada Resort by Wyndham

Agenda

Day 2, June 3 – Articulating SRS Design and Core Requirements			

9-1pm	• Topics 2 + 3:
	  • Reviewing situational assessment results and implications for SRS design
	  • Introduction to VIVA website and SRS Technical Package
	  • Designing an SRS
		Daniel, Fred, and Agbessi	

	• Break (on your own)		
1-2pm	• Lunch		
2-3:30pm	• Topic 4: Collaborative Requirements Development for SRS and Systems Integration, with Walk Through	Kingsley (Remote) Matt	
3:30-4pm	• Break		
4-5pm	• How can SRS help fill DHS gaps?	Bill	
5pm	• Closing		
5-6pm	• Optional Session: Software and IT system considerations and discussion	Matt and Stephen	
6:15pm	• Social and networking event at local restaurant including dinner		

Day 3 Presentations

- Summary of situational assessment results
- Learned during the conference (design decisions)
- What do you plan to do when you get home

Combining Topics 2 + 3: Review situational assessment results and deciding on SRS design

VIVA Website and SRS Technical Package

Swiss TPH

Vital Strategies

Topic 2: Reviewing situational assessment results and implications for SRS design

Linking findings to design

3 June 2025

Review of the situational assessment

Summary points

- Very thorough and detailed
- It would be useful to create **actionable summaries**
- No discussion about **population denominators**
- **Governance arrangements** are diverse and context specific
- Thorough review of the legal but not many considerations on the **legal implications** of SRS implementation

Review of the situational assessment

Summary points

- **Mortality ecosystem are complex** and it will have implications for the design
    1. Parallel approach with limited integration
    2. Integrated SRS
    3. SRS as a transformative strategy

- **Death and birth notification** is not functional in most countries

Review of the situational assessment

How?

Costed action plan

8 SRS design decisions

JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

Introduction to the VIVA website and SRS technical package

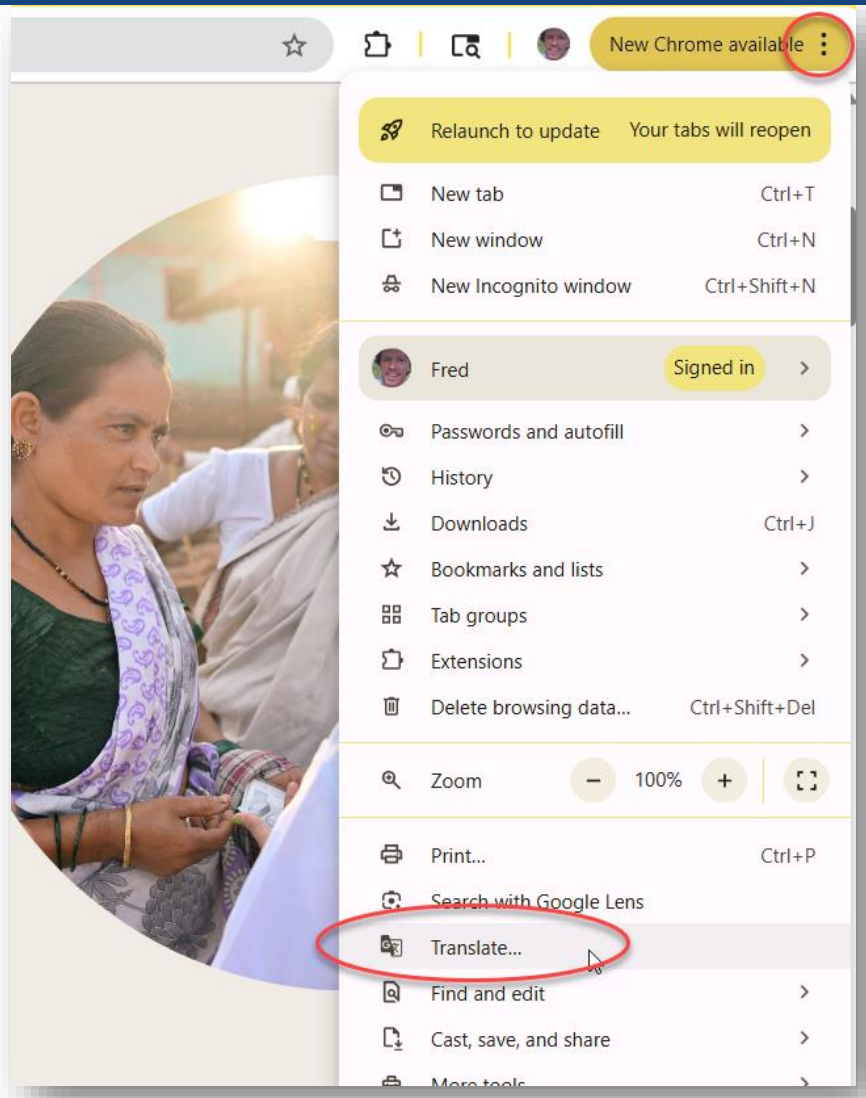
Fred Van Dyk
Software Engineer
Department of International Health

Going Far Together workshop, Dar es Salaam Tanzania 2025

https://viva.jhuhost.org

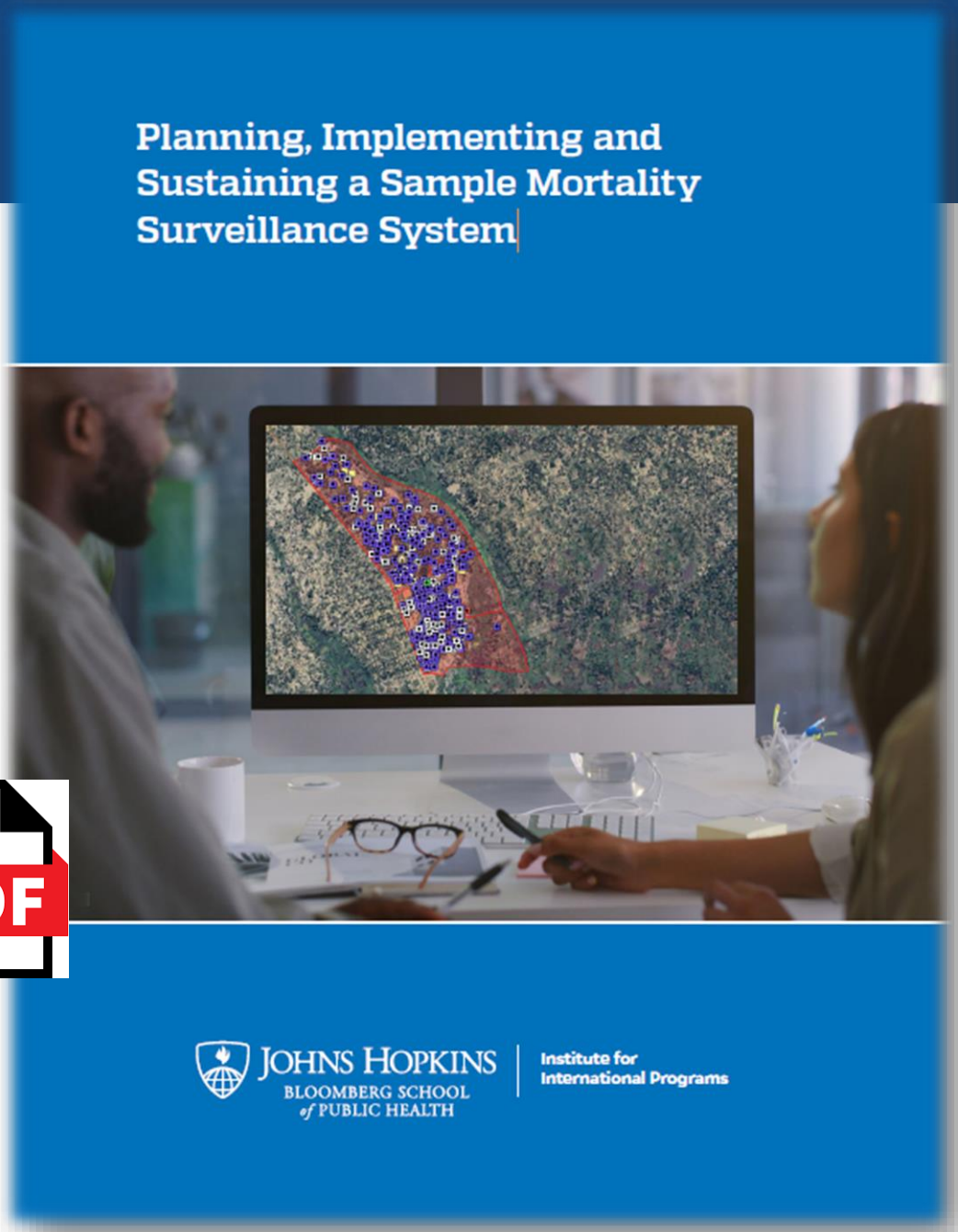
VIVA
Vital Insights for Vital Action

Translation using Chrome browser



COVERS Zambia 2024

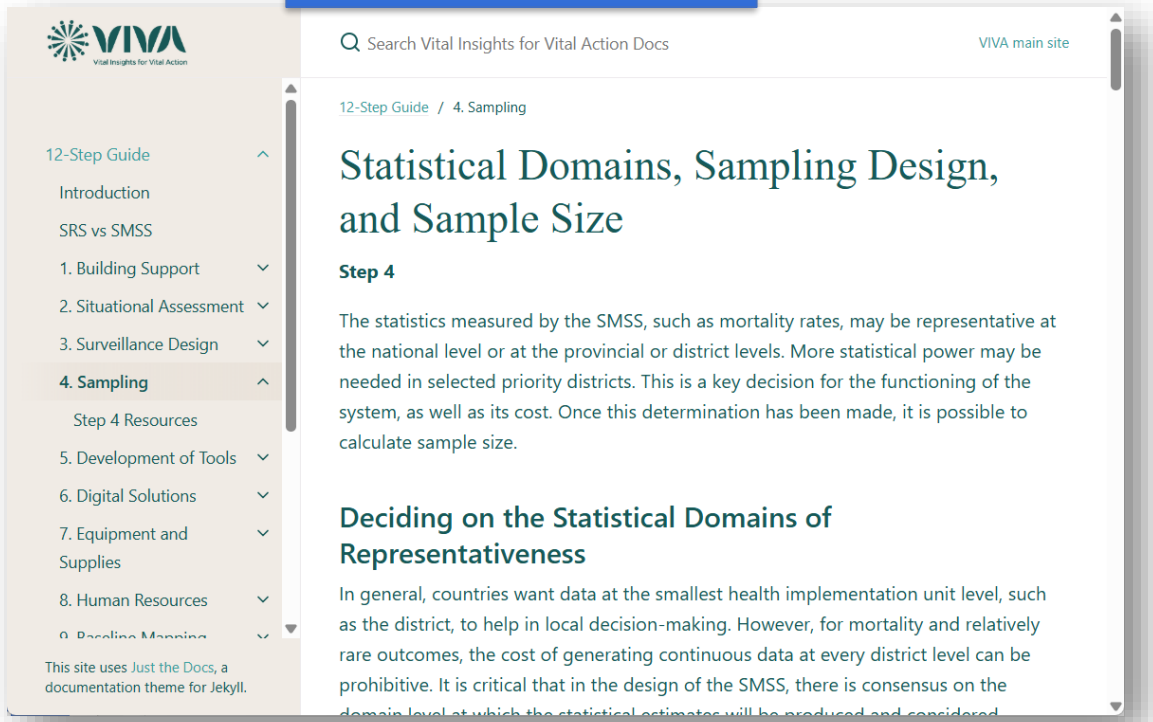
- Goal: Provide a comprehensive guide to support design and implementation of SMSS
- PDF format: available on COVERS dropbox



VIVA and VIVA docs

VIVA Main

VIVA Docs




VIVA
About Viva
Process
Blog
Publications
Contact
Get The Tools
Vital Insights for Vital Action
A comprehensive resource package for setting up continuous data collection systems to enable timely action

Viva Sections

Publications

Featured Publications

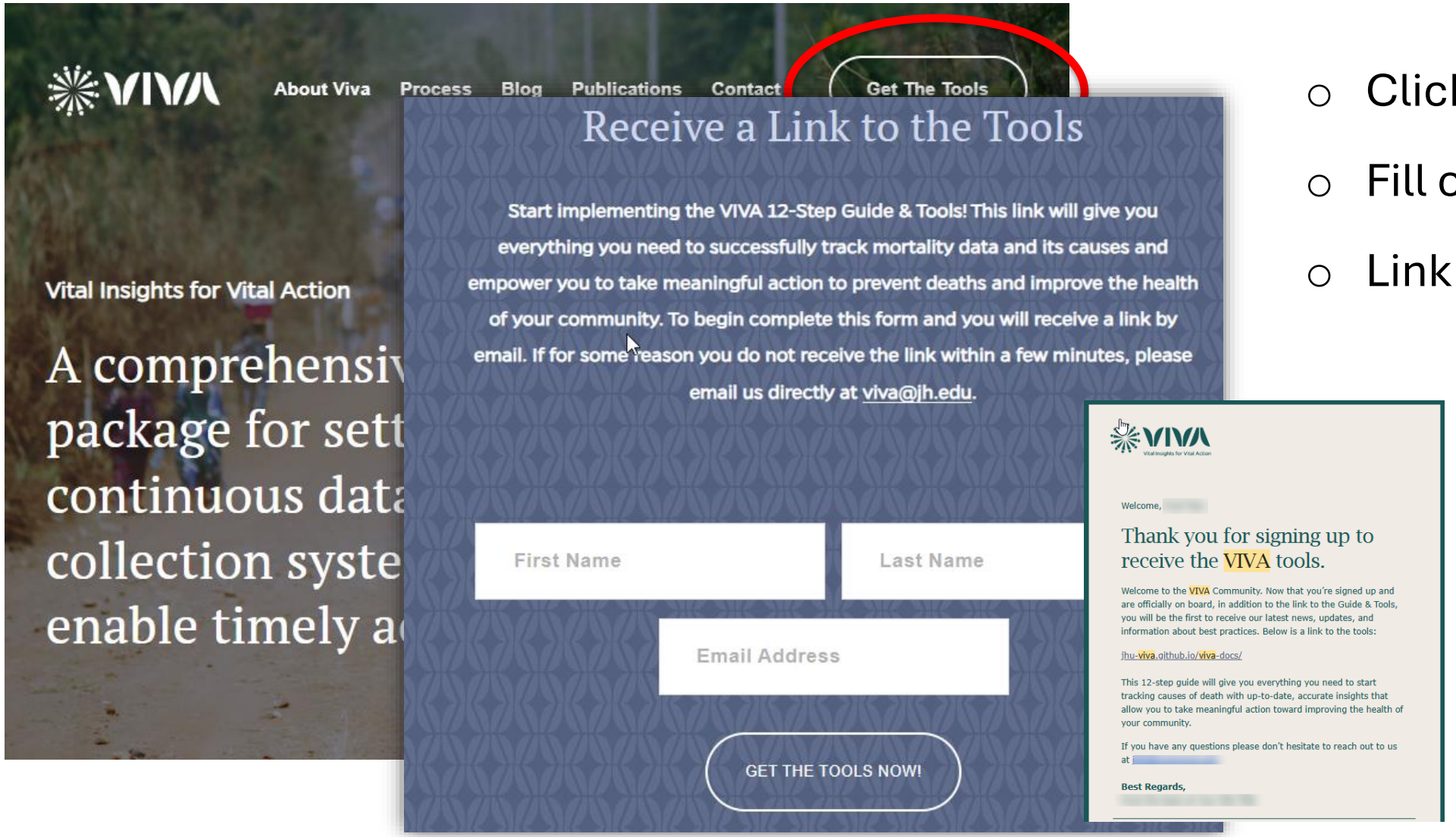
Boerma, T. (2023). Addressing the Gaps in Mortality Data: A Case for National Mortality Surveillance. *The American Journal of Tropical Medicine and Hygiene*, *108*(5_Suppl), 1–2.

Macicame, I et al. (2023). Countrywide Mortality Surveillance for Action in Mozambique: Results from a National Sample-Based Vital Statistics System for Mortality and Cause of Death. *The American Journal of Tropical Medicine and Hygiene*, *108*(5_Suppl), 5-16

Gudo, E. S. (2023). Mozambique Sample Vital Statistics System: Filling the Gaps for Mortality Data. *The American Journal of Tropical Medicine and Hygiene*, *108*(5_Suppl), 3–4.

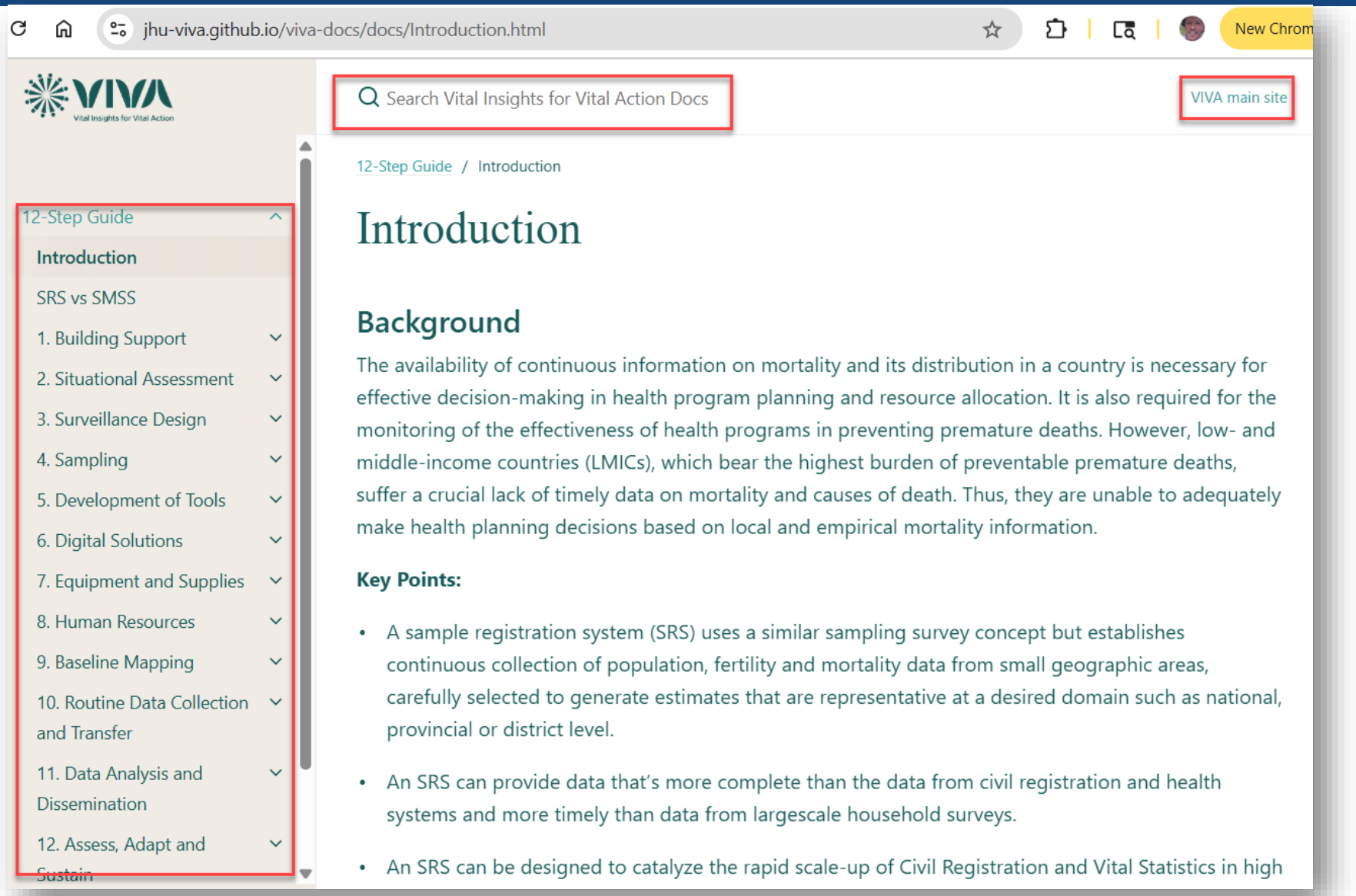
Carshon-Marsh, R., Aimone, A., Ansumana, R., Swaray, I. B.,

