

## COMSA/ SIS-COVE Mozambique:

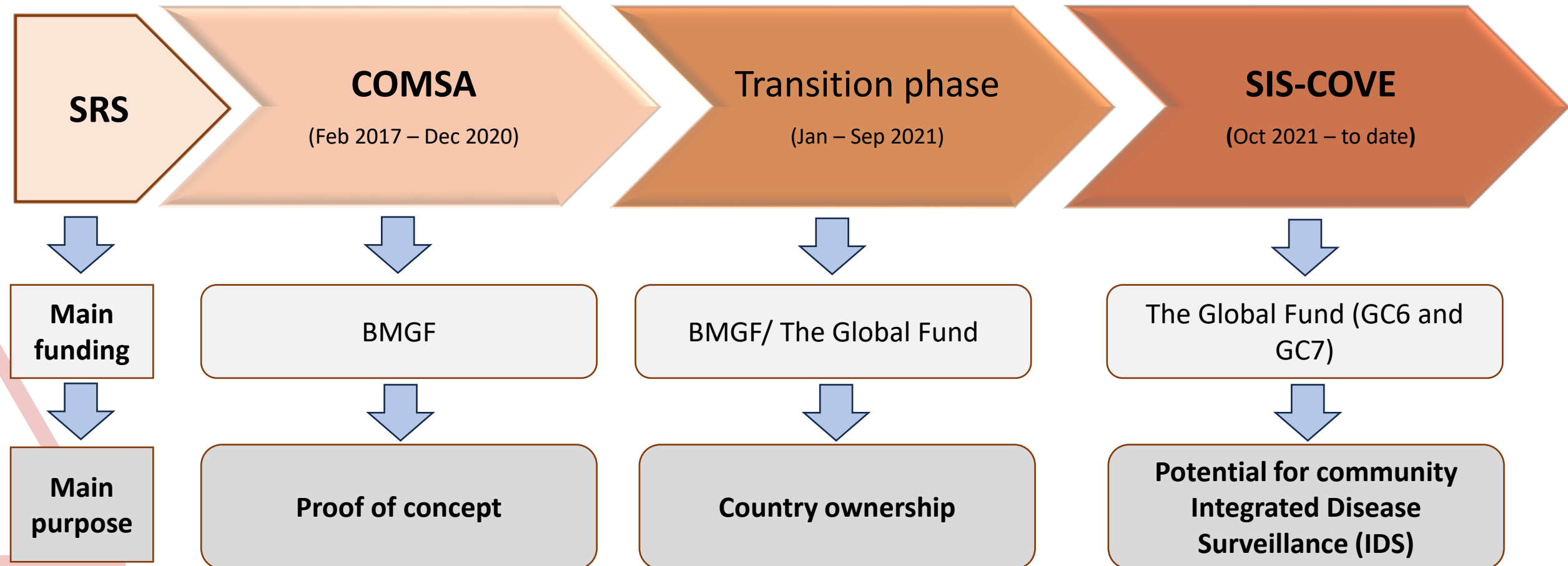
Early-phase project implementation:  
lessons learnt

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*COMSA PI for Mozambique*

December 2025

# Mozambique recognized SRS as a strategy for immediate and long-term availability of representative CRVS and causes of death data



# Lesson 1: Define SRS main goal/ objective

## COMSA Mozambique Goals

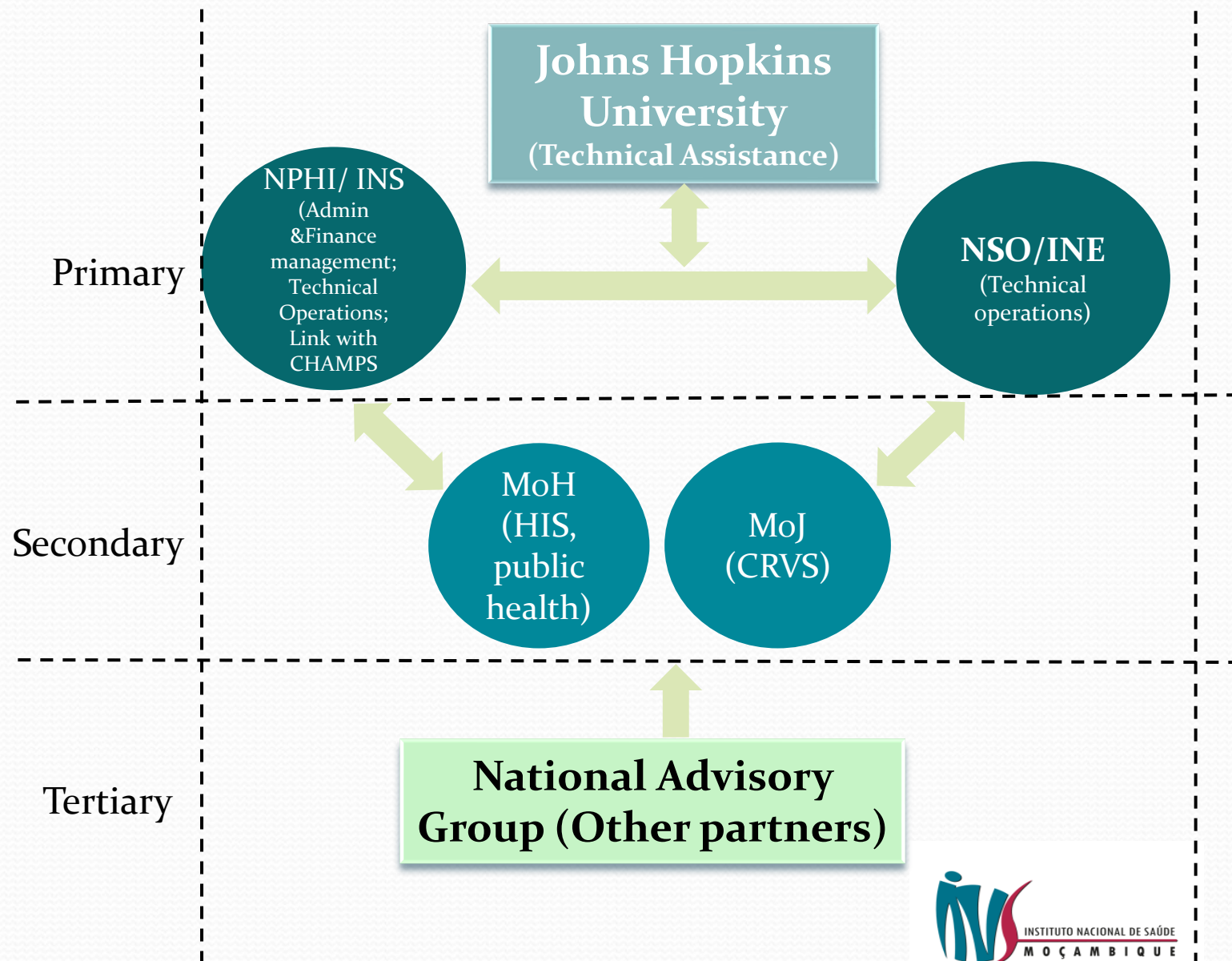
Generate continuous mortality and cause of death data representative at provincial and national levels

Link with CHAMPS to establish a site for collection of MITS in under-five deaths for cause of death assessment, and use data to improve VA-based cause of death in Mozambique

SDG 3: Ensure healthy lives and promote well-being for all at all ages				
Target 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services, medicines and vaccines for all				
MDG unfinished and expanded agenda	3.1: Reduce maternal mortality	New SDG 3 targets	3.4: Reduce mortality from NCD and promote mental health	SDG3 means of Implementation targets
	3.2: End preventable newborn and child deaths		3.5: Strengthen prevention and treatment of substance abuse	
	3.3: End the epidemics of HIV, TB, malaria and NTD and combat hepatitis, waterborne and other communicable disease		3.6: Halve global deaths and injuries from road traffic accidents	
	3.7: Ensure universal access to sexual and reproductive health-care services		3.9: Reduce deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	
				3.a: Strengthen implementation or framework convention on tobacco control
				3.b: Provide access to medicines and vaccines for all, support R&D of vaccines and medicines for all
				3.c: Increase health financing and health workforce in developing countries
				3.d: Strengthen capacity for early warning, risk reduction and management of health risks
Interactions with economic, other social and environmental SDGs and SDG 17 on means of implementation				

## **Lesson 2:** Involve main stakeholders at the conceptualization phase and identify needs and gaps

### Governance role by level, COMSA-Mozambique



# Lesson 3: Define/ adjust SRS main stakeholder's roles if needed

## National Public Health Institute(INS) \*

- National institute for health statistics and health research
- Main SIS-COVE implementation institution
- Interaction with other institutions

## National Statistics Bureau (INE)

- Cartography
- Sampling procedures

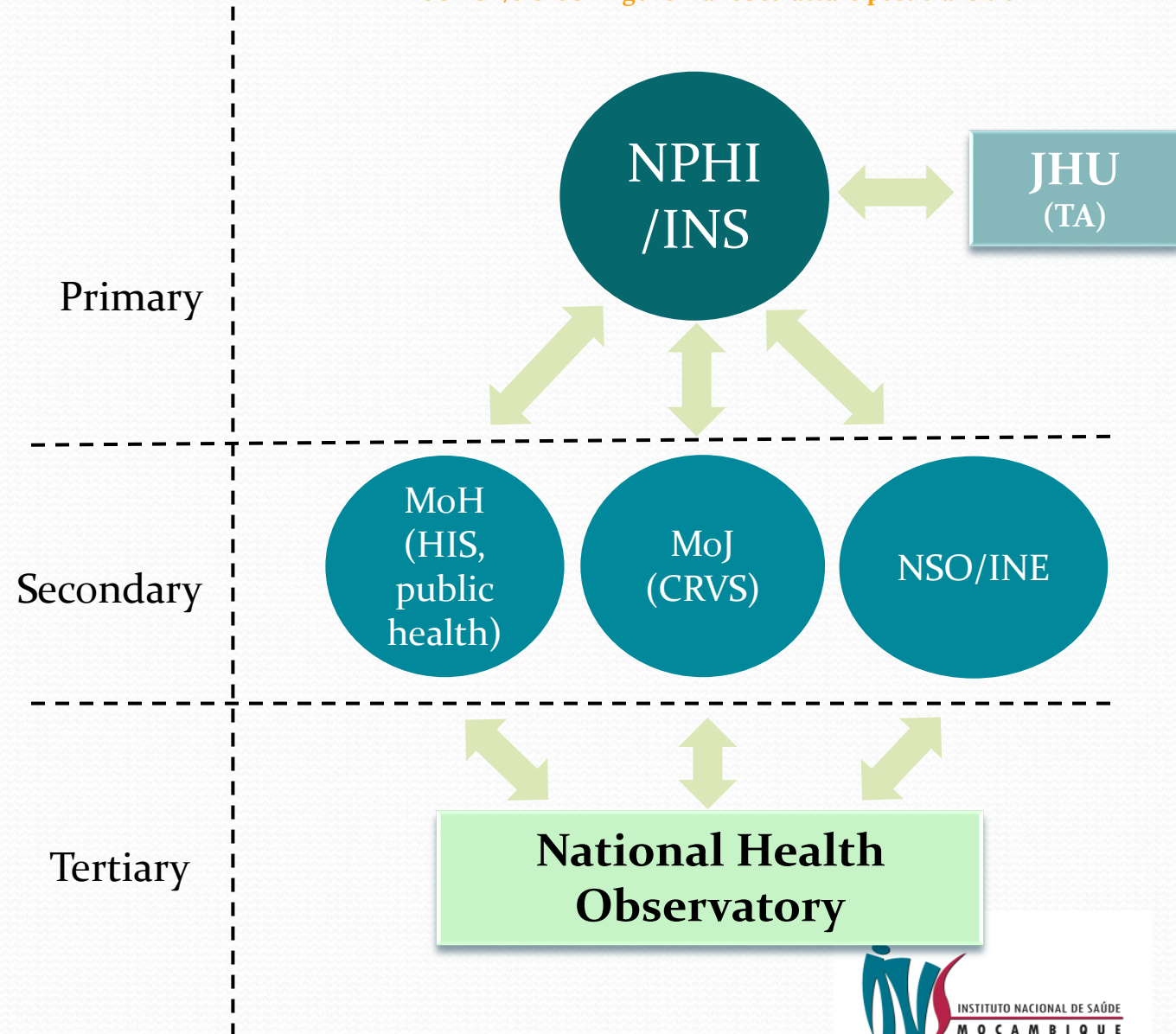
## Ministry of Health (MISAU)