Register for VIVA Docs

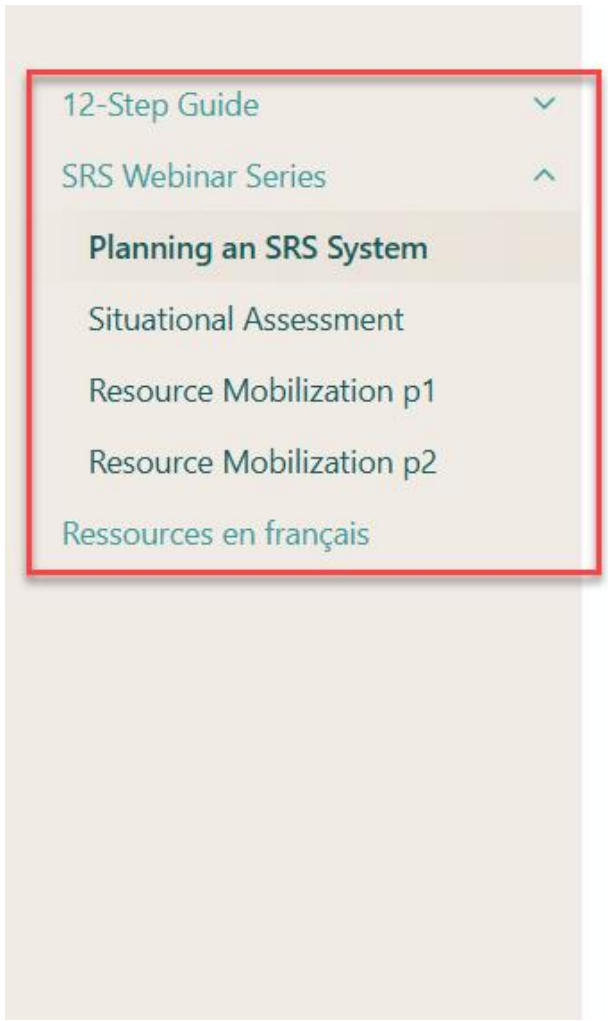


- Click *Get The Tools*
- Fill out form
- Link will be emailed

Viva Docs Overview



Menu and additional resources

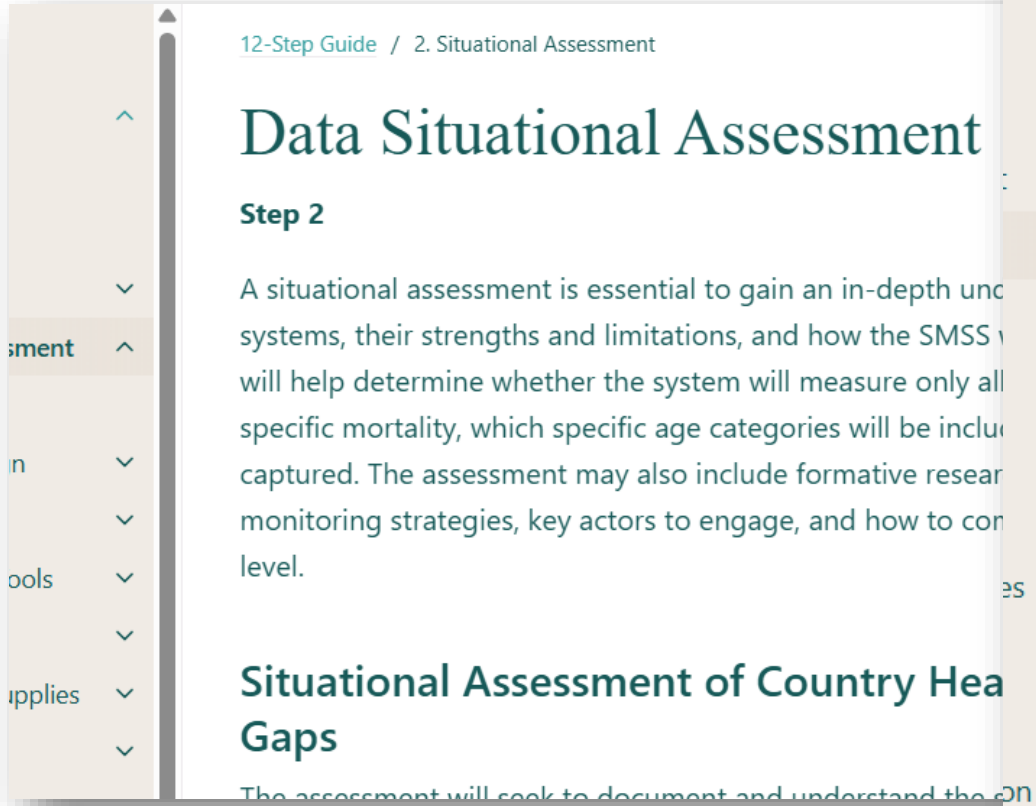


SRS Webinar Series / Planning an SRS System

Planning a Sample Registration System (Jan. 2025)

This webinar focused on situational assessment, which is part of the planning process

Situational Assessment



Surveillance Design

Deciding on the Surveillance Design and Data Collection Strategy

Step 3

As defined in the introduction, SMSS is sample-based but requires continuous data collection to generate near real-time mortality and cause-of-death data.

Recommended Surveillance Strategy: Continuous monitoring of vital events in randomly selected geographic clusters.

The selection of the clusters must be rigorously done from a complete sampling frame to ensure representativeness at the national level (and if desired for sub-national areas). Within each geographic cluster, a resident community worker will be recruited, trained and equipped to monitor the community. Monitoring will include active frequent household visits and the reporting of vital events such pregnancies, pregnancy outcomes and deaths. The community workers will collaborate with the community leaders to ensure completeness of reporting of vital events, enrollment of new households, and linkage with the community health workers.

When deaths occur, Next-of-kin is identified and followed up with verbal and social autopsy interviews for cause of death determination. A digital and information technology solution can be implemented to

Sampling

12-Step Guide / 4. Sampling

Statistical Domains, Sampling D Size

Step 4

The statistics measured by the SMSS, such as mortality rates, may
or at the provincial or district levels. More statistical power may be
This is a key decision for the functioning of the system, as well as i
been made, it is possible to calculate sample size.

Deciding on the Statistical Domains of Rep

In general, countries want data at the smallest health implementat
help in local decision-making. However, for mortality and relatively
generating continuous data at every district level can be prohibitiv
SMSS, there is consensus on the domain level at which the statisti
considered representative. Domains can consist of all or selected

Illustrative Example to Sample Size Calculation

Parameters

- **m** = baseline mortality rate
- **d** = desired margin of error (often also referred to as precision)
- **α** = confidence level, generally taken as 0.05
- **deff** = design effect
- **f** = non-response rate (at household level)
- **CBR** = Crude birth rate
- **h** = Average household size
- **c** = Average number of households per cluster

The estimated number of annual births is obtained by:

$$B = Z^2_{\alpha/2} * \frac{m * (1-m)}{d^2} * deff * \frac{1}{(1-f)}$$

B can be converted to the corresponding number of households n as:

$$n = \frac{B}{h * CBR}$$

The corresponding number of clusters N is obtained as:

$$N = \frac{n}{c}$$

Development of Tools

12-Step Guide / 5. Development of Tools

Tools and Manuals Development, T Ethical Clearance

Step 5

The determination of tools for data collection is driven by the data that made available by the SMSS. In consultation with the registration autho designed to accommodate all relevant variables for its CRVS integration field-tested prior its use in the SMSS platform. Data elements and tools system are driven by the purpose of the system. The purpose can be the rates, age and cause specific distribution. In general, to be useful such s death counts but be able to produce meaningful and interpretable estir denominators for the mortality rates of interest. It would also include sp allow the assessment of disparities or inequalities.

Key Points

Essentials tools include a household population listing form, new house events recording forms (separate for pregnancy outcome and deaths), a interviews form Manuals that explain the data collection process are ne data collection across study clusters. Obtaining appropriate ethical clear

12-Step Guide / 5. Development of Tools / Step 5 Resources

Resources – Development of Tools

Step 5

Cluster Mapping and Household Listing

1 *s5_1 to be linked*

Household Registration

1 Household Registration Guide (docx) A manual is for field supervisors and other m members that will be working on registering households within a cluster.

2 Household Registration Paper Tool (docx) A paper questionnaire to register and u information.

3 Household Registration ODK Tool (xlsx) An ODK XLSX questionnaire to use with O update household information.

Events Recording

1 Pregnancy Paper Tool (docx) A questionnaire to collect information about pregna household.

2 Pregnancy Outcomes Paper Tool (docx) A questionnaire to collect information ab outcomes.

Digital Solutions

SRS vs SMSS
1. Building Support
2. Situational Assessment
3. Surveillance Design
4. Sampling
5. Development of Tools
6. Digital Solutions
IT Checklist
Mapping & GPS
Case Management System
Data Collection Platform
Data Analysis Platform
Linkage to External Systems
Step 6 Resources
7. Equipment and Supplies
8. Human Resources

Digital solutions Architecture

Step 6

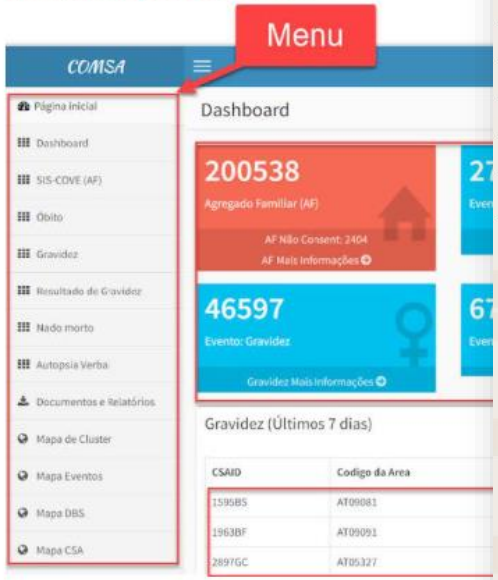
Choosing appropriate hardware a
This section describes the informa
making factors for the Mozambiq
identifiers were generated and ot
update and innovations in digital
the choice of an appropriate digit
that the tools selected for COMSA

General Guidelines

With rapidly improving digital tec
incorporate state of the art techn
monitoring, analysis and release.
The choice of hardware and softw
overall objectives of the SMSS.

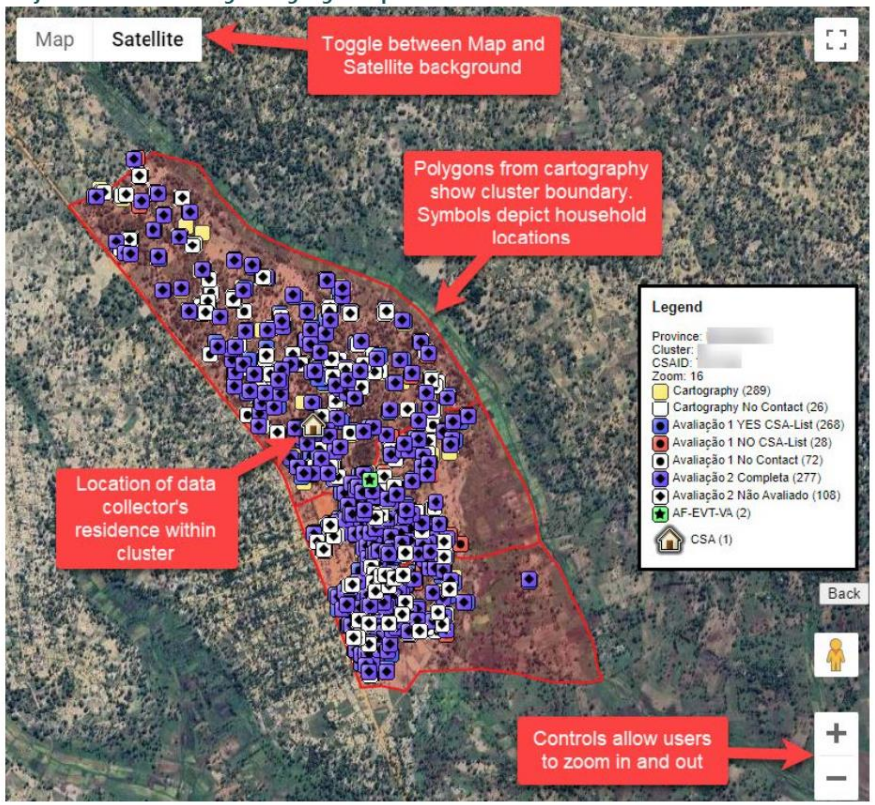
- **COMSA/SIS-COVE Operational Dashb**

Mozambique SIS-COVE



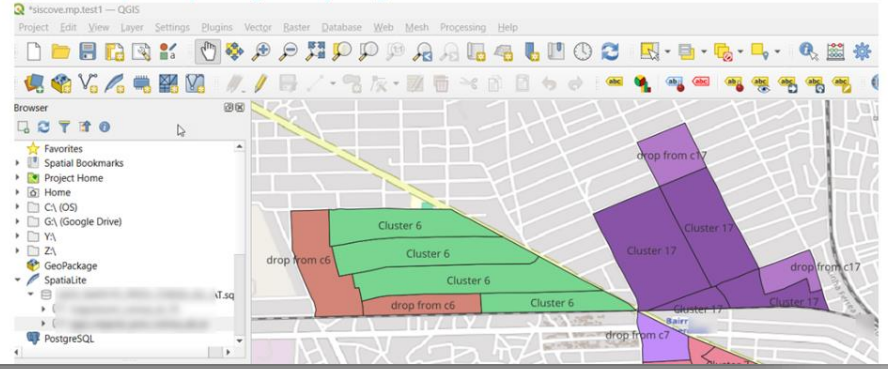
- **COMSA/SIS-COVE Operational Dashb**

Project website with integrated google maps



QGIS offers a comprehensive desktop system for integrating GIS maps and data. It has an offline tool called Qfield which can be used to integrate android data collection devices. QGIS is open source, and it is comparable to the proprietary ArcGIS platform.

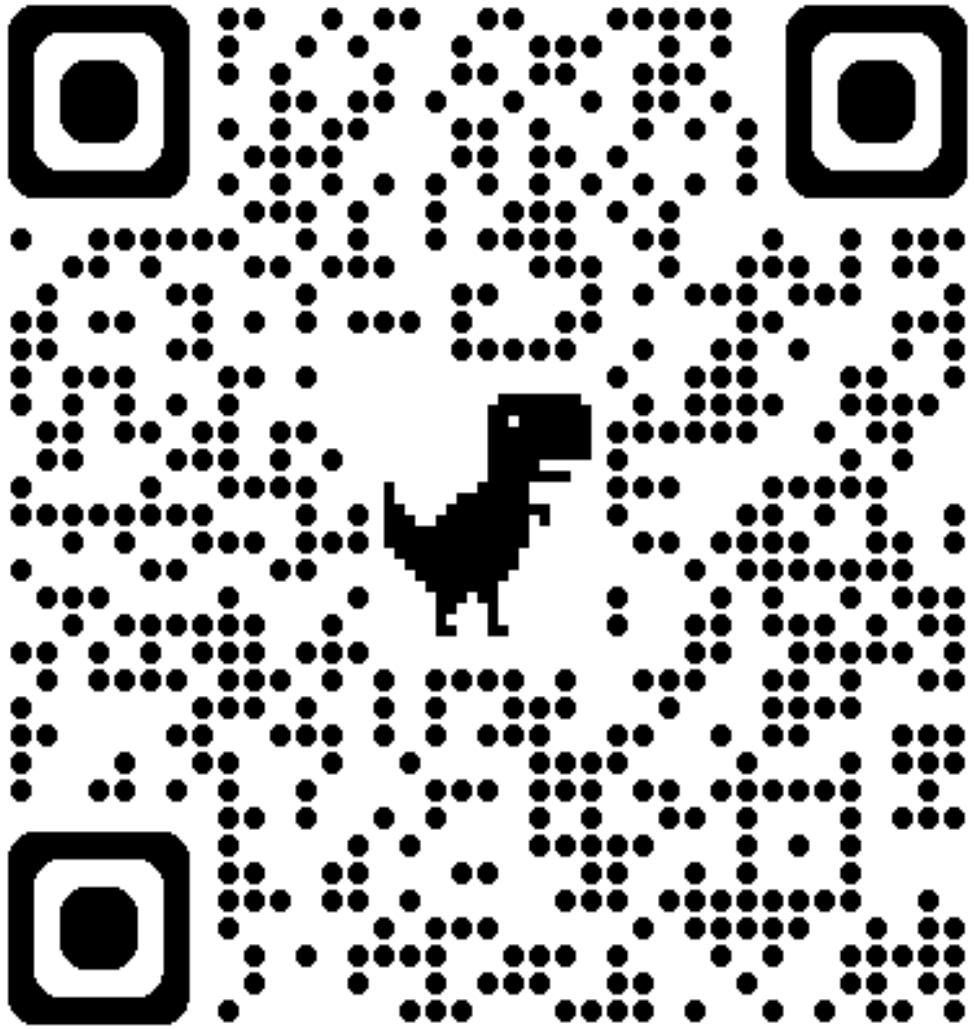
QGIS desktop view: plotting and adjusting cluster boundaries



Closing

https://viva.jhuhost.org

email: viva@jh.edu



Design options for an SRS

Agbessi Amouzou, PhD

Johns Hopkins University

What is a Sample Registration System?

- **SAMPLE**: uses data from randomly selected population geographic units to produce population-level representative indicators.
- **REGISTRATION**: implies a continuous collection of data on key vital events occurring in the sampled population. It does not require legal registration of these events with civil registrar but can facilitate the legal registration.
- **SYSTEM**: the initiative includes sustained and continuous data collection from communities, data management, analysis, and dissemination.