- Community health workers reporting vital events
- Supporting the implementation of serosurveillance
- Interoperability with dHIS-2

## Ministry of Justice (MJCR)

- Linking community births and deaths to CRVS to increase CRVS coverage
- Interoperability with e-CRVS

COMSA/SIS-COVE governance structure post-transition

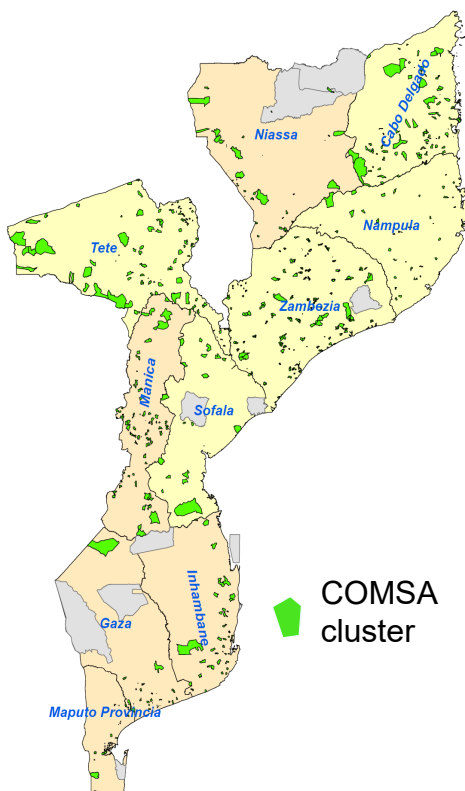


\* With Technical assistance from Johns Hopkins University since 2017

# Lesson 4: Define SRS ideal sampling and representativeness

## Comparison of COMSA Sample to Existing Survey (PHIA 2015)

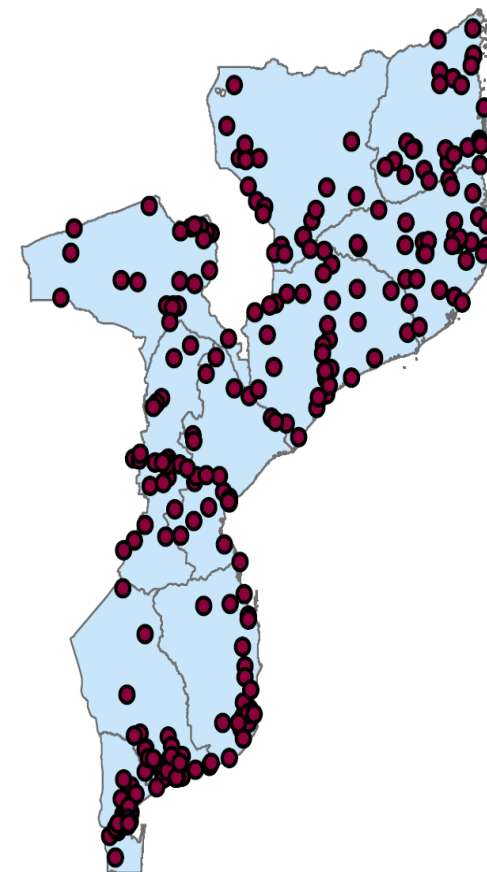
### COMSA/ SIS-COVE



1. Random selection of clusters
2. Representative at national and provincial levels
3. 700 clusters
4. Large cluster (~300, households)
5. Surveillance on total population each cluster
6. 180,000 households
7. Possibility to select a subsample for specific data collection (e.g. MNCH)
8. Continuous

### IMASIDA (PHIA) - 2015

1. Random selection of clusters
2. Representative at national and subnational levels
3. 307 clusters
4. Small cluster (~120 households)
5. Selection of 24 households per cluster
6. 7,169 households
7. No possible for subsample
8. One time survey