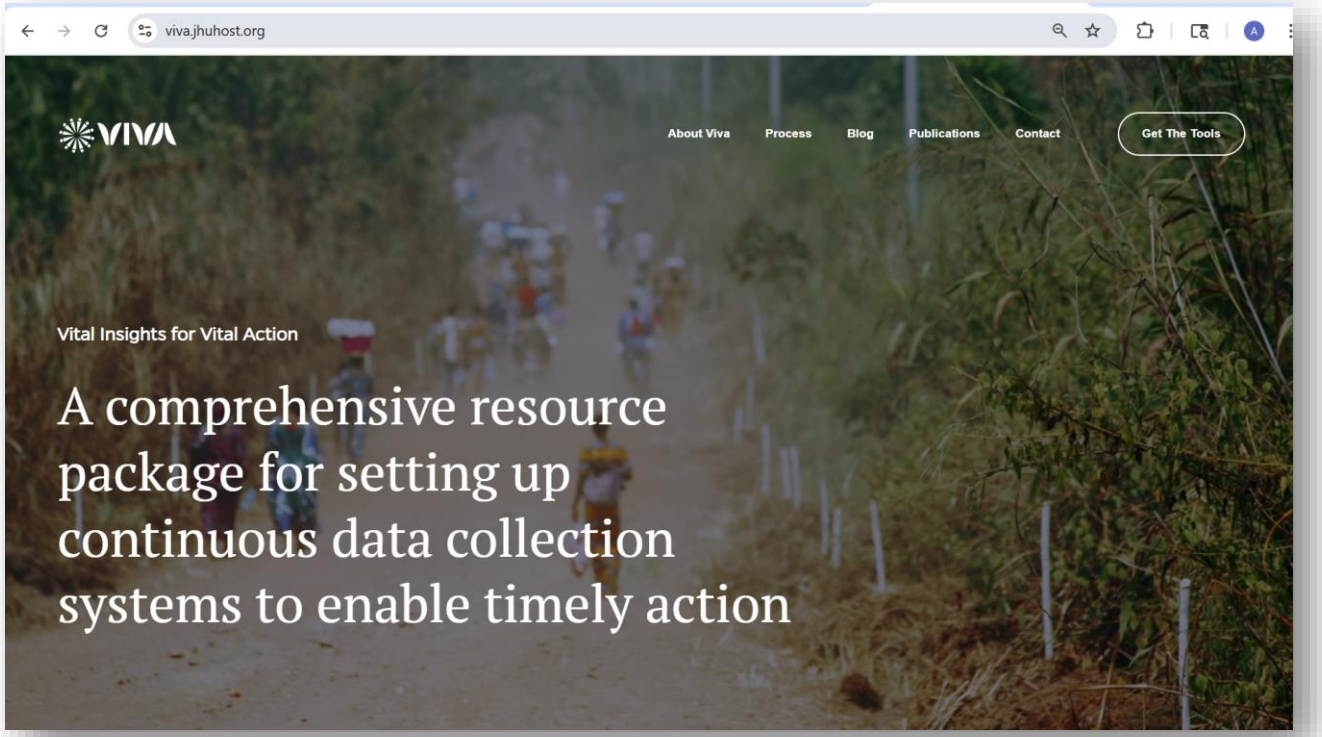
*SRS is a **sustained and continuous** data collection and analysis system based on a representative sample of geographic population clusters to produce population-based empirical estimates of mortality, cause of death, and other population and health indicators.*

Vital Insights for Vital Action

SRS Technical Package

Vital Insights for Vital Action

viva.jhuhost.org



12 Key Steps for Building a Sample Mortality Surveillance System

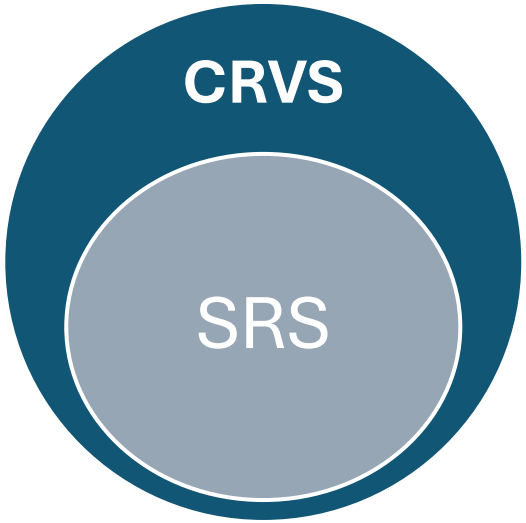
1. **Institutional governance, data ownership and stakeholders' agreement**—determine which institutions will lead and provide oversight for the system.
2. **Situational assessment**—Identify data needs and gaps, types of mortality indicators to measure, and strategies for collection.
3. **Surveillance design and data collection strategy**—Decide on specific aspects of program design.
4. **Statistical domains, sampling design, and sample sizes**—Determine whether the system will measure only all-cause mortality, which specific age categories will include, and whether maternal mortality will be captured. Identify a sampling frame, estimate sample size of clusters, and draw the sample of clusters.
5. **Tool development, testing and relevant ethical clearance**—Data collection tools are adapted to the local context and tested; the project obtains institutional review board approval.
6. **Digital solutions, information technology architecture, setup, and testing**— Select the technology that will be used for data collection, transfer, analysis, storage, and dissemination.
7. **Equipment and supplies**—Identify and produce all equipment and supplies needed to start and maintain the project.
8. **Human resources plan, recruitment, training, and capacity-building**—Identify and recruit human resources at all levels (central, provincial, community levels). Conduct trainings at all levels of the system.
9. **Baseline mapping and listing**—Establish the baseline population and maps of geographic clusters.
10. **Data collection and transfer**—Implement data collection and transfer, including a protocol for supervision and quality assurance.
11. **Data review, analysis, integration, and use**—Develop and plan for sharing the datasets and well as the analysis, dissemination and integration/linkage with other systems.
12. **Assess, adapt, and sustain**—Develop sustainability and financing plans.

7 Decision points to make

1. Level of integration with CRVS and other systems
2. Smallest geographic sampling units
3. Statistical domains
4. Core minimum data to collect
5. Data collection strategy
6. Assessing completeness of events reporting
7. Phasing implementation

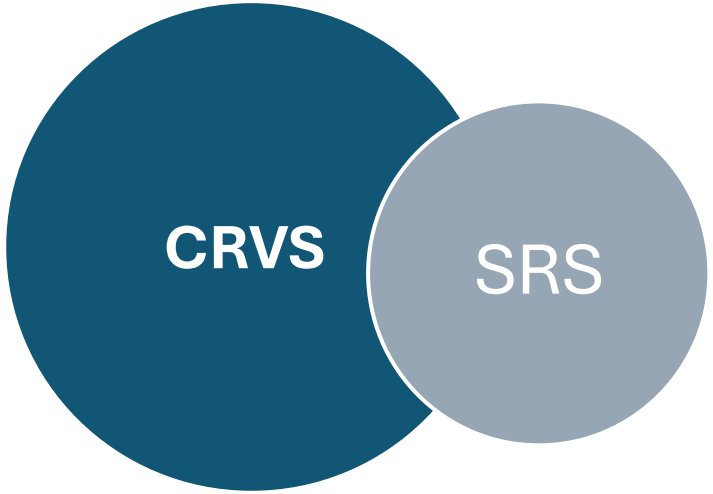
Decision Point #1:

Integration with OR Linkage to CRVS



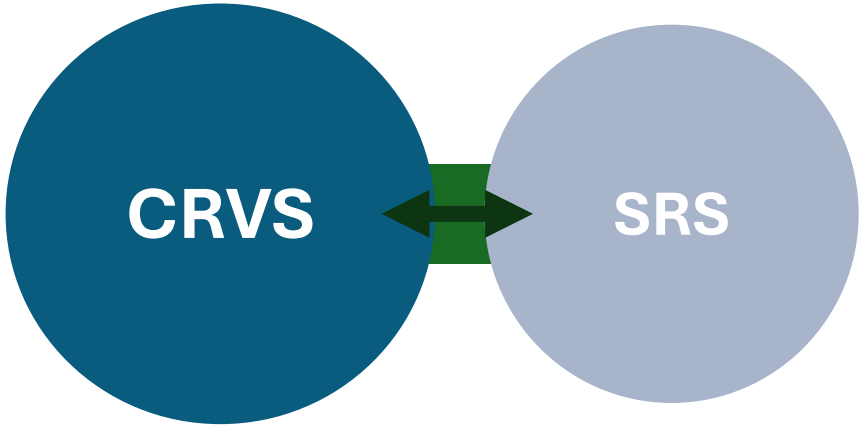
Complete Integration

- SRS is built within existing CRVS
- May be more challenging to design
- Deficiencies in CRVS carry on to SRS if unaddressed
- Strong coordination with stakeholders



Partial Integration

- Some geographic areas/clusters are integrated with CRVS
- May be less challenging than the complete integration

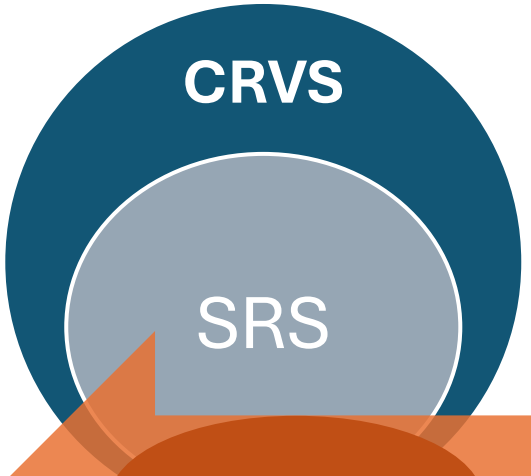


Linkage

- Data flows between CRVS and SRS
- Less challenging than the other two options
- Can be faster to implement

Decision Point #1:

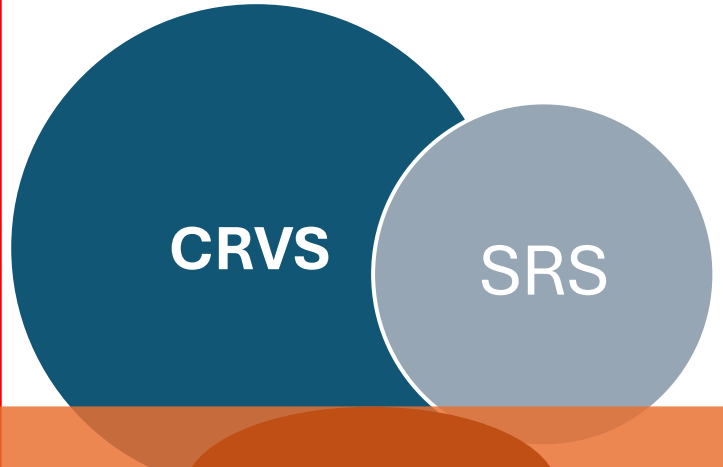
Integration with OR Linkage to CRVS



Phase 2

Complete Integration

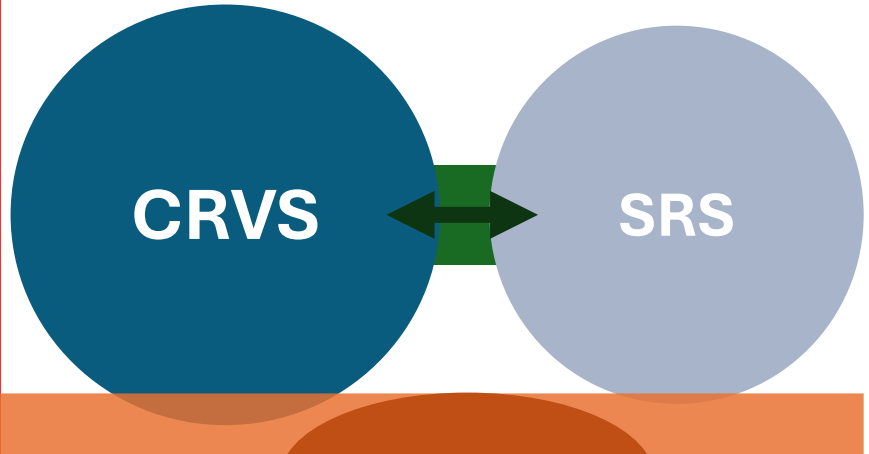
- SRS is built within existing CRVS
- May be
to desig
- Deficien
on to SR
- Strong coordination with stakeholders



Phase 2

Partial Integration

- Some geographic



Phase 1

Linkage

- Data flows between CRVS and

her

You can also think about integration with other systems, e.g. HMIS

Decision Point #2:

Deciding on geographic clusters: smallest geographic units for surveillance

Pop. Census Enumeration Areas (EAs)

Pros:

- Usually available from the latest population census
- Are more stable over time
- ~100-150 HHs
- Small enough for surveillance by one community worker
- More nationally complete and allow rigorous sampling

Cons:

- Need many of them (Increase HR)
- Can cut across same communities/villages
- Is not an official administrative unit
- Boundaries not always clear for the community workers

Group of EAs (e.g. Census supervision area)

Pros:

- Usually available from the latest population census
- Are more stable over time
- More complete and allow rigorous sampling

Cons:

- Size varies and sometime can be large
- Is not an official administrative unit
- Boundaries not always clear for the community workers

Villages/subdistricts/ others

Pros:

- Administrative units
- More complete and allow rigorous sampling

Cons:

- Unstable over time
- Size varies and some can be large
- Complete sampling frame may not be available
- More vulnerable to data completeness

Decision Point #3:

What statistical domains to use? At what subnational levels will the statistics be generated?

National and sub-national regions / provinces (Admin-1) level

Pros:

- Minimum level

Cons:

- May not produce district level data for all districts

National and sub-national regions / provinces (Admin-1) level and selected priority districts

Pros:

- Data on some district level

Cons:

- May not produce district level data for all the country
- May require large sample size

National, Sub-national region/provinces (Admin-1) level and all districts

Pros:

- More attractive to district managers
- Data on each district

Cons:

- May require large sample size

Decision Point #4:

What data to collect?

Mortality statistics require:

Numerators:

- Number of deaths and its distribution by age, sex, geography, and cause of death

Denominators:

- Births (for stillbirths rates, perinatal, childhood mortality rate)
- Population by age and sex (person-years lives or population at risk)

Core minimum dataset in the SRS

- Births (or pregnancy outcomes)
- Deaths by age
- Population distribution by age and sex
- Cause of death for each death identified (through VA)
- Births and death registration
- Relevant stratifiers: region/provinces, urban/rural,

Additional country-specific data may be included as relevant

Decision Point #5:

What is your data collection strategy?

Trained community worker in each cluster reports events, followed by regular data verifications and completeness assessments

Pros:

- Continuous reporting
- Continuous team and contact with community

Cons:

- Vulnerable to incompleteness if large clusters
- Must be continuously maintained

Train primary health facility staff to work with community volunteers and key informants within facility catchment areas

Pros:

- Linkage with health facility
- Community health officials more engaged

Cons:

- Vulnerable to incompleteness
- Cluster boundaries not always clear and followed
- Match between facility and community events

Facility births and deaths, complemented by community deaths reported by a community worker

Pros:

- Linkage with health facility
- Community health officials more engaged

Cons:

- Vulnerable to incompleteness
- Cluster boundaries not always clear and followed
- Match between facility and community events

Regular retrospective surveys

Pros:

- Easier to manage

Cons:

- No continuous contacts with communities
- May be more rigid

Decision Point #6:

How would you assess completeness of events reporting?

Dual recording with capture-recapture approach: conduct an independent retrospective census at regular interval (1 year) and match events

Pros:

- Current best approach
- Completeness can be assessed for both data collection methods

Cons:

- Extensive
- Difficulties matching events
- Expensive

Embedded completeness survey: retrospective survey on a small subsample at regular interval (1 year)

Pros:

- Easy to manage

Cons:

- Difficulties matching events
- Sample must be well selected to minimize uncertainties

External comparison: Comparison of data to external sources

Pros:

- Easy to implement

Cons:

- External data not available
- Time period may not match

Decision Point #7:

Should you phase the SRS implementation?

- If capacity and resources are a constraint, consider the possibility of phasing implementation in geographic areas
- Phase I: start with a smaller number of regions/provinces
  - Select based on government priorities or existing infrastructures
  - Select areas to generate meaningful and interpretable data
  - May allow further learning for nationwide scale up
- Phase II:
  - Move to remaining regions/provinces the following year

8 Decisions

Your responses will feed into your SRS proposal

1. **Decide on your system integration process given your vision and objectives**
    1. Justify your choice using your mortality assessment findings

2. **Decide on the smallest geographic units (clusters) to sample**
    1. Be sure that a sampling frame is available and obtainable: a sampling frame is a complete roster of the geographic units with their population
    2. Articulate how your choice is based on your mortality assessment findings
    3. Identify any additional information you may need to finalize your decision

3. **What statistical domains would be relevant for your country?**

4. **What minimum data to focus on in the SRS**

5. **What data collection strategy is most suitable for your country?**
    1. Justify based on the mortality assessment findings
    2. You may need to carry out a formative research for community reporting

6. **How would you assess completeness of events reporting?**
    1. Your choice will depend on your data collection strategy

7. **Consider phasing implementation**
    1. Justify any need to phase implementation
    2. Decide on the phase

8. **How would you design the governance structure to manage the SRS?**

Lunch

Topic 4: Collaborative requirements development for SRS and systems integration

Applying Collaborative Requirements Development Methodology (CRDM) for Integrated Sample Registration Systems (SRS)

Kingsley Arhin-Wiredu MSc, MPH

June 3, 2025

Outline of Presentation

Unlocking Mortality Data: Global Challenges, the Role of SRS, and Opportunities

An Integrated Mortality Systems Ecosystem

Collaborative Requirements Development and Enterprise Architecture

Documenting Requirements for Systems Integration

Summary

The Issue: Unlocking Mortality Data for Impactful Use

Global Challenges

- Incomplete death registration
- Fragmented, disconnected systems
- Data not accessible or timely

Why SRS Matters

- Captures continuous mortality data
- Provides nationally representative data
- Supports countries with weak CRVS

The Opportunity

- Foundation for integrated mortality surveillance
- Enables timely public health decisions
- Supports SDGs and health equity goals

Why do many SRS Systems Struggle

Fragmented data systems that do not talk to each other

Poor stakeholder alignment: IT teams, public health programs, implementing partners, and civil registration often work in silos

Lack of clearly defined data needs or shared objectives

No governance plan: who owns the data, who accesses it, and how data is protected

Outline of Presentation

Unlocking Mortality Data: Global Challenges, the Role of SRS, and Opportunities

An Integrated Mortality Systems Ecosystem

Collaborative Requirements Development and Enterprise Architecture

Documenting Requirements for Systems Integration

Summary

An Integrated Mortality Systems Ecosystem

Data **PRODUCERS**

- CRVS Mortality Data
- SRS Mortality Data
- Public Health & Surveillance Data
- Community - Verbal Autopsy Data

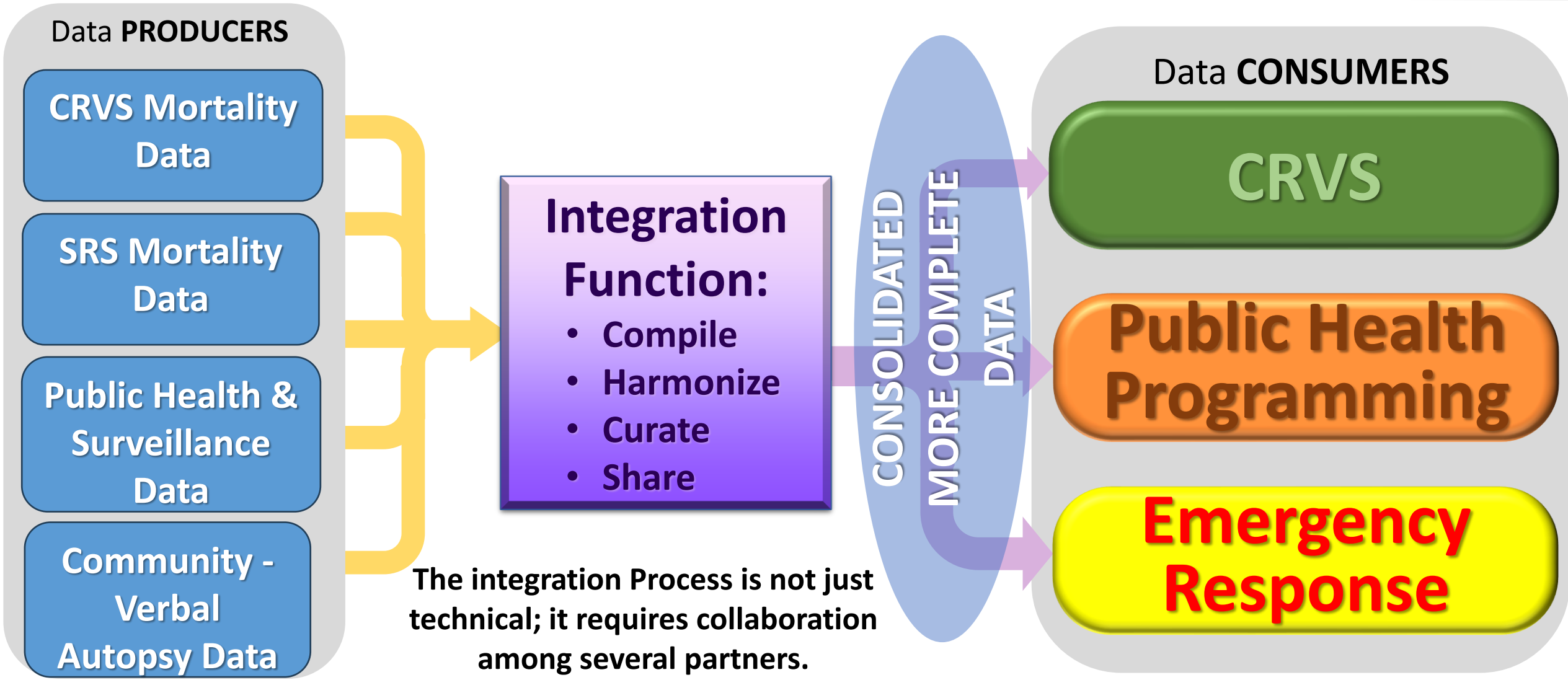
Could SRS complement national CRVS and health data systems to provide more complete mortality information?

Could integrating SRS with CRVS and existing health information systems improve the timeliness and accessibility of mortality data?

Could embedding SRS within a national data strategy make mortality surveillance more sustainable and scalable?

Could SRS data be used to improve public health policy, emergency response, and disease monitoring at local and national levels?

An Integrated Mortality System Ecosystem



An Integrated Mortality System Ecosystem

Integration Function:

- Compile
- Harmonize
- Curate
- Share

The integration Process is not just technical; it requires collaboration among several partners.

Start with a Digital Maturity and System Readiness Assessment

Align Stakeholders Around Shared Objectives

Use Enterprise Architecture (EA) as a Planning Tool

Plan for Data Integration and Use

Design with Sustainability in Mind

Typology of Integration 1 - Point of data collection

Type of Integration	Consideration	Example
Collecting data once, using many times	• The needs and objectives of systems need to be clearly defined and understood • Requires an agreed set of minimum data elements	• Using a common form that is consistent with both civil registration regulations and public health requirement for reporting all deaths

Typology of Integration 2 - Digital integration

Type of Integration	Consideration	Example
Compiling data within central repository; building system interoperability	• Requires definition of and adherence to common data integration and interoperability standards	• Establishing a data mart for mortality data within a health data warehouse • Linking health and civil registration data systems to share data

Typology of Integration 3- Data Use

Type of Integration	Consideration	Example
Using data together at time of analysis; data triangulation	• Multiple sources of data, qualitative or quantitative • Can accommodate alignment of data sources where digital integration is not feasible	• Using multiple sources of data and/or types of analyses to enhance the interpretation of findings, including through the comparison of sources

Outline of Presentation

Unlocking Mortality Data: Global Challenges, the Role of SRS, and Opportunities

An Integrated Mortality Systems Ecosystem

Collaborative Requirements Development and Enterprise Architecture

Documenting Requirements for Systems Integration

Summary

Where do we go from here?
Collaborative Requirements Development

Adapted from the Public Health Informatics Institute's Collaborative Requirements Development Methodology

Ensure Agreement Among High-Level Stakeholders

Identify Key Leaders

- Representing all potential data consumers
- Representing ministries and programs with a stake
- Define shared objectives & mutual benefits

Question to be answered:

- What information is needed by whom, and what would they do if they had this information?

Define Requirements

Identify Data Sources

- What data are needed to meet the information needs of SRS?
- Existing mortality data sources
- New data needed

Address Data Policy, Access, Needs

- Who is owner or custodian?
- What policies/governance are required to make it accessible?
- Harmonize data standards
- Data/information flow
- Timeliness requirements
- Analysis/dissemination

Design System Changes

Systems/Platform

- Digital solution? Yes or no
- Agree on platform(s)
- Data interoperability/exchange
- Hardware/software
- Comms/networking

Operating Procedures:

- Define roles, access, security, confidentiality
- Assign responsible parties
- Operations manual

Collaborative Requirements Development and the Vital Insights for Vital Action (VIVA) 12-Step Guide

Ensure Agreement Among High-Level Stakeholders

VIVA STEP 1: Building support

VIVA STEP 2: Situational assessment

Define Requirements

VIVA STEP 3: Surveillance Design

VIVA STEP 4: Sampling

VIVA STEP 5: Development of tools

VIVA STEP 10: Routine data collection and transfer

VIVA STEP 11: Data analysis and dissemination

Design System Changes

VIVA STEP 6: Digital solutions

VIVA STEP 7: Equipment and supplies

VIVA STEP 8: Human resources

VIVA STEP 9: Baseline mapping

VIVA Step 12: Assess, Adapt, and Sustain

Applying CRD to Strengthen SRS Integration: 3 Key Areas

Define Core SRS Functions, Services, and Processes

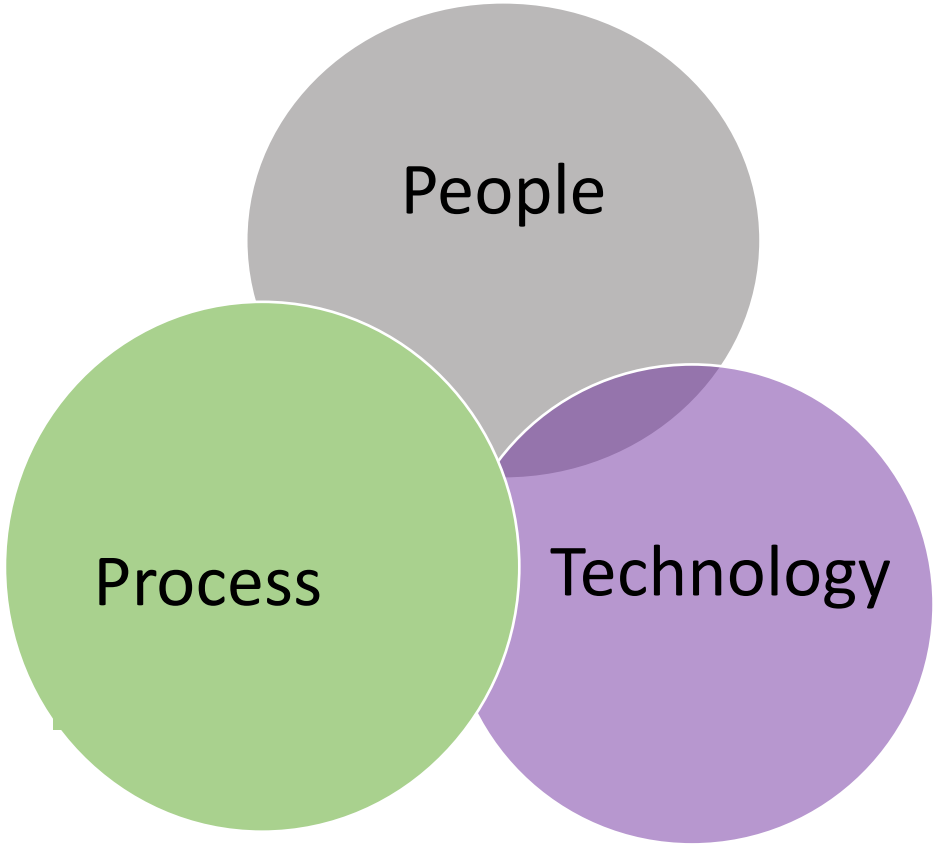
Identify System Components and Integration Opportunities

Capture Data Consumer Use Cases and Access Requirements

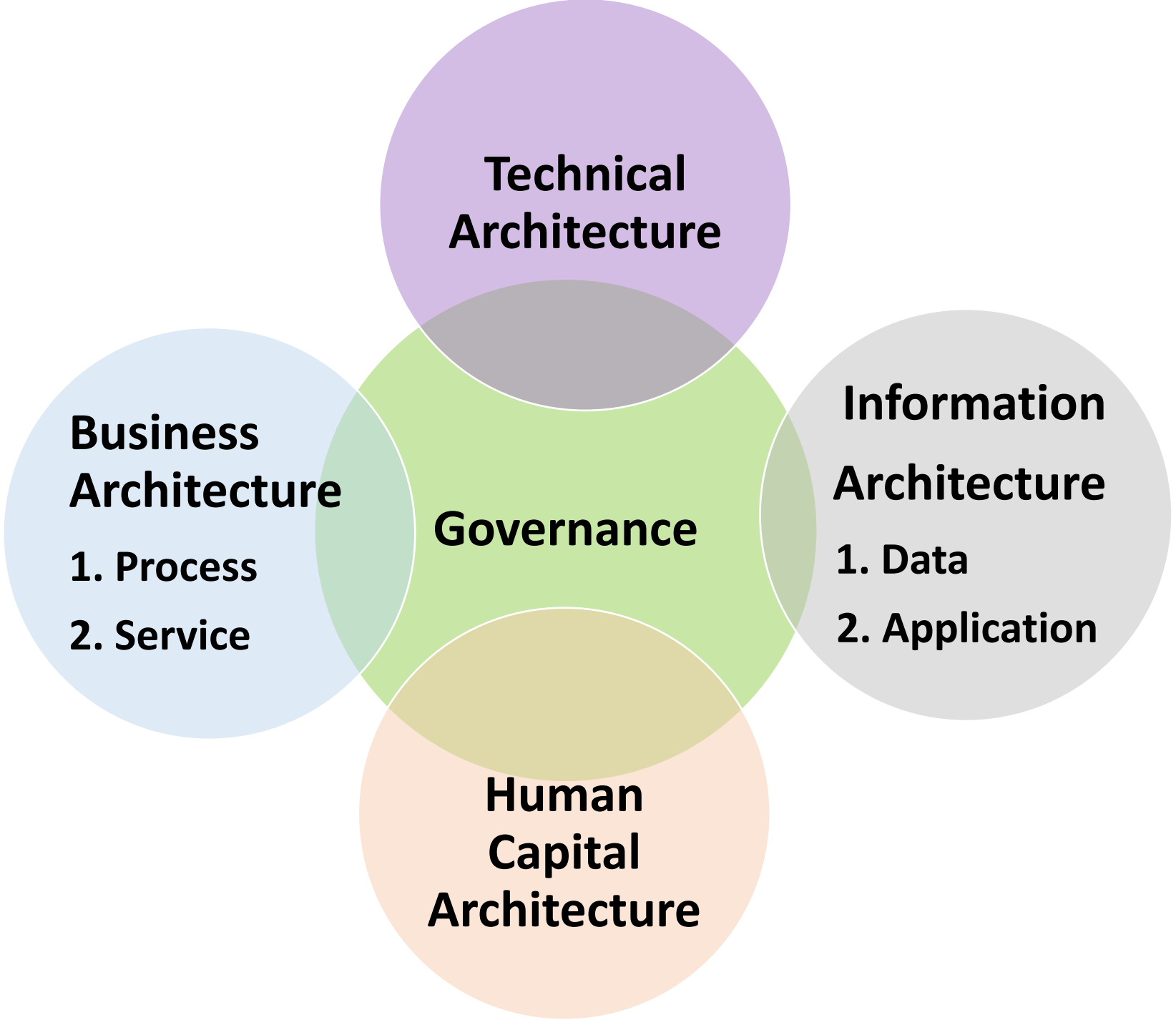
What Does This Mean for Integrated Sample Registration Systems?

- Designing the SRS within the national Enterprise Architecture creates a structured, integrated framework linking **people**, **processes**, and **technology** for mortality systems

- Collaborative requirements development helps document and propose standardized operational requirements for harmonizing mortality systems as part of an SRS integration function.



Layers of Enterprise Architecture in Sample Registration System



Outline of Presentation

Unlocking Mortality Data: Global Challenges, the Role of SRS, and Opportunities

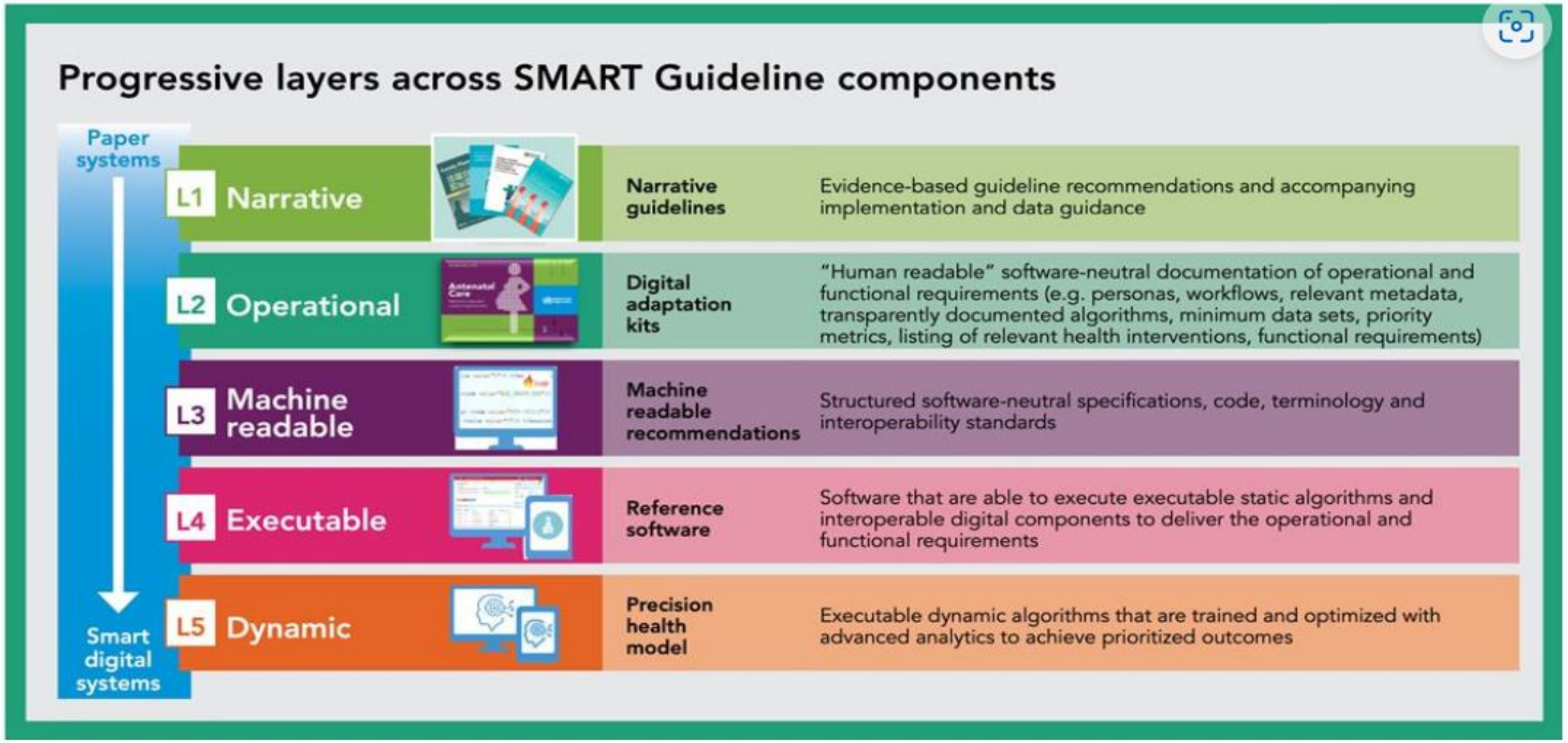
An Integrated Mortality Systems Ecosystem

Collaborative Requirements Development and Enterprise Architecture

Documenting Requirements for Systems Integration

Summary

Progressive Layers Across SMART Guidelines Components



Documenting Requirements: Components of the Digital Adaptation Kit (DAK)

Component 1: Health interventions and associated recommendations

Component 2: Generic persona

Component 3: User scenario

Component 4: Business processes and workflows

Component 5: Core data elements

Component 6: Decision-support logic

Component 7: Indicators and reporting requirements

Component 8: High level functional and non-functional requirements

Examples of Core Processes within Integrated Mortality Systems

Identify synergies and support system integration among various data sources

- Detecting death in communities
- Detecting death in health facilities
- Ascertaining CoD for community deaths
- Ascertaining CoD for medically attended deaths
- Internal processing of data, including coding
- Compiling and harmonizing data collected
- Analyzing data for surveillance purposes
- Interpreting, reporting, and documenting findings
- Disseminating evidence

Establish processes that ensure data access for data consumers

Core Processes for Integrated Sample Registration System

Community detection and reporting of vital events aligned and integrated with CRVS processes

Verbal autopsy submission and linkage with CRVS, HMIS, ETC.

Real-time data aggregation and internal review by supervisors and the SRS team

Data management, processing, and analytics

Public dissemination and routine data exchange with other systems (HMIS, CRVS)

A Continuous Feedback loop to assess, adapt, and sustain high-quality data in the broader mortality data ecosystem context

Documenting Requirements: Examples

Establishing the core mortality surveillance functions and processes:

Zambia adapted DAK for documenting system requirements for new Mortality Surveillance Unit at Zambia Public Health Institute

- Incorporated components in Systems Assessment Report
- Updates for SRS underway

Integrating systems to harmonize various data sources:

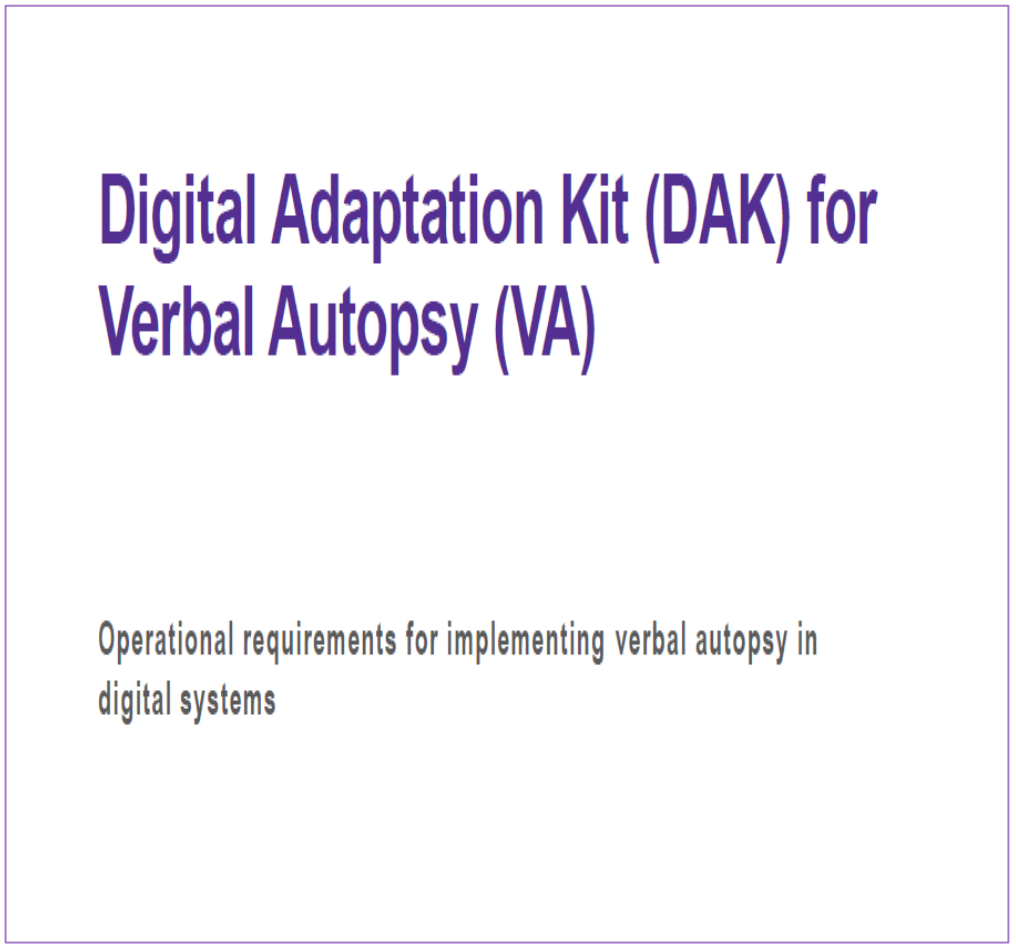
Zambia plan for ICT use within SRS (technical document available upon request)

- with linkage to CRVS
- evaluating feasibility of using National Data Warehouse to aggregate data from different sources

Understanding the needs of data consumers (under development):

- Requirements for routine excess mortality (Uganda)
- Requirements for HIV programming (US CDC)