# Lesson 5: Define SRS main data collection and analysis tools

**SIS-COVE based on trained community workers, using real time data reporting and analysis tools**

## Community surveillance

Household listing form  
List of events in the community:

- Pregnancies
- Pregnancy outcomes
- Deaths, including 3 questions to capture maternal deaths for any woman aged 12-54

## Verbal and Social Autopsy (VASA)

Verbal Autopsy  
Questionnaires (WHO 2016):

- Neonatal (less than 28 days, includes stillbirth)
- Children (28 days-11 years)
- Adults (12 years and over)

Social Autopsy Questionnaires

- Household, housing and community characteristics
- Care seeking behavior/ Pathway to survival

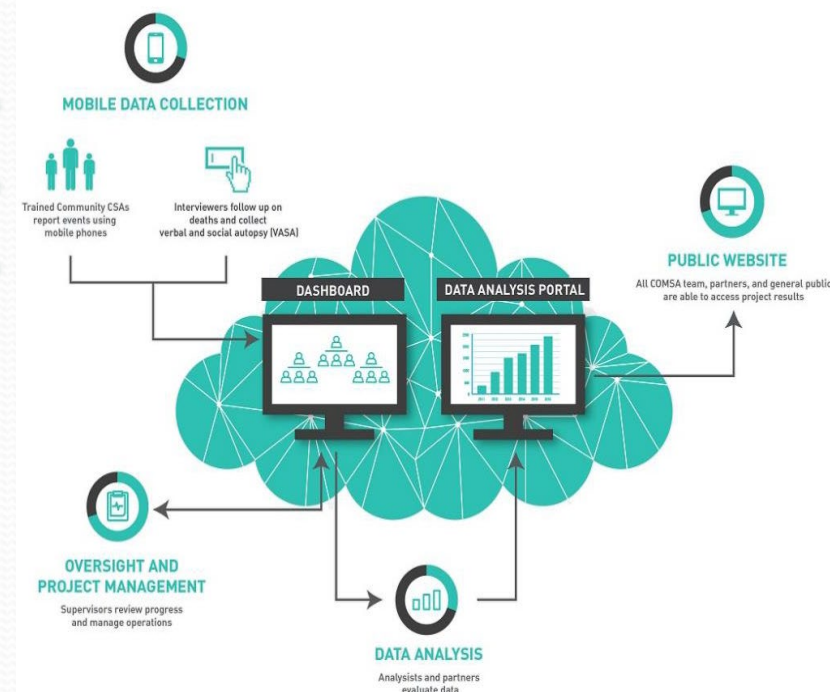
## Automated methods for determination of causes of death

Inter-VA 5

InsilicoVA

EAVA

VA Calibration with CHAMPS data



## **Lesson 6:** Consider an IT and data systems infrastructure that might allow interoperability and other innovative solutions



Interoperability between  
COMSA/SIS-COVE and e-  
CRVS



SIS-COVE module  
developed using dHIS-2 for  
HMIS at the health sector

# Lesson 7: Define SRS main outputs

## SIS-COVE main vital events outputs

Birth profile

Death profile

Mortality rates

Causes of death

Determinants of death



### CONSTATAÇÕES-CHAVE



Em 2019, os colectores de dados em 700 conglomerados em todas as 11 províncias de Moçambique enumeraram 855.479 pessoas, identificaram 13.975 nascimentos e 3.898 mortes e realizaram 3.437 autópsias verbais e sociais, usando tecnologia móvel.



65% dos nascimentos ocorreram em média numa unidade sanitária, com menos de metade dos partos em unidades sanitárias de Cabo Delgado e Zambézia e com cobertura quase universal em Maputo cidade e Maputo província.



A nível nacional, 30% dos nascimentos e 15% das mortes foram registados no sistema de registo civil, com grande variação: 42% dos nascimentos e 92% das mortes registadas em Maputo cidade e apenas 2% dos nascimentos e 27% das mortes em Cabo Delgado.



A taxa de mortalidade neonatal foi de 29,4 mortes por 1.000 nascidos vivos e a prematuridade causou 54% das mortes neonatais. A taxa de mortalidade infantil foi de 53,6 por 1.000 e a taxa de mortalidade de menores de cinco anos foi de 81,7 por 1.000. A taxa de mortalidade de menores de cinco anos de idade foi estimada em 103 por 1.000 em conglomerados nas zonas rurais e 51,3 por 1.000 em conglomerados nas zonas urbanas. As principais causas de morte entre crianças de 1 a 59 meses foram malária (23%), diarreia (12%) e HIV (12%), com 34% atribuídas a outras infeções. Para crianças de 5 a 14 anos, os ferimentos causaram 18% das mortes, a malária cerca de 13% e o HIV cerca de 11%, com 27% atribuídos a outras infeções.



Para pessoas de 15 a 49 anos, o HIV causou 28% das mortes, os ferimentos 15% e as causas maternas fizeram 11%, sendo 13% devido a outras infeções e 22% a outras causas. Entre os adultos com 50 anos ou mais, as principais causas foram TB (23%), cancro (17%) e HIV (11%), com 24% atribuídos a outras causas.



# Lesson 8: Understand the costs of SRS at their different phases is crucial for planning and stakeholder's engagement and advocacy

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## Implementing the Countrywide Mortality Surveillance in Action in Mozambique: How Much Did It Cost?