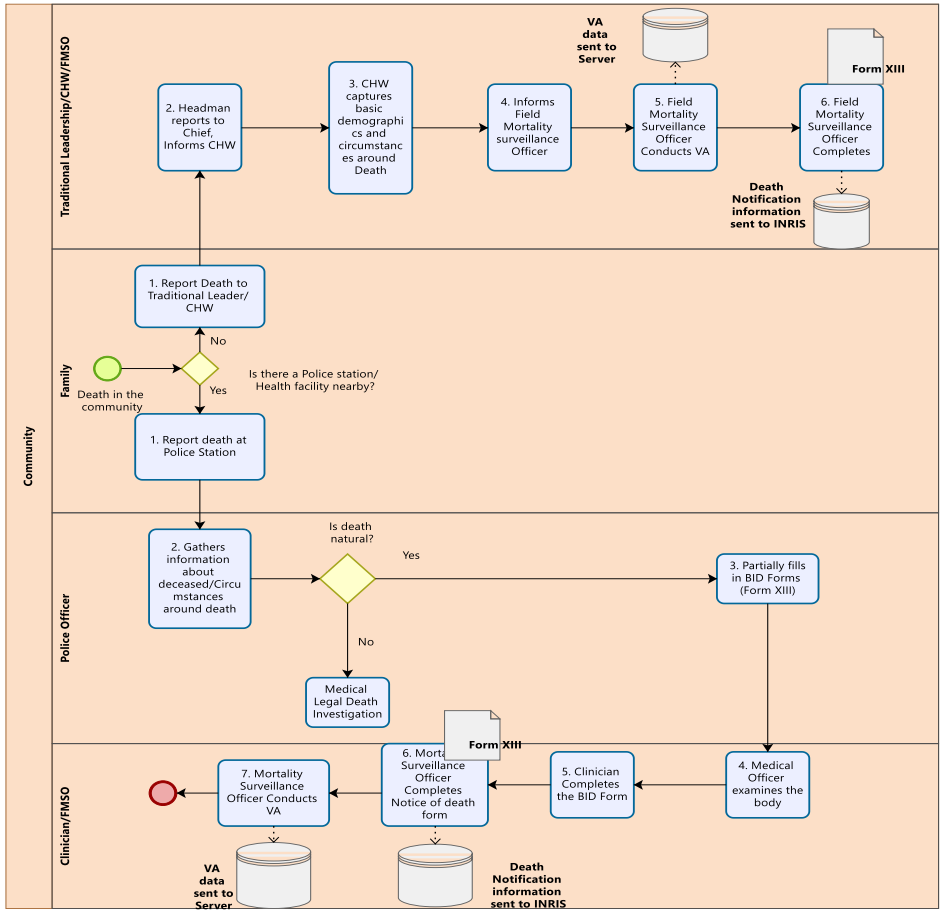
Documenting Requirements: Examples



Documenting Requirements: Example - Systems Integration in Zambia

Business process map

Detecting death in communities



Key User Personas

S/N	Targeted Personas	Persona Category	Primary Responsibilities	Key Characteristics	Capacity Development Needs
1	Mortality Surveillance Officer	Data producer	Detecting deaths in communities, conducting verbal autopsies, reporting deaths	Field-based, interacts directly with communities, requires mobile data collection tools	- Training in mobile data collection tools and technologies. - Skill development in conducting verbal autopsies. - Awareness of community engagement strategies.
2	Mortality Surveillance Data Manager	Data producer	Oversee mortality data collection, ensure accuracy through validation checks, enable data sharing across health systems, and generate reports to track mortality trends and causes of death.	Strong data management, validation, analysis, interoperability, and reporting skills, focusing on accuracy and public health decision support.	- Advanced training in data management systems. - Skills in data validation, quality control, and reporting. - Understanding of data security and privacy regulations
3	Medical Doctor/Clinician	Data producer/user	Detecting deaths in health facilities, medical certification of cause of death (MCCD), assigning ICD codes	Hospital-based, requires access to patient records, needs up-to-date ICD coding knowledge	- Up-to-date training on ICD coding and MCCD processes. - Access to continuous professional development in medical certification of cause of death. - Familiarity with digital health record systems (eMCCD).

Documenting Requirements: Example - Systems Integration in Zambia

User Scenario

User Scenario	Detecting Death in Communities
Title	From Community Alert to Digital Registration: A Streamlined Community Death Detection Process
Persona	Sarah, a Mortality Surveillance Officer

Sarah receives an alert on her mobile device about a death that occurred in the community within the last 48 hours (Alert Reception). She immediately contacts the family to verify the details of the death, collecting essential information such as the deceased's name, age, date of death, and circumstances (Verification). Sarah notifies the local police about the death, providing them with the verified information (Police Notification). Using the National Unique Identifier (NID), Sarah accesses the SmartCare Plus (SC+) mobile interface to retrieve any existing information about the deceased (Data Retrieval). Sarah conducts a verbal autopsy interview using the WHO VA instrument on her tablet, which is pre-populated with any available SC+ data (Verbal Autopsy). After reviewing the collected VA data for completeness and accuracy, Sarah will submit it electronically to ODK Central (Data Submission). The system automatically generates a verbal autopsy receipt, which Sarah attaches to the Brought in Dead (BID) certificate (Documentation Generation). Sarah provided the family with the VA receipt and BID certificate, explaining that these are required for obtaining a burial permit (Family Assistance). Sarah liaises with the forensic pathologist in cases requiring forensic investigation, ensuring that the medico-legal death investigation report or MCCD is properly documented and submitted to the Chief State Forensic Pathologist's office (Forensic Cases).

Sarah ensures that all documentation, including the BID certificate and notice of death forms, is electronically transmitted to the Department of National Registration, Passport and Citizenship (DNRPC) for official death registration (Digital Registration). Sarah confirms that the death has been successfully registered in the electronic system within the stipulated 48 hours (Follow-up).

Core Data Elements

Activity ID/Name	Data Element ID	Data Element Name	Description and Definition
Detection of death in a community			
DDC.A1 Gathers information about the deceased BID certificate	DDC.A1.DE1	First name	Deceased first name
		Last name	Deceased last name
	DDC.A1.DE2	Place of residence	The place where the deceased lived
	DDC.A1.DE3	Age of the deceased	Age in years of the deceased
	DDC.A1.DE4	Date of death	The date the death occurred in the community
	DDC.A1.DE5	Time of death	The time the death in the community
	DDC.A1.DE6	Place of death of death	The place, city, town where death occurred
	DDC.A1.DE7	Whether natural or sudden death	How the death happens whether caused or sudden.
	DDC.A1.DE8	Relationship of informant with deceased	

Documenting Requirements: Example - Systems Integration in Zambia

Decision support logic

Business rule	All community deaths must be reported within 48hours	
Trigger	Deaths occurs in the community	
Input	Action	**Output**
Death information (location, time, personal details)	If death occurs in urban/peri-urban area with nearby health facility or police post: Then family notifies police.	Partially filled BID form or traditional burial approval
	Police gather initial information and inspect body	
	Police partially fill BID form	
	Then family sends BID form to the district registrar's office	
	If there is a mortality surveillance officer stationed at the hospital, Then MS officer is notified	
	Else: The family proceed with obtaining burial permit	

Indicators and reporting requirements

Indicator	**Definition**	**Data / method / formula**	**Frequency**	**Notes / Surveillance outputs**
Numbers of deaths	- Observed events in defined community - OR aggregated numbers by date of death	Line lists of individual deaths with age, sex, address, date of death, place of death (facility name),	Daily / weekly / monthly	- Trends in deaths by age / sex - Geographic/socioeconomic trends
Excess mortality * (EM)	Difference between observed and expected deaths in the population over a defined period	EM = Observed deaths – Exp deaths	Monthly / annual	Expected deaths from projections based on historical data averaged across 3-5 years

Outline of Presentation

An Integrated Mortality Systems Ecosystem

Collaborative Requirements Development and Enterprise Architecture

Documenting Requirements for Systems Integration

Use of Digital Adaptation Kit to Document Requirements

Summary

Important Concepts for Integrating Sample Registration Systems

Integrated mortality systems ecosystem, supported by an integration function to link data producers with data consumers

People, processes, and technology

Collaborative requirements development

Enterprise architecture to map future state

WHO SMART Guidelines and Digital Adaptation Kit to document requirements

What is the best practical approach to implementing an integrated Sample Registration System?

Start with a Digital Maturity and System Readiness Assessment

Align Stakeholders Around Shared Objectives

Use Enterprise Architecture (EA) as a Planning Tool

Plan for Data Integration and Use

Design with Sustainability in Mind

Important Take Away Message

As proposed by the project sponsor

As described in the project request

As designed by the architect

As constructed by the production team

What the customer wanted

Key Frameworks for Integrated SRS

- **CRDM**: Collaborative methodology for defining shared requirements across stakeholders
- **DAK**: 8-component template for documenting digital health requirements systematically
- **EA**: Architecture framework aligning people, processes, and technology
- **VIVA 12-Step**: Comprehensive guide for SRS design and implementation
- **WHO SMART Guidelines**: Progressive layers from narrative to AI-enabled guidelines

Key Concepts for Integrated SRS

- **Integrated Ecosystem**: Links mortality data producers with consumers
- **Three Integration Types**: Data collection, digital integration, and data use
- **Sustainability**: Local ownership, realistic costing, aligned strategies

End of Presentation

Comments, Questions and Discussions

Break

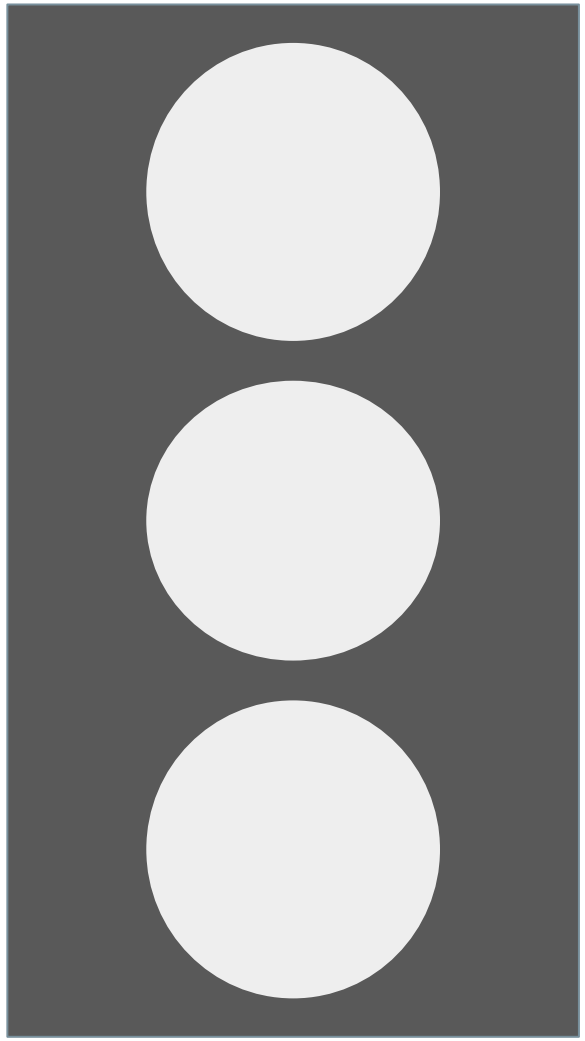
How can an SRS help fill DHS gaps?

How can SRS help fill DHS gaps?

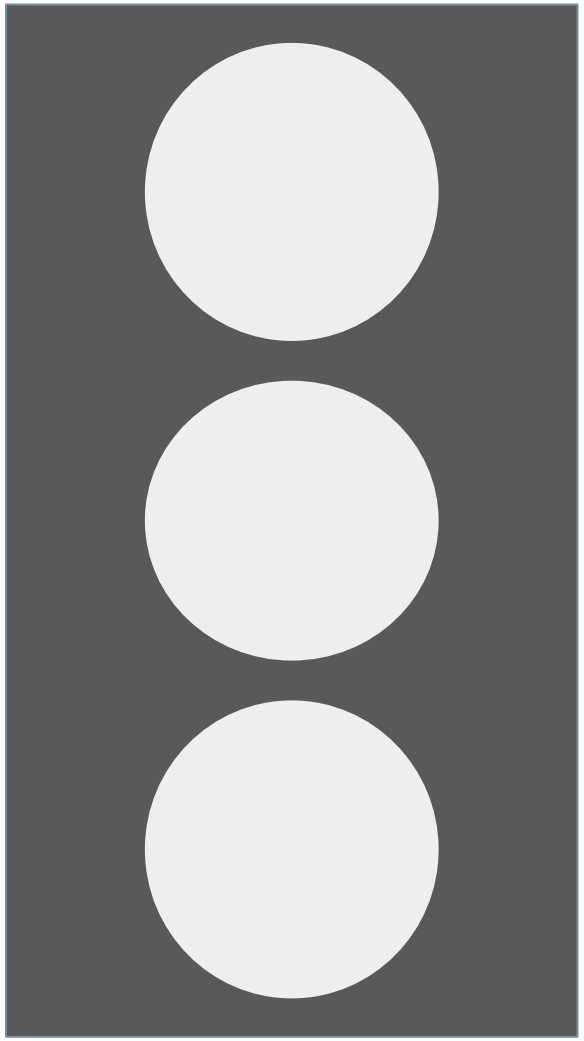
William Weiss, Johns Hopkins University

Using a stop light approach what score would you give DHS and SRS as far at being able to: **Estimate mortality rates?**

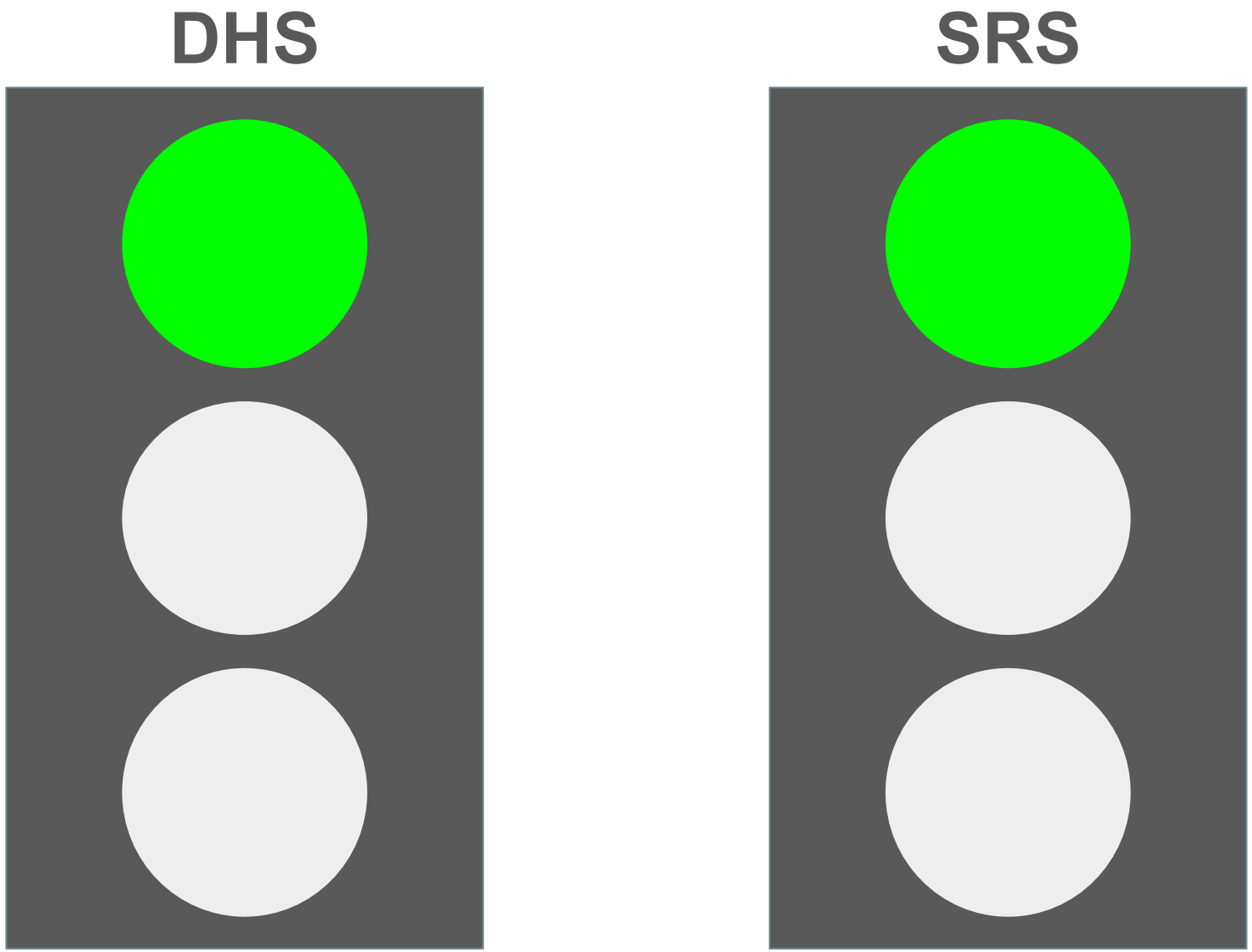
DHS



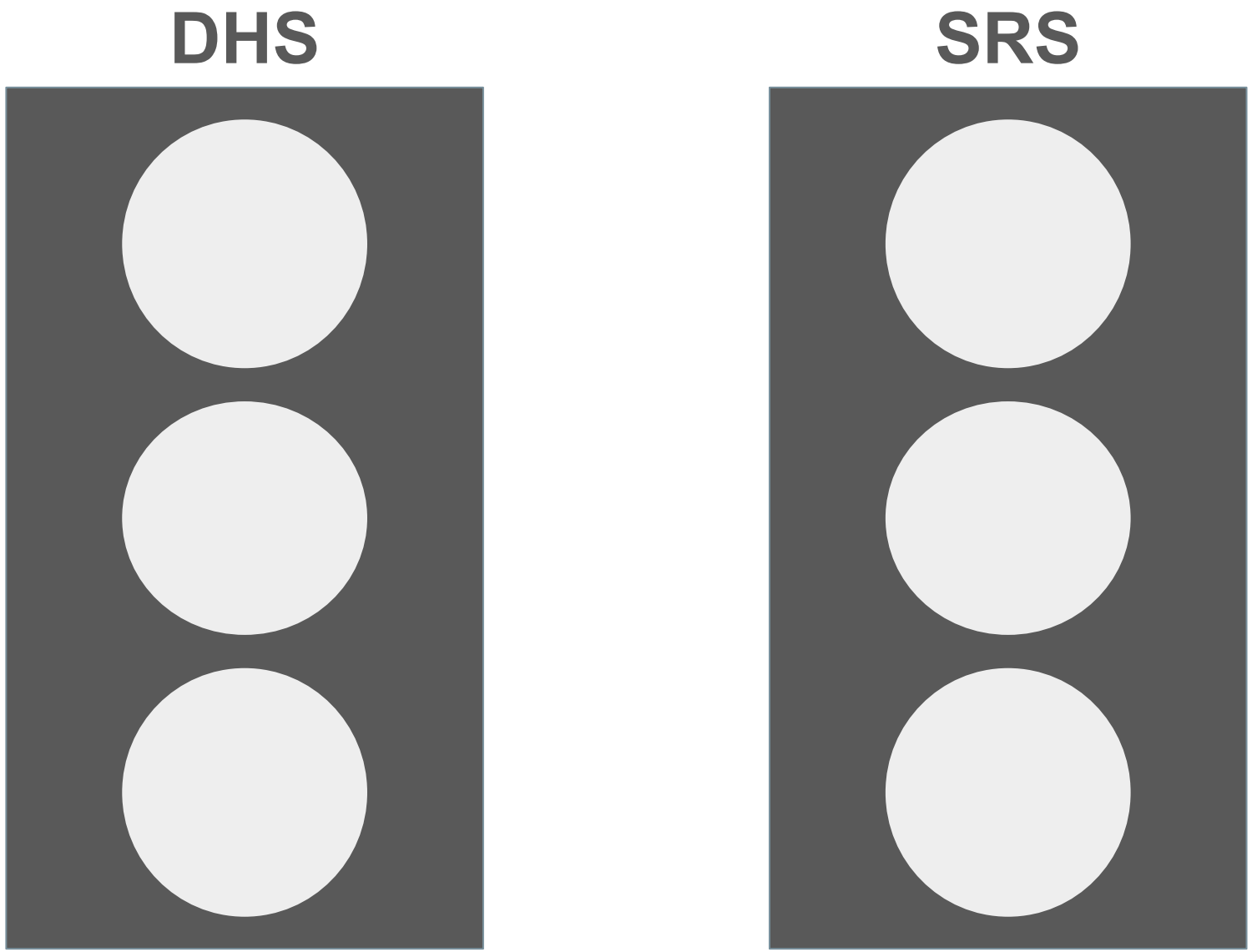
SRS



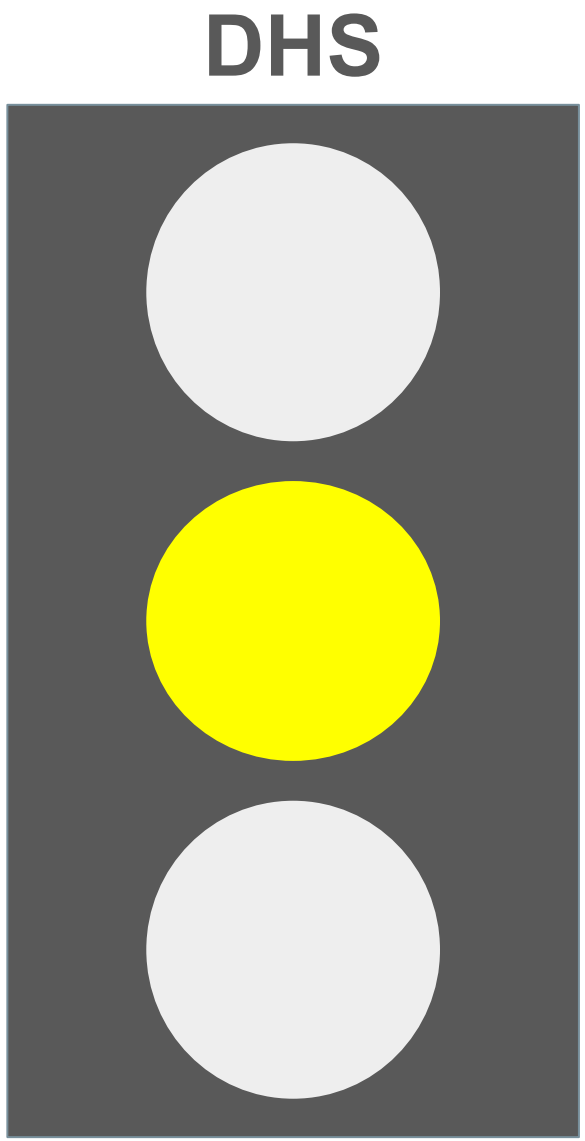
Estimate mortality rates?

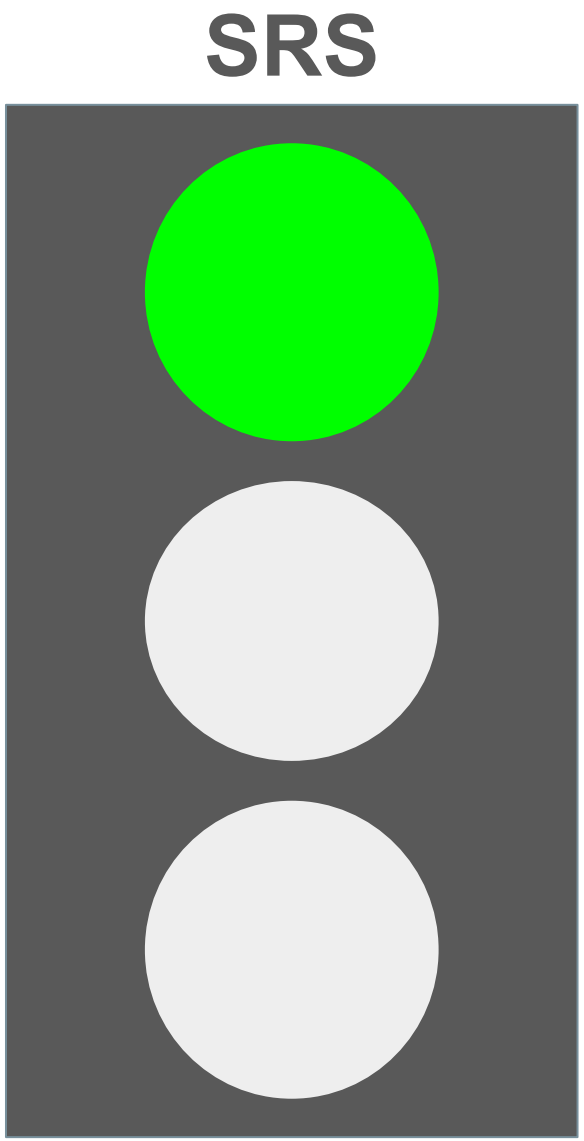


Estimate mortality rates for all ages and events?

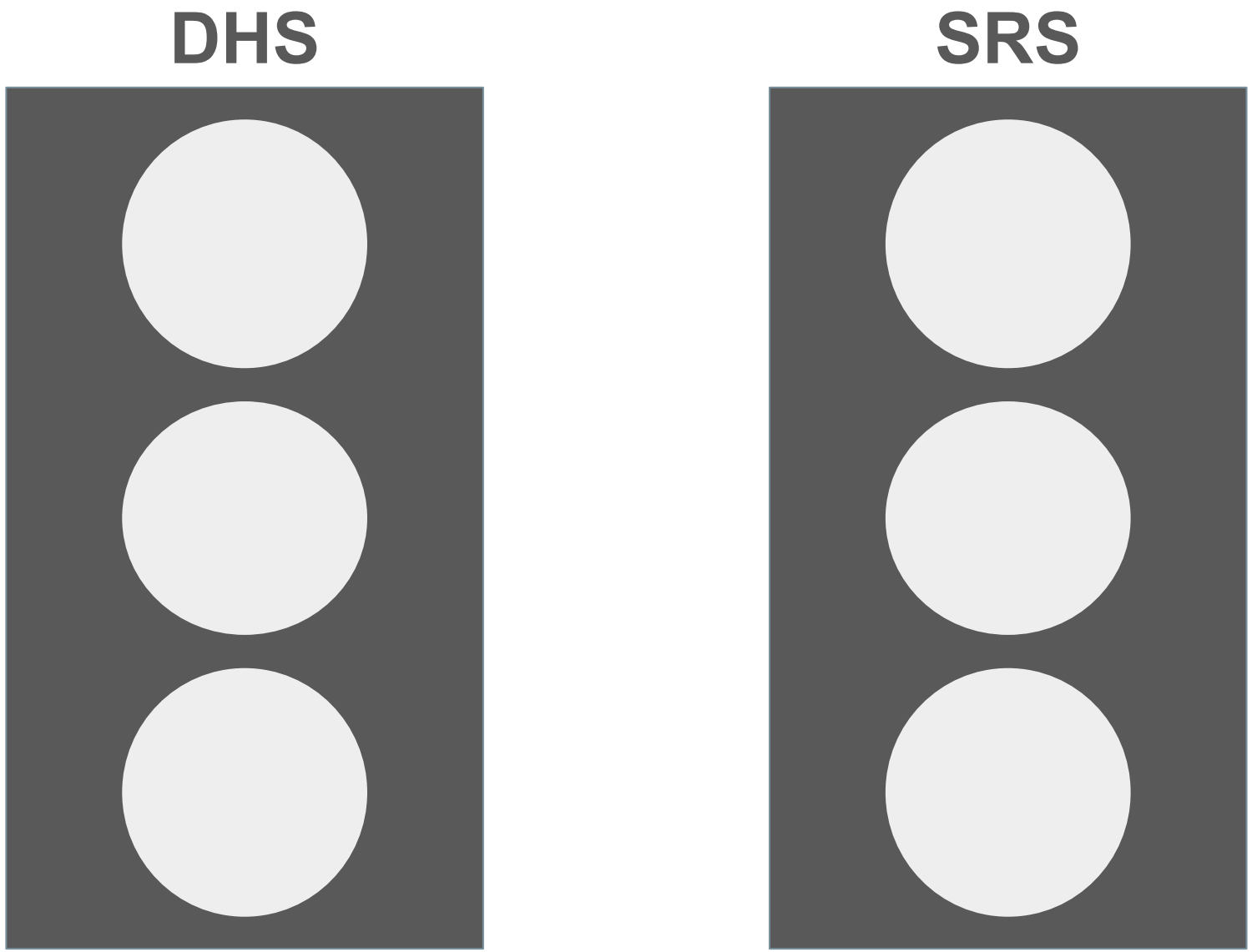


Estimate mortality rates for all ages and events?

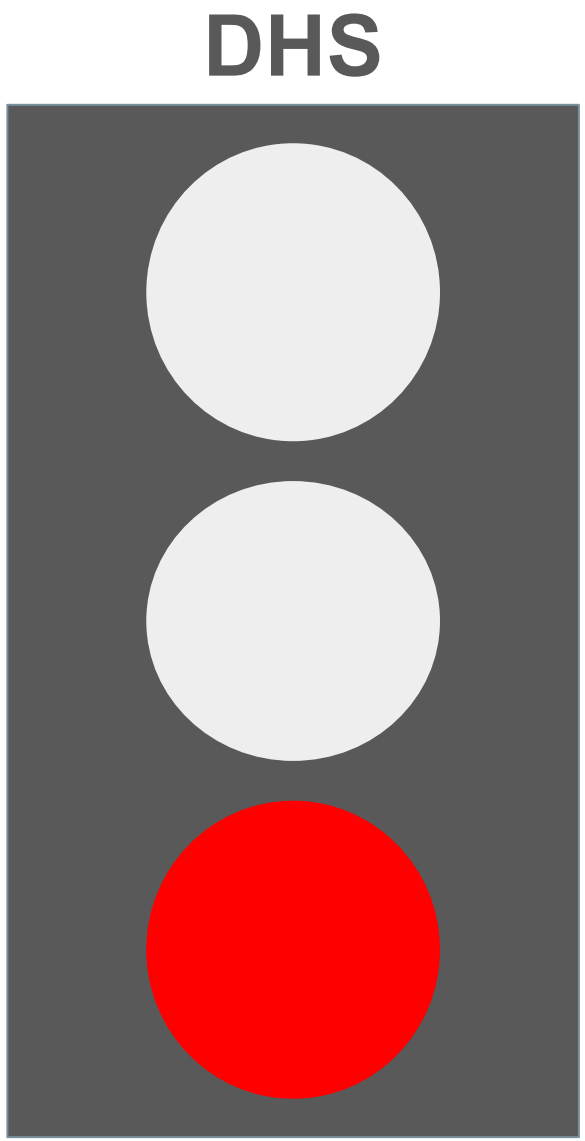


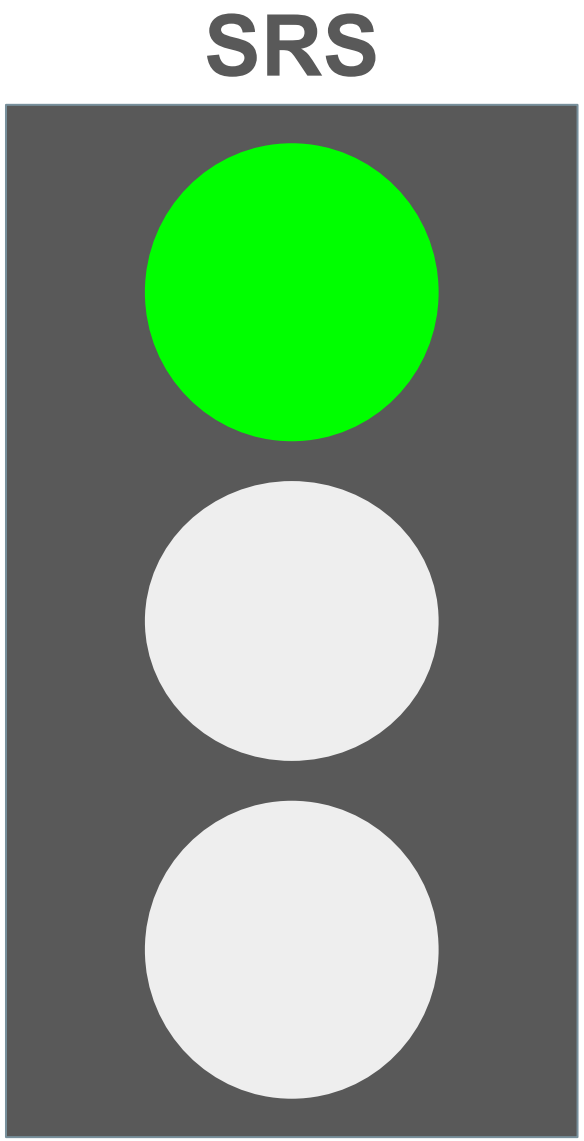


Update mortality rates annually?

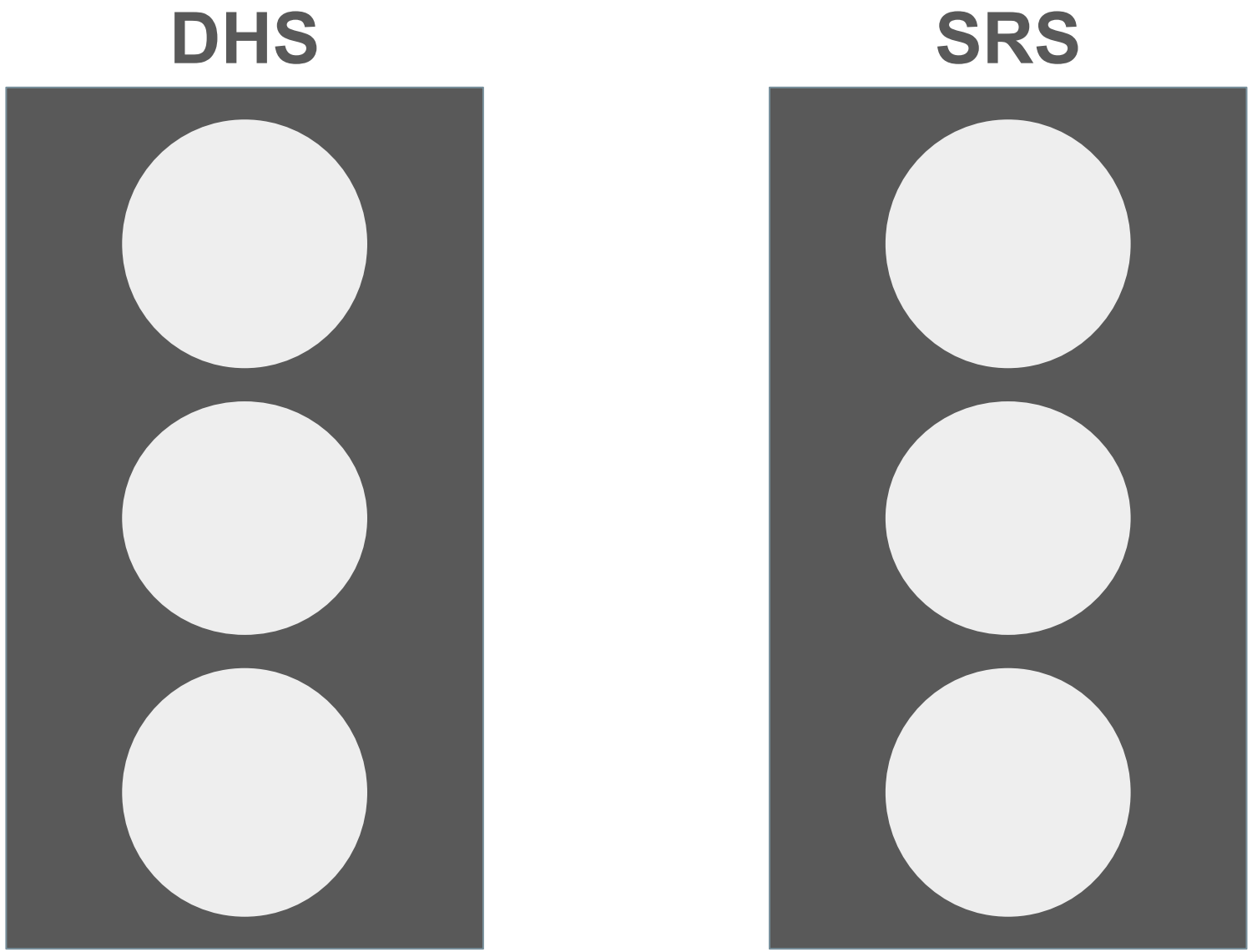


Update mortality rates annually?