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**Abstract.** Complete sample registration systems are almost inexistent in sub-Saharan Africa. The Countrywide Mortality Surveillance in Action (COMSA) project in Mozambique, a national mortality and cause of death surveillance system, was launched in January 2017, began data collection in March 2018, and covers over 800,000 population. The objectives of this analysis are to quantify the costs of establishing and maintaining the project between 2017 and 2020 and to assess the cost per output of the surveillance system using data from financial reports produced by the National Institute of Health in Mozambique. The program cost analysis consists of start-up (fixed) costs and average annual operating costs covering the period of maximum implementation in 700 clusters. The cost per output analysis quantifies the annual operating cost of surveillance outputs during the same period. Approximately two million dollars were spent on setting up the system, with infrastructure, technological investments, and training making up over 80% of these start-up costs. The average annual operating costs of maintaining COMSA was \$984,771 per year, of which 66% were spent on wages and data collection incentives. The cost per output analysis indicates costs of \$37–\$42 per vital event captured in the surveillance system (deaths, pregnancies, pregnancy outcomes), \$303–\$340 per verbal and social autopsy conducted on a reported death, and a per capita cost of \$1–\$1.3. In conclusion, establishing COMSA required large costs associated with infrastructure and technological investments. However, the system offers long-term benefits for real-time data generation and informing government decision-making for health.

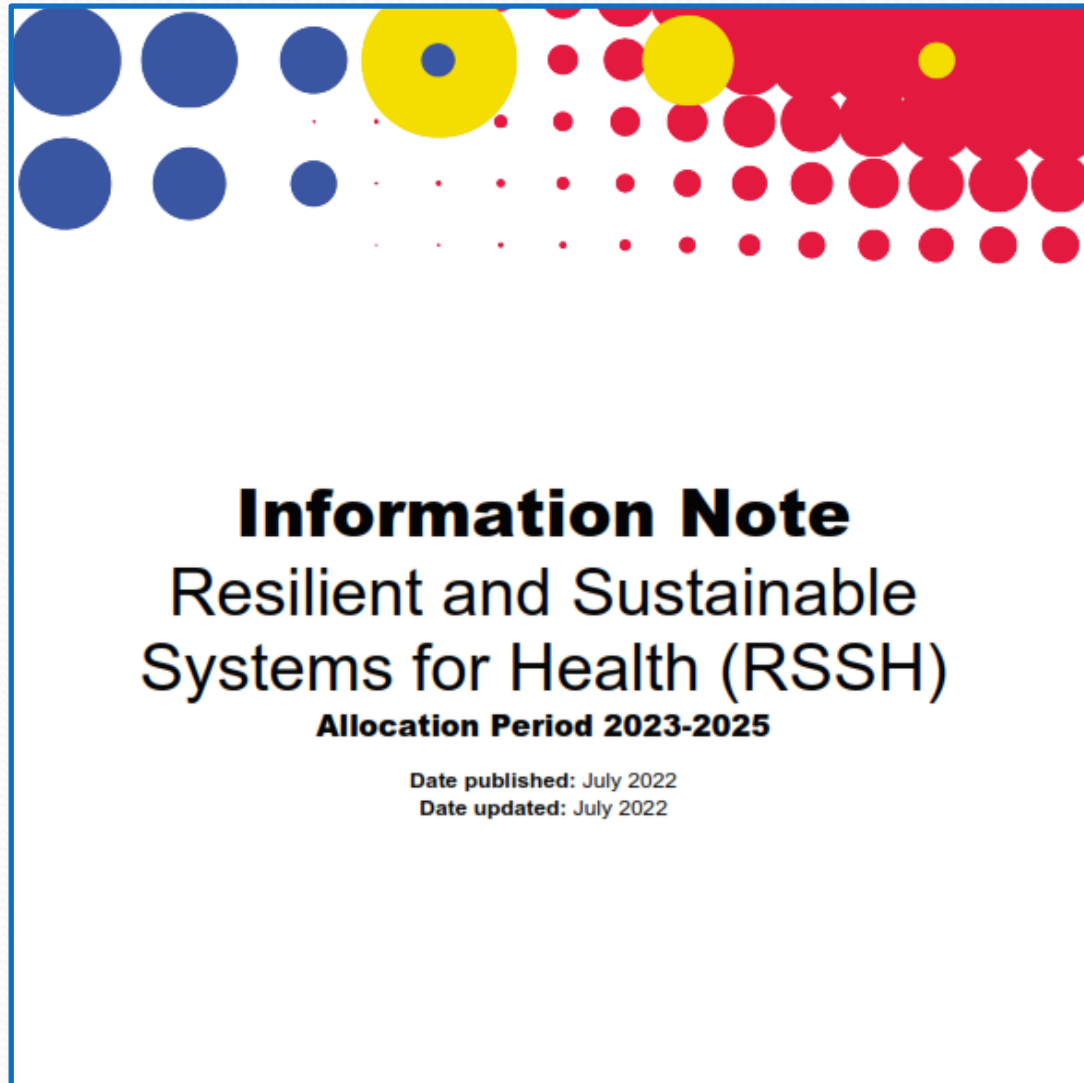
Design and initiation phases: start-up fixed COMSA costs at central and cluster levels			
Category	Description	Cost (US\$)	Percentage
Design phase			
Central-level costs			
Formative research	Formative research study	29,400.0	1.5
Cluster-level costs			
Baseline population and cluster mapping	Household listing and delineating cluster boundaries, data collection and training materials	250,078.7	12.4
Initiation phase			
Central-level costs			
Infrastructure	Vehicles	800,000.0	39.5
Training	Training of trainers for CSA surveillance and VASA	143,245.0	7.1
Technology	Smartphones, tablets, laptops, desktops, monitors, printers, transformers, solar chargers, statistical software, international shipping	259,308.8	12.8
Cluster-level costs			
Field materials	T-shirts, hats, backpacks, household labels, banners, etc.	37,179.7	1.8
Training	Training of interviewers for CSA surveillance and VASA (travels, lodging, per diems, etc.)	503,787.8	24.9
Total		2,023,000.0	100.0

COMSA = Countrywide Mortality Surveillance in Action; CSA = community surveillance agent; VASA = verbal and social autopsy.

Maintenance phase: average annual operating costs at central and cluster levels (2019–2020)			
Category	Description	Cost (US\$)	Percentage
Central-level costs			
Personnel and incentives	Wages (INS, INE staff)	196,905.0	20.0
Infrastructure	Vehicle maintenance, fuel, cloud servers, printing, emergency infrastructure, etc.	202,766.9	20.6
Administration and logistics	Banking fees, tender announcements	10,025.1	1.0
Field supervision	Supervision of data collection and travels	26,839.6	2.7
Communication	Telephone, Internet	20,626.1	2.1
Dissemination	Stakeholder meetings, conferences, dissemination workshops, etc.	1,322.4	0.1
Cluster-level costs			
Personnel and incentives	Wages (Delegados, administrative/finance staff, coordinators, supervisors, VASA data collectors, CSA, drivers), incentives, health insurance, data collection per diems)	452,770.2	46.0
Communication	Staff communication plans	46,767.4	4.7
Refresher trainings	CSA and VASA refresher trainings	26,747.2	2.7
Total		\$984,771.0	100.0

CSA = community surveillance agent; INE = Instituto Nacional de Estatísticas; INS = Instituto Nacional de Saúde; VASA = verbal and social autopsy.

## Lesson 9: Map potential SRS funders according to their interest and scope



- **Civil registration and vital statistics:** Applicants are encouraged to include funding to strengthen civil registration and vital statistics (CRVS) systems. Focus should be on strengthening mortality and causes of death reporting in health facilities and to the extent possible, from community registers. These efforts should be linked with continuous support for analysis and use of mortality data to inform policy decisions and program implementation. Applicants should refer to the [Information Note on Global Fund Investments in Mortality Data Systems, Analysis and Use](#) for details.



Table 2: Mortality data system strengthening & analysis: where the Global Fund support fits best

Item	Support?
1. Analysis and use of mortality data from surveys, surveillance, routine reports and vital registers	Yes
2. Integration of mortality reporting into HMIS/DHIS 2	Yes
3. Reporting and analysis of mortality data from community vital registers	Yes
4. Assessment of the health sector components of CRVS system	Yes
5. Assessment of death registration and reporting coverage in CRVS	Yes
6. Partnerships and TA facilitation for mortality analyses	Yes
7. Training pool of TA providers	Yes
8. ICD-10 implementation & cause of death reporting in clinical settings	Yes
9. Sample registration systems (SRS) and SAVVY	Partly
10. Establishment of vital registers in health facilities	Partly
11. Establishment of vital registers at community level	Maybe
12. Establishing national CRVS systems	No

# Lesson 10: Ensure SRS data dissemination and use at all levels

## COMSA/ SISCOVE Levels of Data Dissemination and Use in Mozambique

### National level

Ministers council

Official dissemination event

### Provincial level

Multisectoral roundtables

Programmatic meetings

### Community level

CSAs at provincial meetings

Distribution of flyers during field work activities



### Meetings



### Radio



### Newspapers



### Live interviews



# Lesson 11: Ensure SRS data is being used for local, national and international evidence-based policy decision making

SIS-COVE and DHS as the main sources of data to inform the development of the 2025-2029 Health Sector Strategic Plan



REPÚBLICA DE MOÇAMBIQUE  
MINISTÉRIO DA SAÚDE  
Direcção de Planificação e Cooperação

Plano Estratégico do Sector da Saúde

PESS 2014-2019

(Extensão 2020-2024)

«O NOSSO MAIOR VALOR É A VIDA»

Maputo, Agosto 2022

COMSA/SIS-COVE being used for mortality estimates by international agencies

Levels & Trends in  
**Child Mortality**

Report 2021  
Estimates developed by the  
United Nations Interagency Group  
for Child Mortality Estimation

unicef | World Health Organization | WORLD BANK GROUP | United Nations

ent at this time. First, direct n the age groups estimated in , and thus unlikely to impact ates. Second, while some ections have suggested a large d under five deaths could s of excess mortality using leads in 2020 from more than sis (more than 70 countries gistration data available for countries had data from their at Information Systems (HMIS) mortality analysis, along with EA systems in Mozambique of systematic excess mortality youth in 2020 – perhaps port suggesting it could beund than anticipated in ne of these interventions s of pandemic mitigation l distancing, handwashing and

all-cause mortality (also denoted mortality) in 2020. The baseline mo obtained by fitting a Generalized Li mortality between 2015 and 2019 to, with quasi-Poisson distribution to ob group and sex. The model is defined  $\log(\text{deaths}_{i,t}) = \beta_0 + \beta_1 + \log(\text{ex}$  where  $\text{deaths}_{i,t}$  and  $\text{exposure}_{i,t}$  indicate, the death counts and population at age group  $i$ , sex  $s$ , and country  $c$ , du (between years 2015 and 2019).  $\beta_0$  as the intercept and  $\beta_1$  for the secular e mortality (as an exponential trend). intervals, 50 per cent, were produced with quasi-Poisson distribution, obaining robust standard errors. For example, population estimates 1 of age and period, between 2015 and obtained from the World Population projection. In order to account for v fertility during the pandemic, data o counts were complemented with an counts where this information was

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COVID-19  
The 2022 UN IGME estimates do not include any adjustment in the years 2020 and 2021 for COVID-19-related mortality as the evidence is insufficient to support an adjustment at the time. First, direct COVID-19 deaths in the age groups estimated in this report are rare, and thus unlikely to impact national-level estimates. Second, a UN IGME analysis of excess mortality using empirical data on deaths in 2020 from more than 110 countries or areas and in 2021 from more than 70 countries or areas (including data from 15 countries' Health Management Information System (HMIS) and data from the COMSA system in Mozambique) found evidence of systematic excess mortality among children or youth in 2020 or 2021.