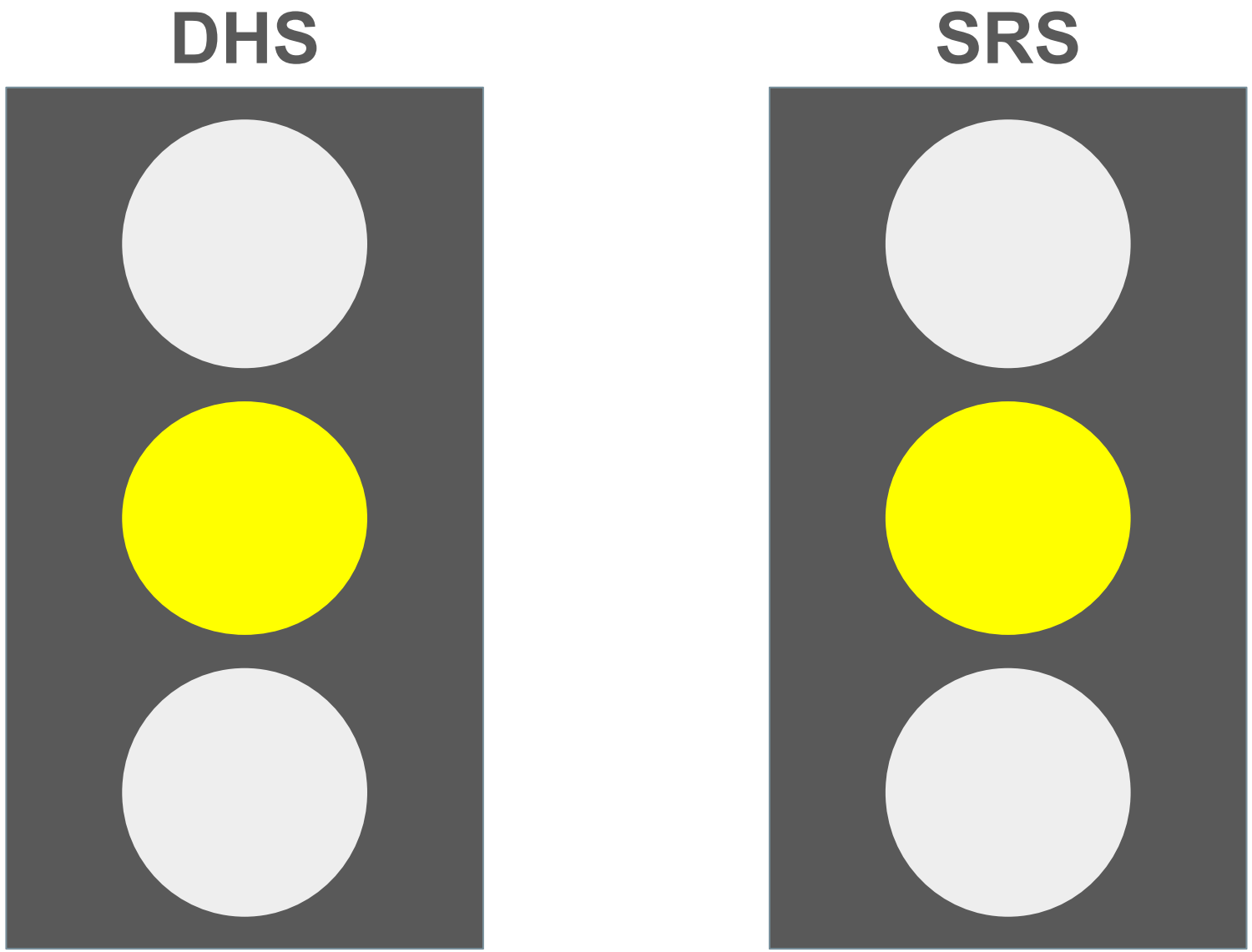




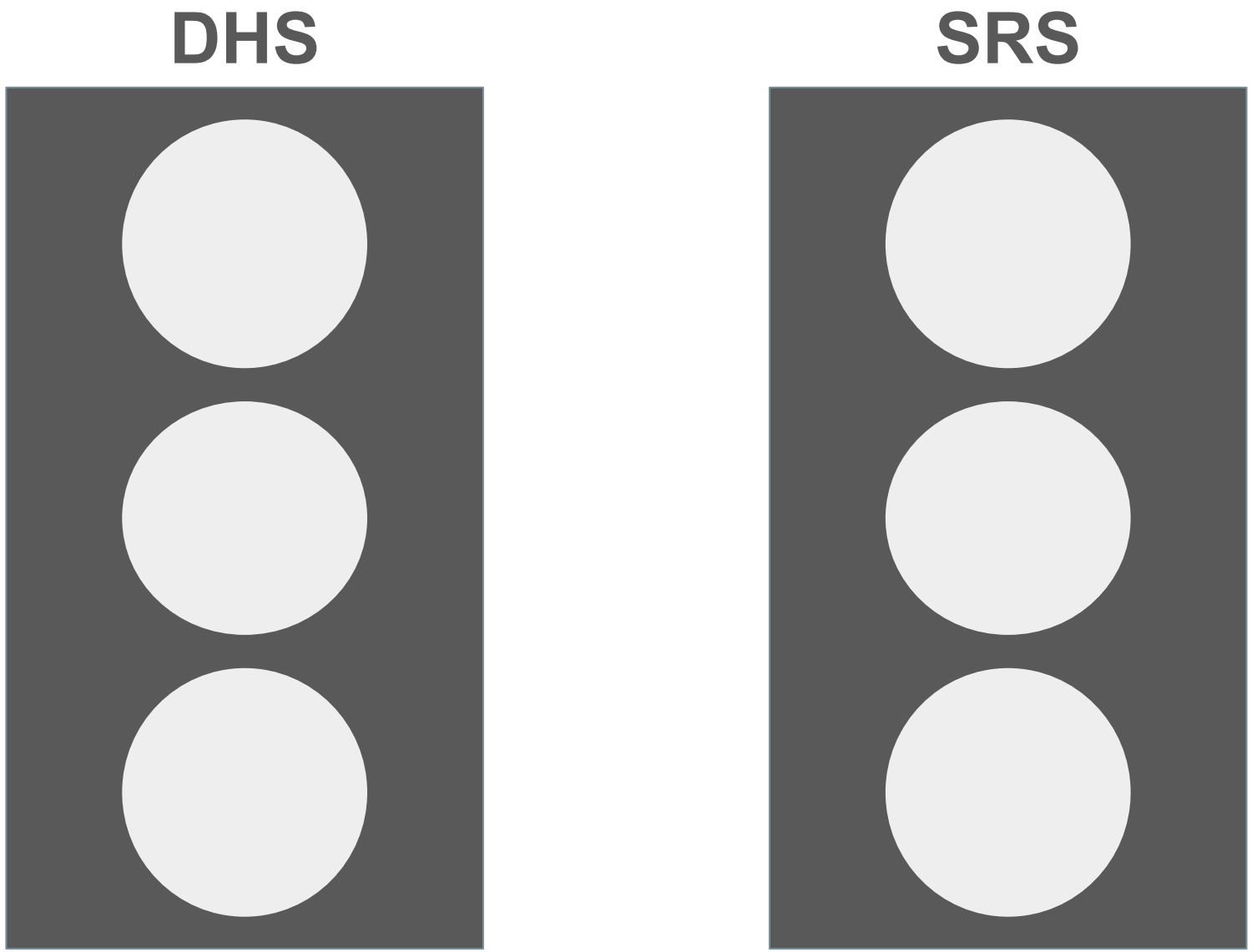
Provide subnational estimates of mortality?



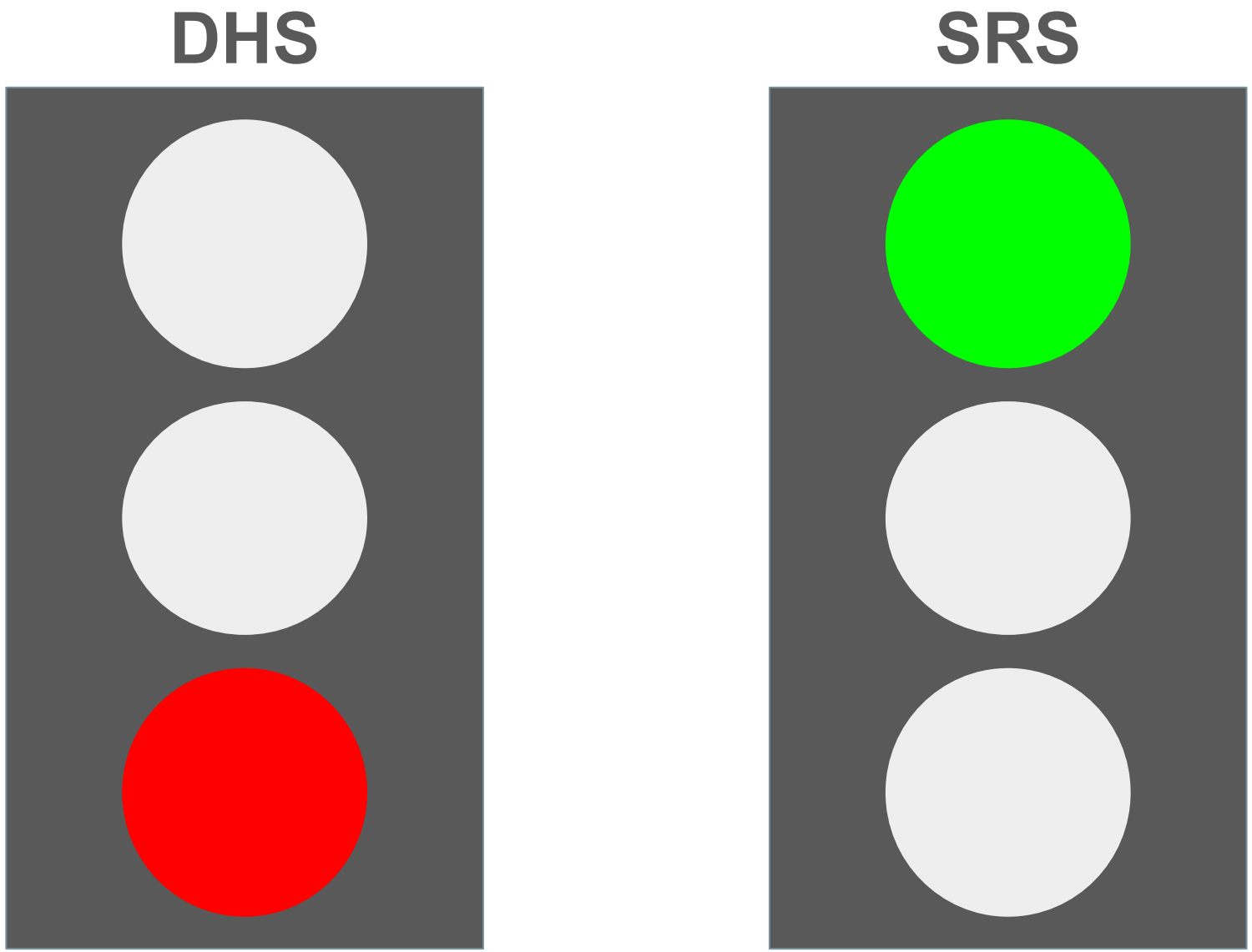
Provide subnational estimates of mortality?



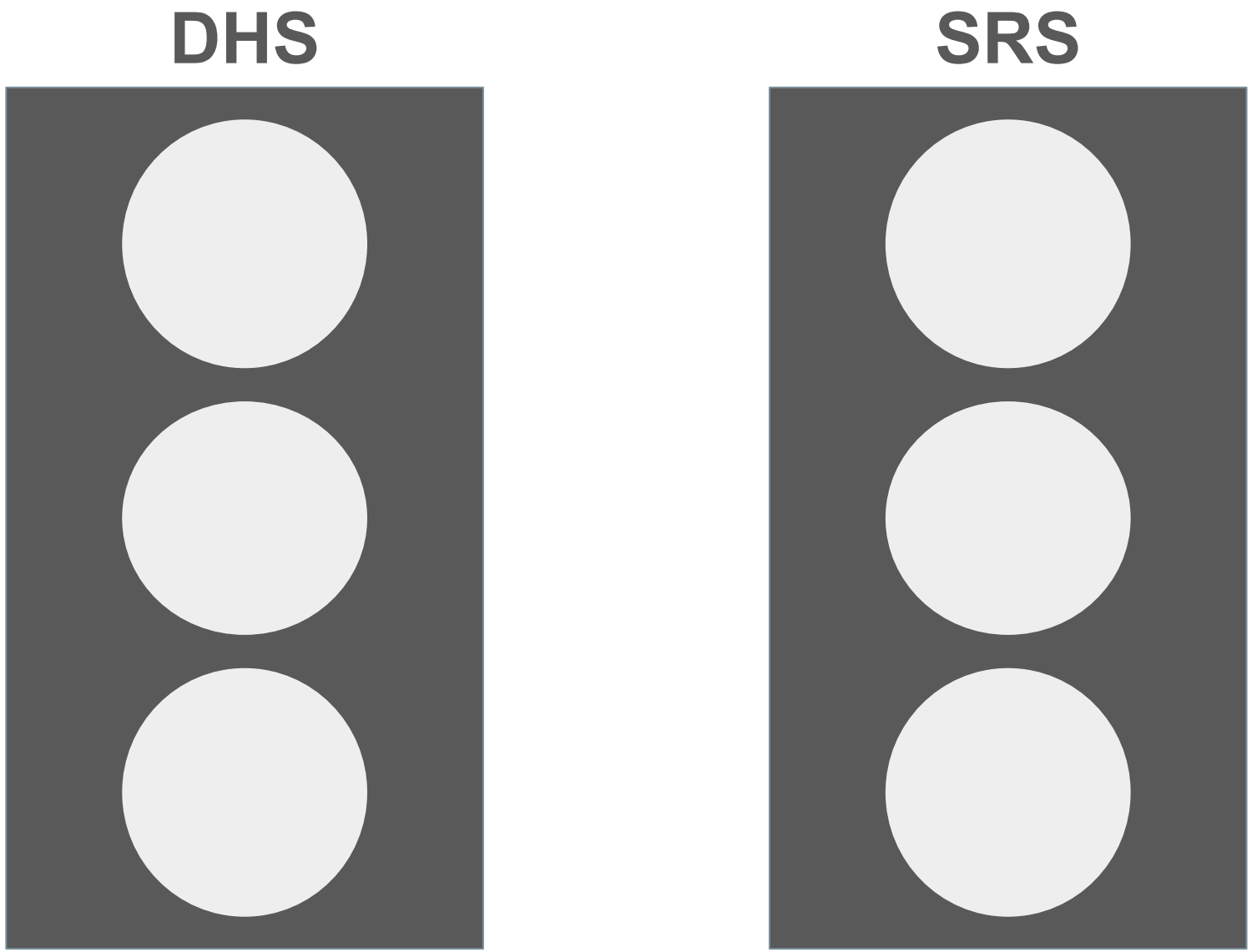
Estimate causes of death across age groups?



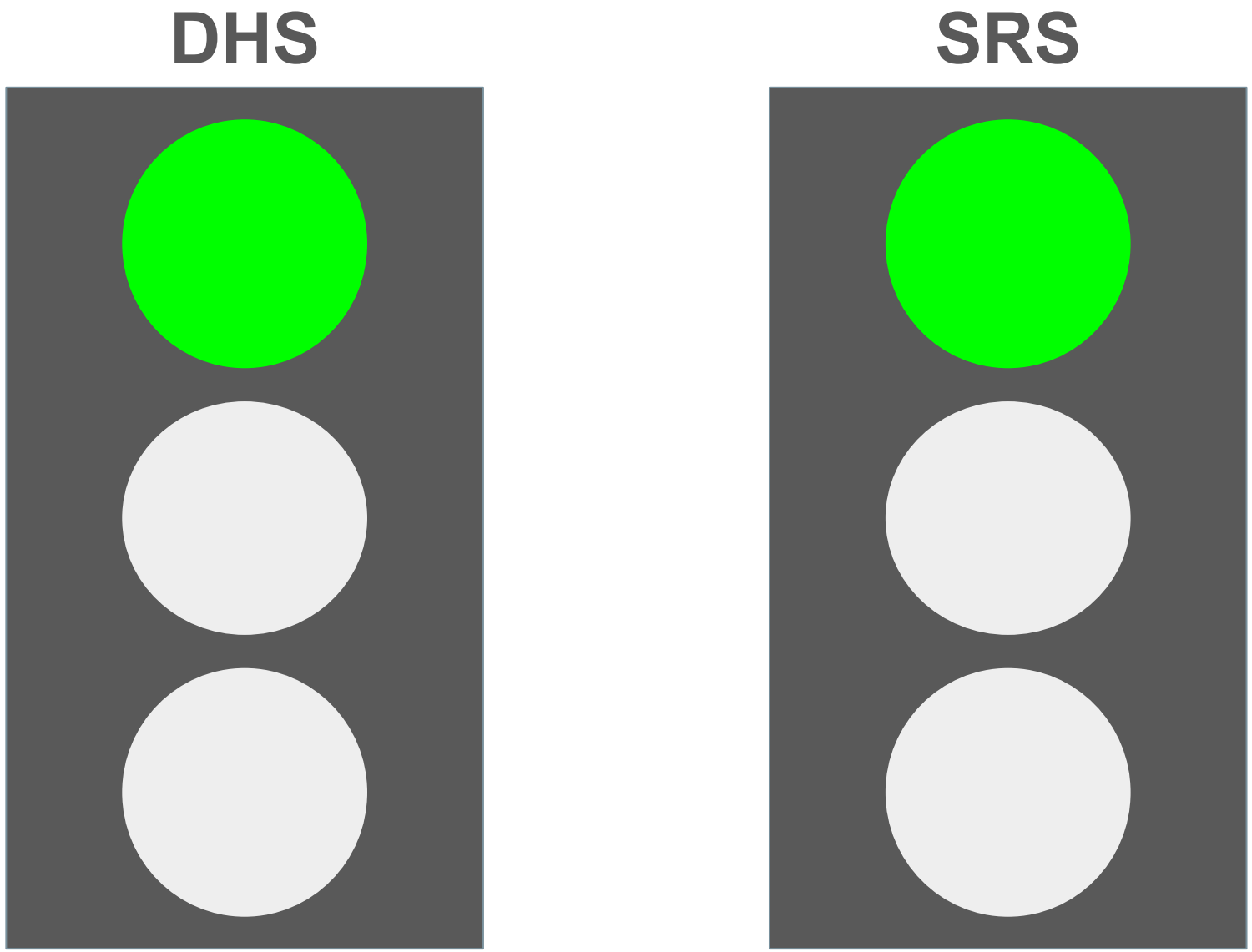
Estimate causes of death across age groups?



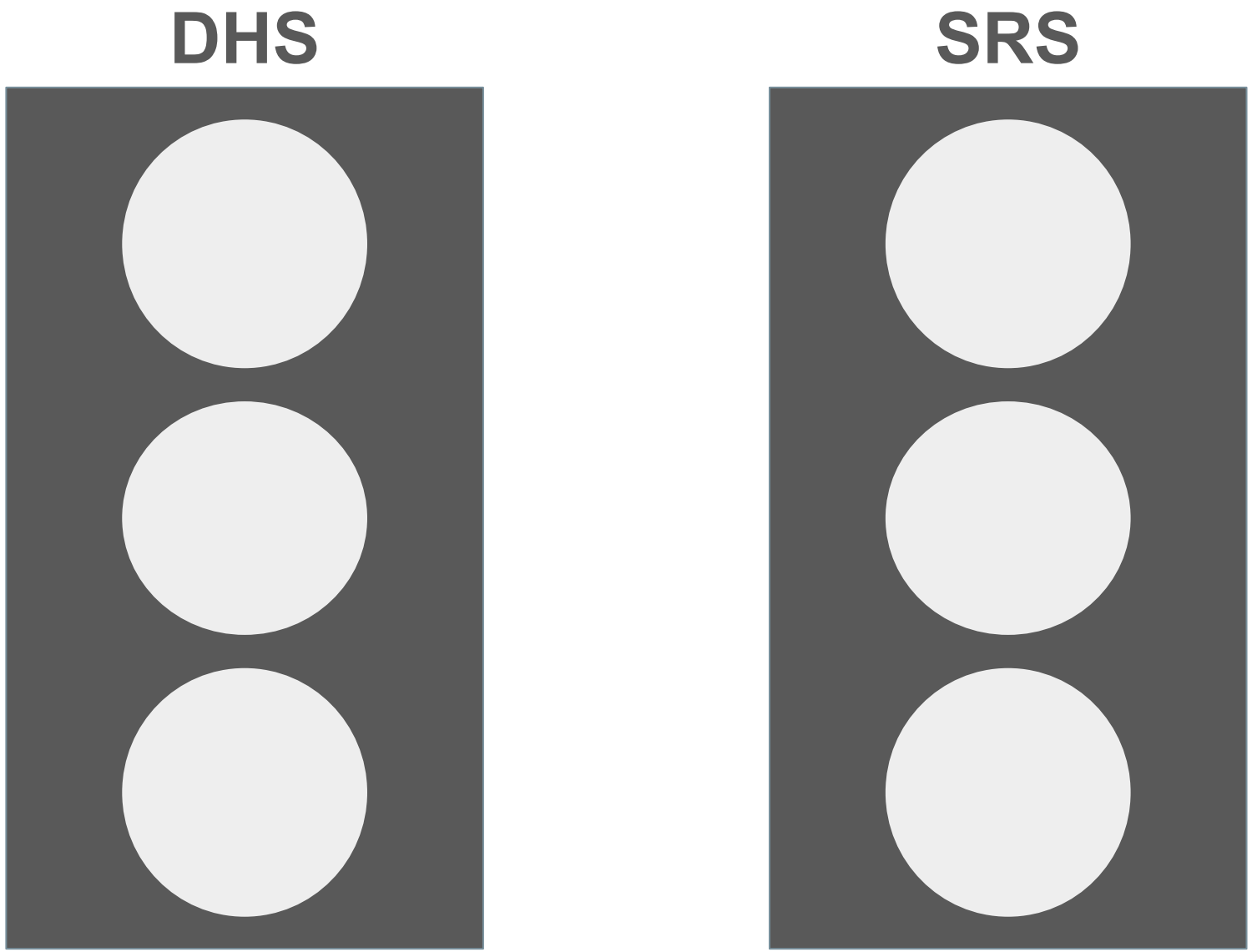
Provide denominators for rates (birth, mortality by age, sex, other)?



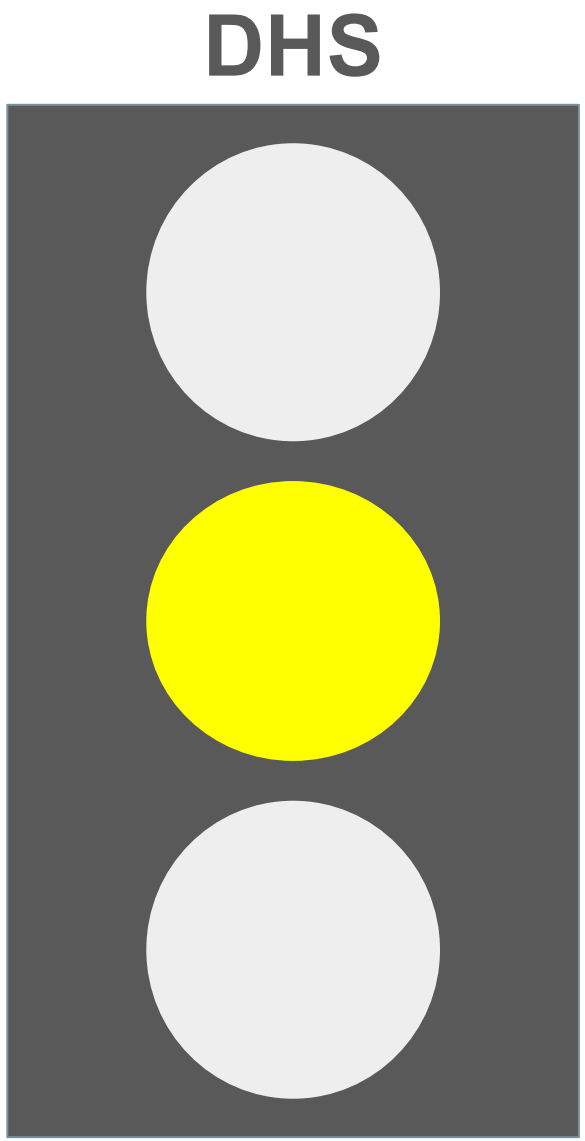
Provide denominators for rates (birth, mortality by age, sex, other)?