Levels & Trends in  
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the UN IGME during the count process). Additionally, data from 17 countries' HMIS (Afghanistan, Burkina Faso, Burundi, Eswatini, India, Kenya, Lesotho, Liberia, Malawi, Mozambique, Namibia, Nigeria, Pakistan, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe) and from the Mortality Surveillance for Action in Mozambique.

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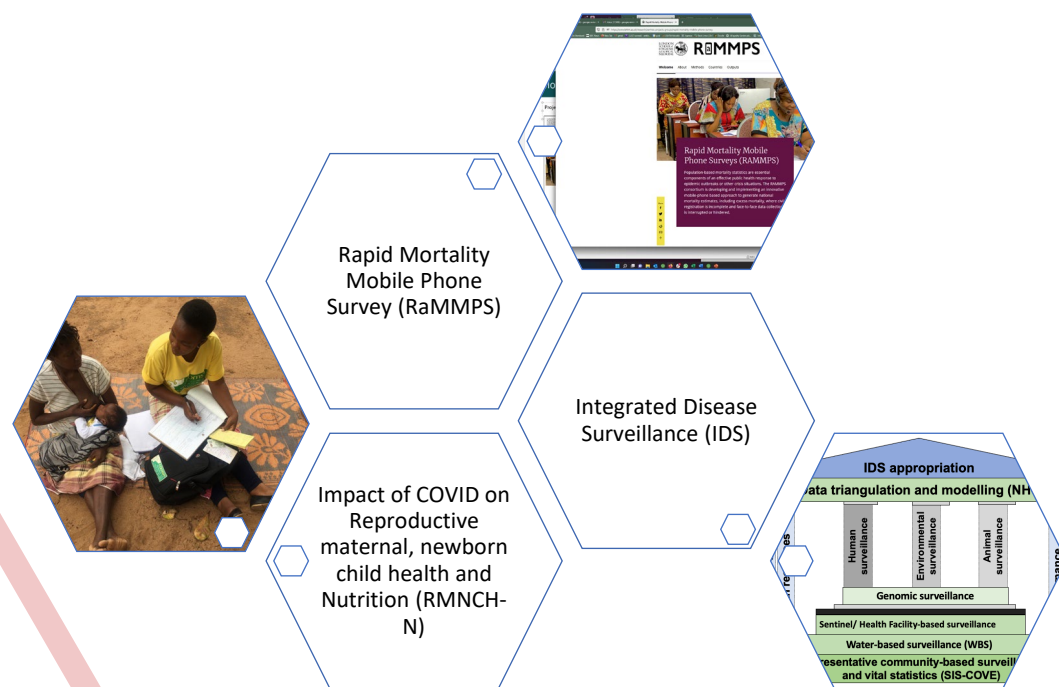
anex II: Excess mortality analysis

Infants and youth, especially in low-income countries, are at a higher risk of indirect deaths or ill health due to the COVID-19 pandemic. Excess mortality is defined as the difference between observed deaths and expected deaths, based on historical data. Excess mortality is defined as the difference between observed deaths and expected deaths, based on historical data. Excess mortality is defined as the difference between observed deaths and expected deaths, based on historical data.

For the analysis of excess mortality from COMSA data in 2020, 2021, 2022 and 2023, excess mortality was estimated for each country and year. Between 2015 and 2020 were estimated from Population Division (the United Nations Economic Commission for Latin America and the Caribbean, Population Division, Report on the State of the World's Population 2020). Excess mortality data were obtained from the HMIS of 17 countries (Afghanistan, Burkina Faso, Burundi, Eswatini, India, Kenya, Lesotho, Liberia, Malawi, Mozambique, Namibia, Nigeria, Pakistan, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe) and from the Countrywide Mortality Surveillance for Action in Mozambique.

The final dataset contained data on observed numbers of deaths for more than 100 countries.

# Lesson 12: Leverage SRS to implement other public health related initiatives



nature communications



Article

<https://doi.org/10.1038/s41467-025-62305-9>

## Multiplex bead assays enable integrated serological surveillance and reveal cross-pathogen vulnerabilities in Zambezia Province, Mozambique

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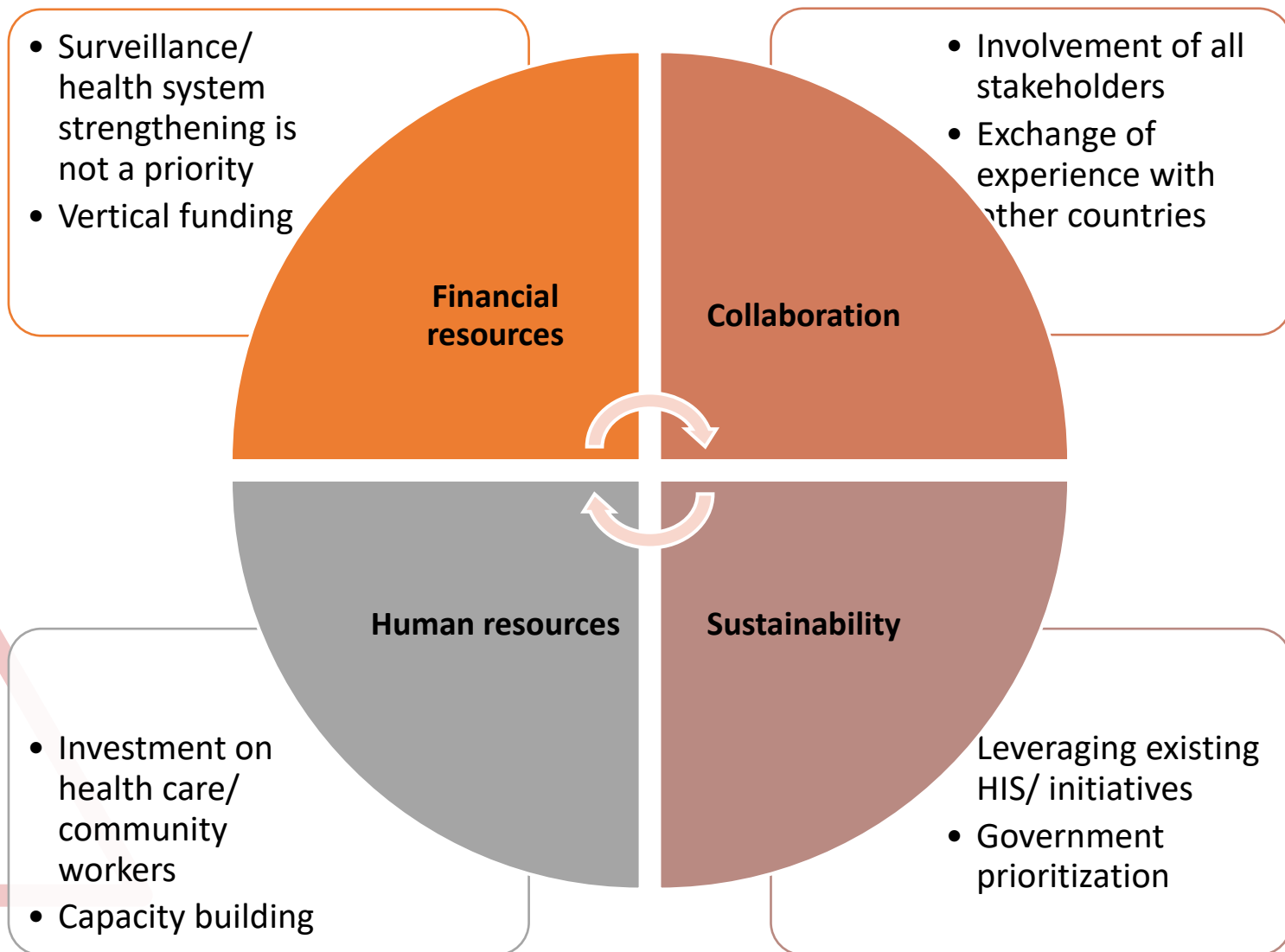
Check for updates

Andrea C. Carcelen<sup>1</sup>✉, Celso Monjane<sup>2</sup>, Sophie Bérubé<sup>3</sup>, Saki Takahashi<sup>4</sup>, Thebora Sultane<sup>2</sup>, Imelda Chelene<sup>2</sup>, Gretchen Cooley<sup>5</sup>, E. Brook Goodhew<sup>5</sup>, Catriona Patterson<sup>6</sup>, Kevin Tetteh<sup>6</sup>, Manuel Mutambe<sup>2</sup>, Melissa M. Higdon<sup>1</sup>, George Mwinnyaa<sup>1</sup>, Gilberto Nhapure<sup>7</sup>, Pedro Duce<sup>7</sup>, Diana L. Martin<sup>5</sup>, Christopher Drakeley<sup>6</sup>, William J. Moss<sup>1,4</sup> & Ivalda Macicame<sup>2</sup>

Multiplex serological assays simultaneously measure antibodies to multiple antigens, furnishing insights into exposure and susceptibility to several pathogens and cross-pathogen vulnerabilities. Our serosurvey tests dried blood spots from 1292 individuals for IgG antibodies to 35 antigens from 18 pathogens using a multiplex bead assay for vaccine preventable diseases, malaria, SARS-CoV-2, neglected tropical diseases, and enteric pathogens in Mozambique. We produce pathogen-specific seroprevalence estimates and age-seroprevalence curves and identify spatial differences in seroprevalence. Rural clusters have higher odds of seropositivity to most NTDs neglected tropical diseases, *Plasmodium falciparum* malaria, and enteric pathogens, but lower odds of seropositivity to SARS-CoV-2 and vaccine preventable diseases compared to urban clusters. This co-occurrence identifies clusters with high vulnerability to multiple pathogens. We identify a candidate group of antigens that are correlated with high overall vulnerability. Our results demonstrate a role for multiplex serology in integrated disease surveillance to guide control strategies for individual and co-endemic pathogens.

[https://pmc.ncbi.nlm.nih.gov/articles/PMC12381283/pdf/41467\\_2025\\_Article\\_62305.pdf](https://pmc.ncbi.nlm.nih.gov/articles/PMC12381283/pdf/41467_2025_Article_62305.pdf)

# General Lessons learned/ challenges/ opportunities while implementing COMSA/ SIS-COVE in Mozambique



# IANPHI Africa Regional Network: 2024 Recognition of Success



Obrigado(a)!  
Khanimambo!