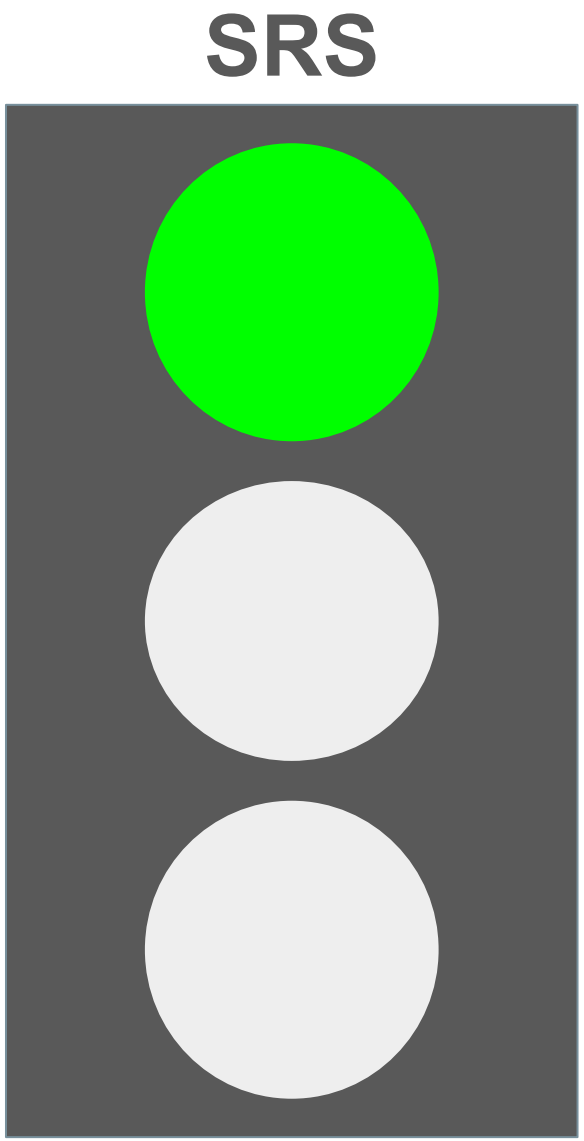


Allow for additional special studies of national interest?



Allow for additional special studies of national interest?





Summary: SRS in the time of DHS Gaps

Function	DHS	SRS
Estimate mortality rates?		
Estimate mortality rates for all ages and events?		
Update mortality rates annually?		
Provide subnational estimates of mortality?		
Estimate causes of death across age groups?		
Provide information on population denominators?		
Allow for additional special studies of national interest?		

Closing

Software and IT System Considerations and Discussion

Multi-Country SRS Planning and Experience-Sharing Conference

Day 2

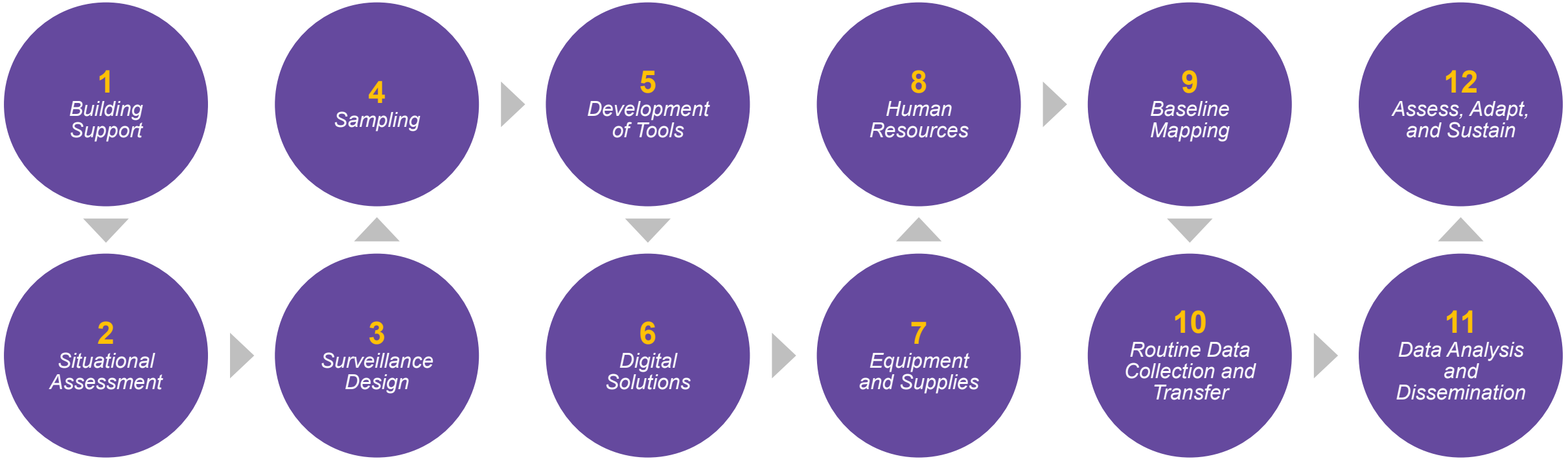
Session Goals

- Discuss what comes after the collaborative requirements have been gathered and the SRS design is complete
- Learn from the experience of Zambia's SRS team
- Provide input to a new effort to prepare detailed IT implementation tools and frameworks

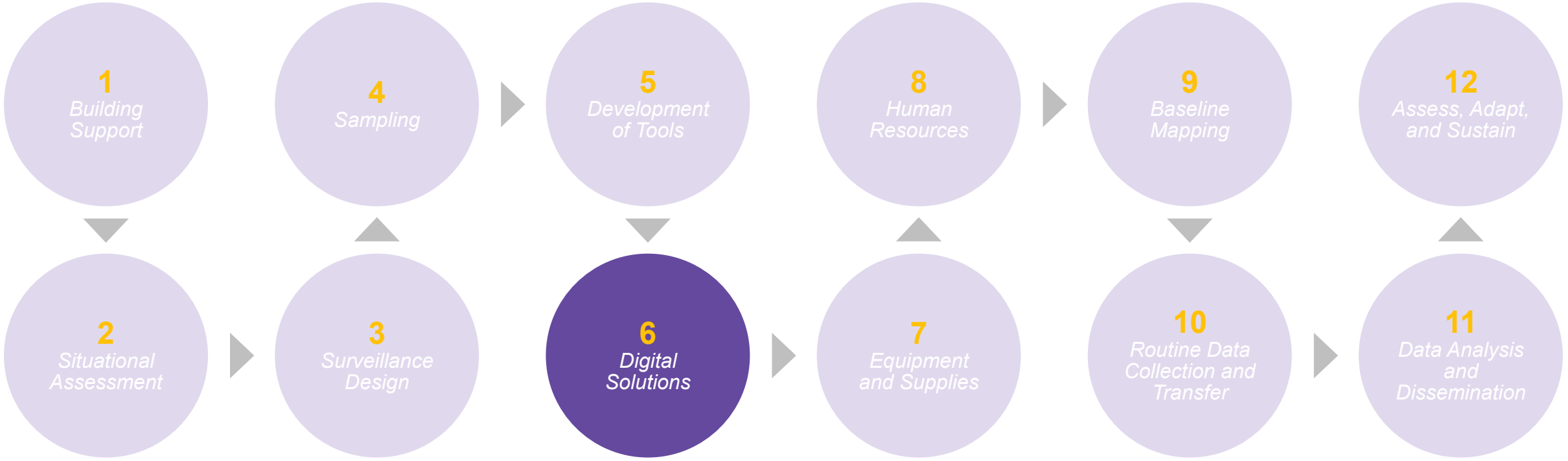
Who are you?

1. I have no familiarity with IT
2. I have some understanding of IT systems and development, but I do not do it myself
3. I am an experienced IT administrator or software developer
4. I am an experienced IT administrator or software developer with experience in SRS or mortality surveillance technology

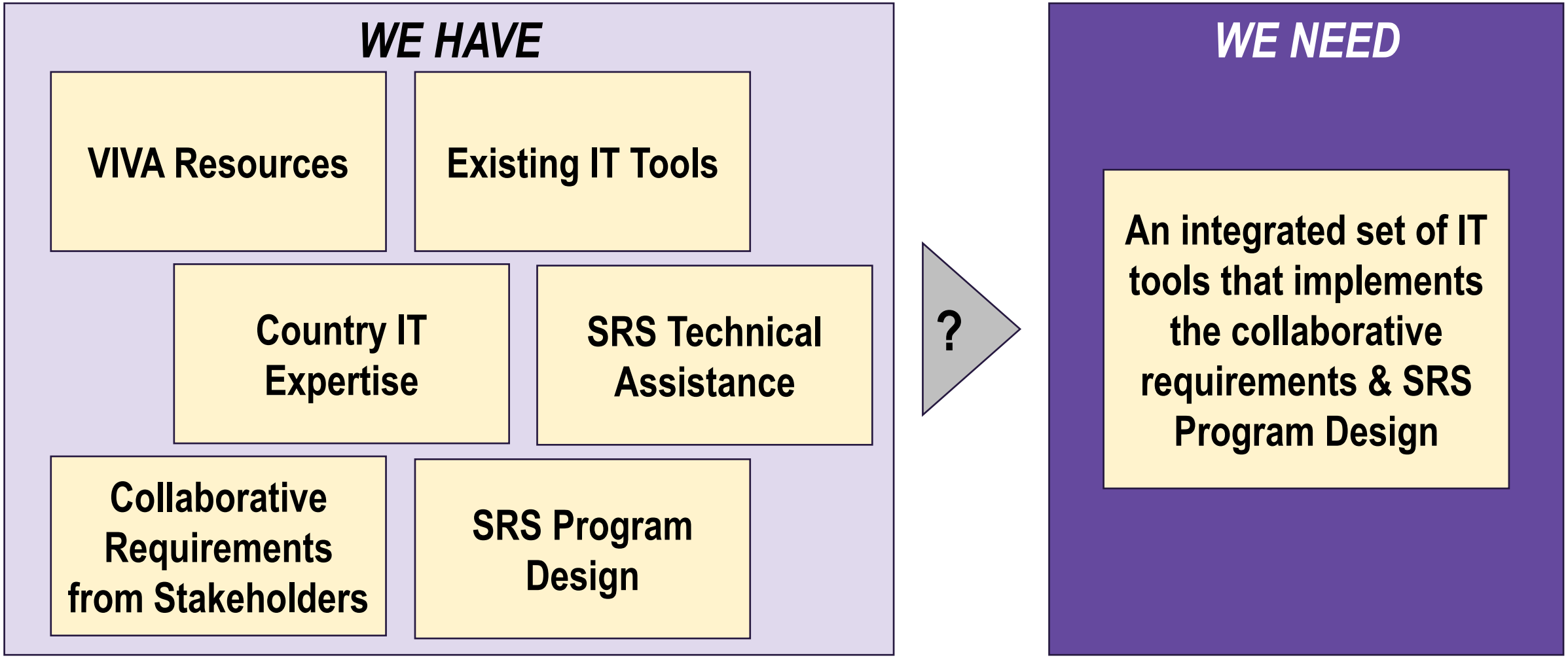
Reminder: the SRS 12 steps



How do you implement Step 6?



Step 6: Digital Solutions



Implementing Step 6: Proposed Processes

Step 6A: Requirements, Specifications, & Design

Step 6B: Implementation

Step 6A Requirements, Specifications, & Design

Understand Timeline & Outcomes → *Refine Requirements* → *IT Specification & Gap Analysis* → *System Design*

	Understand Timeline & Outcomes	IT Specification & Gap Analysis	System Design
Key Activities	• Understand from all stakeholders the programmatic timeline, key deadlines, and desired outcomes • Define requirements for the system • Map detailed implementation workflows	• Transform requirements into IT specifications • Overlay existing systems with specifications • Determine where existing systems meet – or do not meet – needs	• Finalize workflows • Design integration points between systems • Design any desired new system development
	Note: These two processes should be completed earlier, such as through collaborative requirements and SRS design; however, these products may need to be refined		
Zambia Lessons Learned	• Plan for new information to be uncovered later in the process, requiring a revision to these steps • Develop a deep understanding of existing data protection and software approval requirements – even those that may not be "official"	• The logical technical approach may not be optimal for the existing institutional affiliations to software or technical tools	• Early on – before this step – identify early IT leads who can guide the discussions and manage the system design teams

Step 6B Implementation

	Software Development	*Train Staff on Software*	*Pilot and Adjust (if necessary)*	*Production Launch*
Key Activities	• Create integrations between systems • Build new systems or modify existing systems to add desired new features	• Develop documentation and training materials • Conduct trainings per user level (e.g., administrator, data user, field staff)	• Conduct a pilot of the system and processes Develop pre-pilot objectives and assessment criteria • Assess the pilot and address issues	• Finalize documentation and training materials • Train new staff • Launch the system
Zambia Lessons Learned	• Ensure an accurate estimate of the human resources required – and commitment for those resources – before deciding to adopt, adapt, or build	*Zambia SRS not yet at this step*		

How did we get to where we are?

Zambia SRS Examples

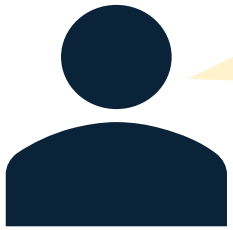
ZAMBIA EXAMPLE

Understand Timeline & Outcomes → *Refine Requirements*

In Zambia, we needed to refine the requirements and system design by understanding specific **personas who would interact with the IT systems**.

These personas help non-informaticians to **explain what they need**, guiding IT specification development.

PERSONAS: Identify and understand needs of a customer



Ensures the project effectively captures, analyses, and interprets data on mortality to improve public health outcomes

Personal

Name

Geoffrey

Role/Title

National Epidemiologist

Background

Public health specialist; epidemiologist; medical statistician

Location

National/Lusaka

Responsibilities

- Ensure data being captured aligns with program objectives
- Liaise with data manager on QA/QC system and data management processes
- Determine what type and level of analysis is embedded and routinely performed in the system
- Perform routine & specialized data analysis
- Determine appropriate outputs according to end user

Goals

- Ensure seamless collection, transmission, and utilization of quality (mortality) data

Critical Tasks

- Export and review data of interest for analysis purposes
- Run inbuilt reports
- Perform data extraction using custom scripts
- Execute custom scripts for specialized data analysis
- Flag data quality concerns within the system

ZAMBIA EXAMPLE

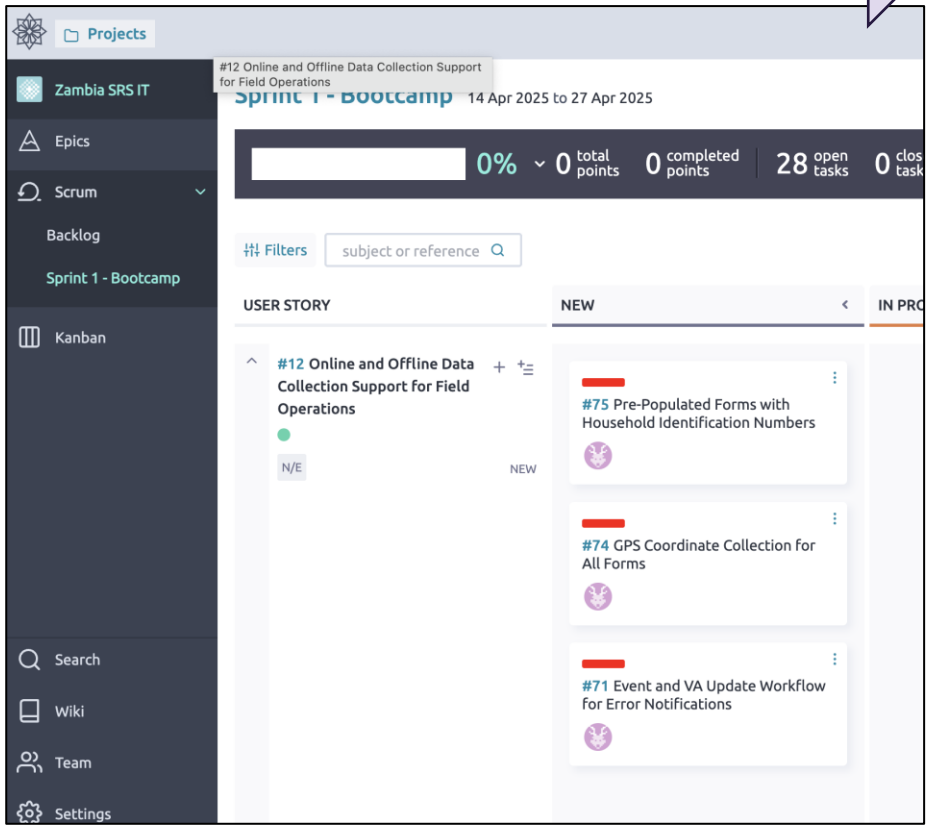
IT Specification & Gap Analysis → *System Design* → *Software Development*

In Zambia, we broadly developed IT requirements from the personas, translated those requirements into IT specifications, and then **cross referenced those specifications versus the existing tools** flagged for consideration.

A **software development team** is currently **addressing gaps**.

Requirements → *Technical IT specifications & mapping to existing systems* → *Developing Software*

B	C	D	E
Requirement from Sticky notes	**Votes**	**Expand the system requirements in technical terms. What IT system design is desired?**	**Which design elements are already covered by existing tools?**
Integrate with external software such as R, Stata, and Python	7		
Allow for upload and output for external analyses	7		
Be able to save my script for reuse by myself and others	2		SIS-COVE analysis portal; additionally, this could be fulfilled through a combination of GitHub code repositories and something like RStudio Server (and analogous items for other languages)
Can integrate code/scripts from external software	3		
Code Collaboration	1	The system must offer the ability for users to run custom analyses in their chosen analysis platform. These analyses, furthermore, must be shareable such that code can be collaborative and reused.	
Allows for upload of output from external sources	3	The system must integrate with other data sources of non-mortality data, such as population, expected deaths, etc, to enable analysis and provide context. In this specific user story, the data just needs to be able to be integrated into data analysis processes and is not necessarily needed for visualization in the dashboard or other purposes. Note: Need to consider export of data (bi-directional). Data sharing via API or manually.	SIS-COVE analysis portal; additionally, this could be fulfilled through a combination of GitHub code repositories and something like RStudio Server (and analogous items for other languages)
		District/Province/Regional levels need	



What comes next?

We are creating an operational “playbook”

Goal: provide frameworks and technical aides for navigating this path to IT implementation

Distribution: planned integration within the JHU VIVA set of resources by December 2025

Context: ground the frameworks and aides in what worked – and what did not work – for existing SRS implementations in Zambia and Mozambique

To succeed, we need to understand your needs

What steps in this process feel like something you can do today? Why?

Conversely, what steps do you anticipate being the most difficult? Why?

If we could only develop one resource for you to navigate this process, what would it be?

Backup

Developing IT specifications

A specification statement should be clear, concise, unambiguous, and measurable:

I need to analyse VA data.

compared to

I need VA COD data presented in near-real time stratified by age groups, sex, and geographic boundaries