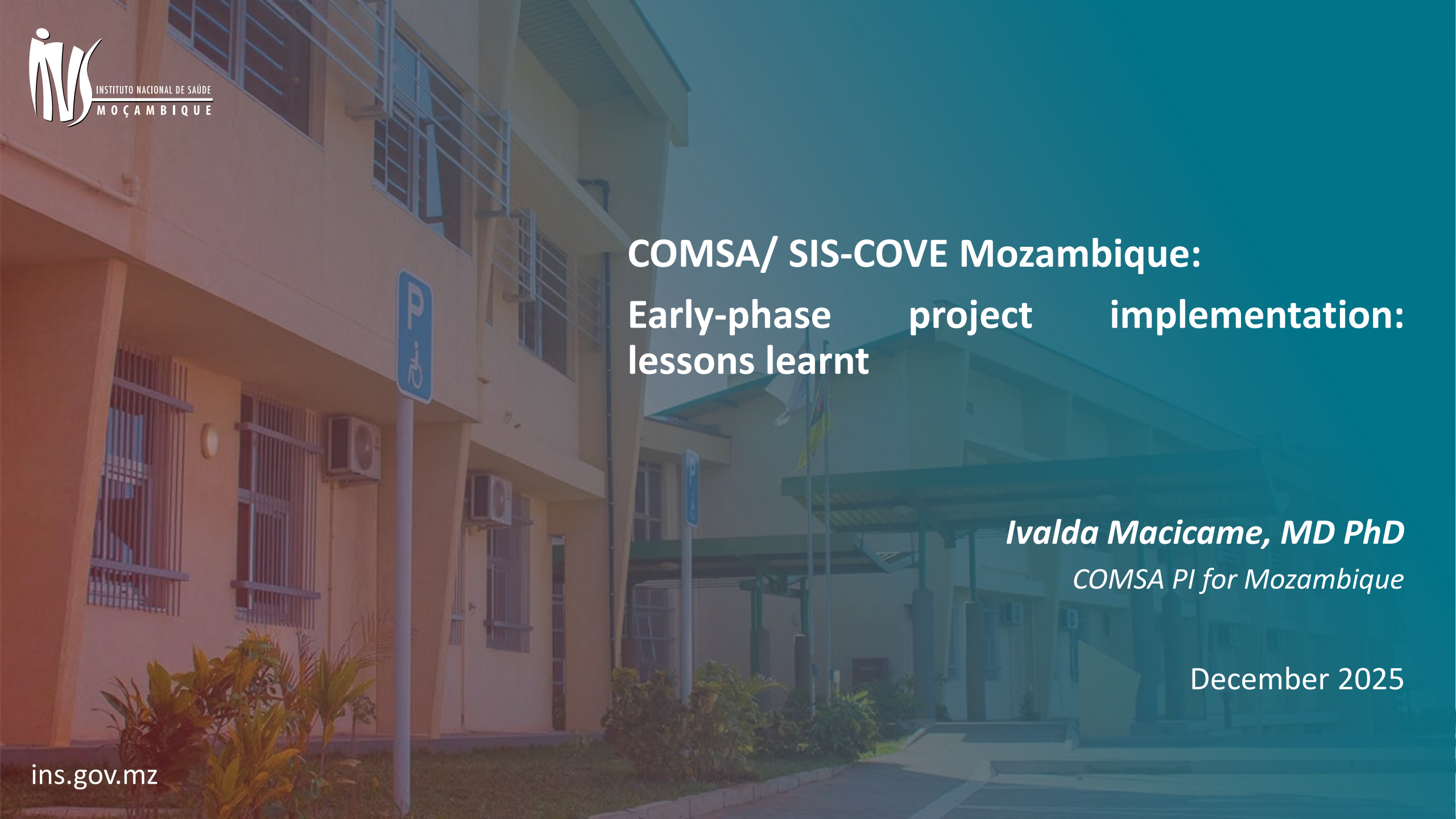


COMSA/ SIS-COVE Mozambique:

Early-phase project implementation: lessons learnt

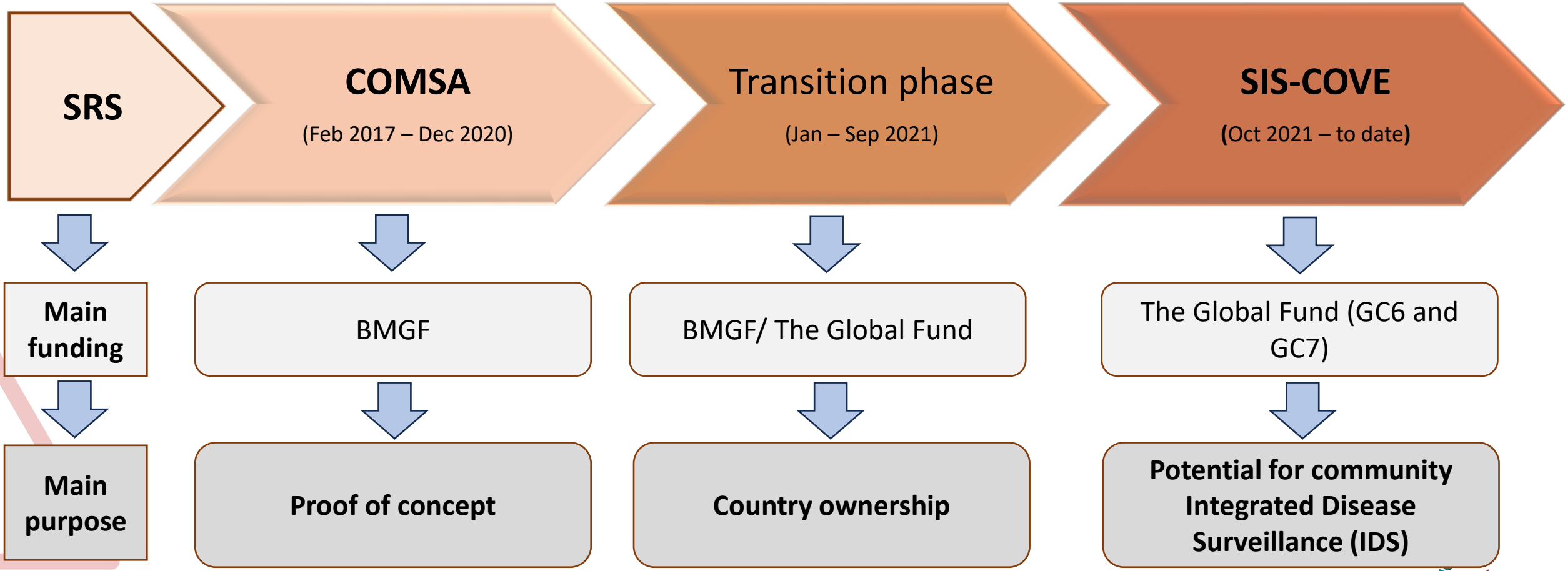
Ivalda Macicame, MD PhD

COMSA PI for Mozambique

December 2025

ins.gov.mz

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

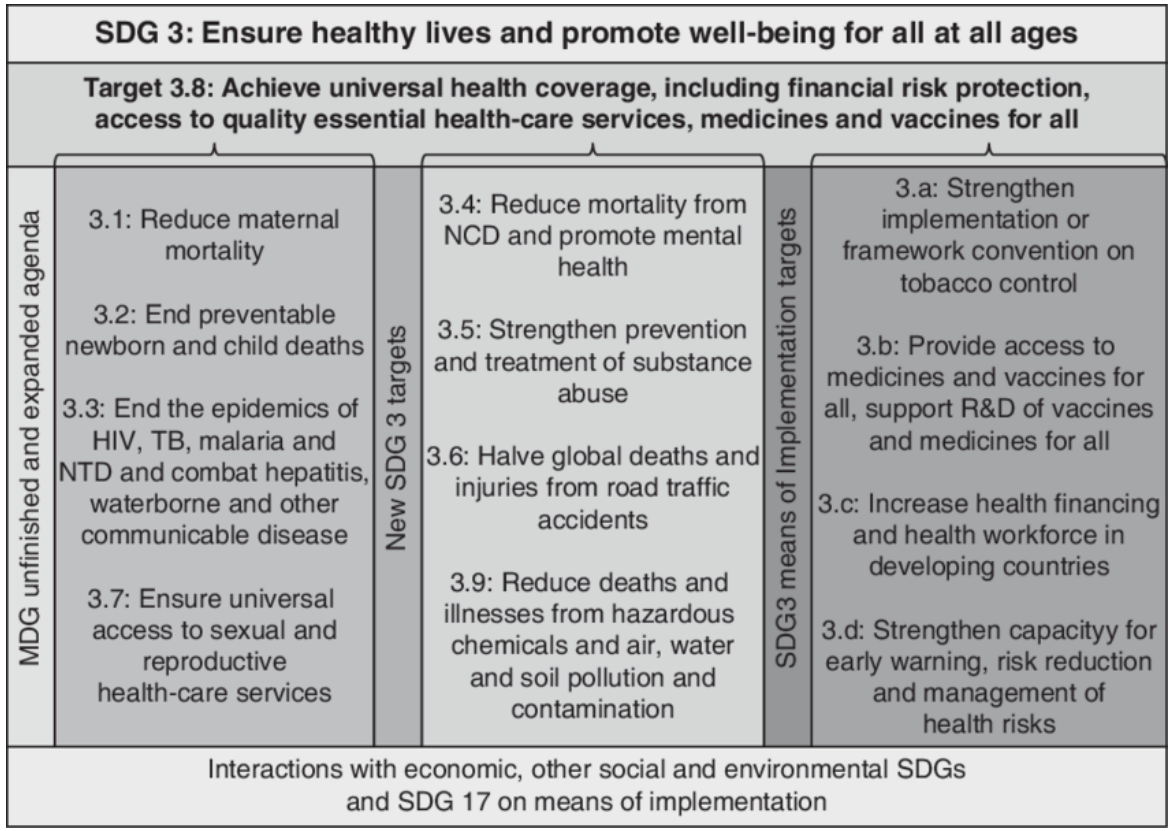


Lesson 1: Define SRS main goal/ objective

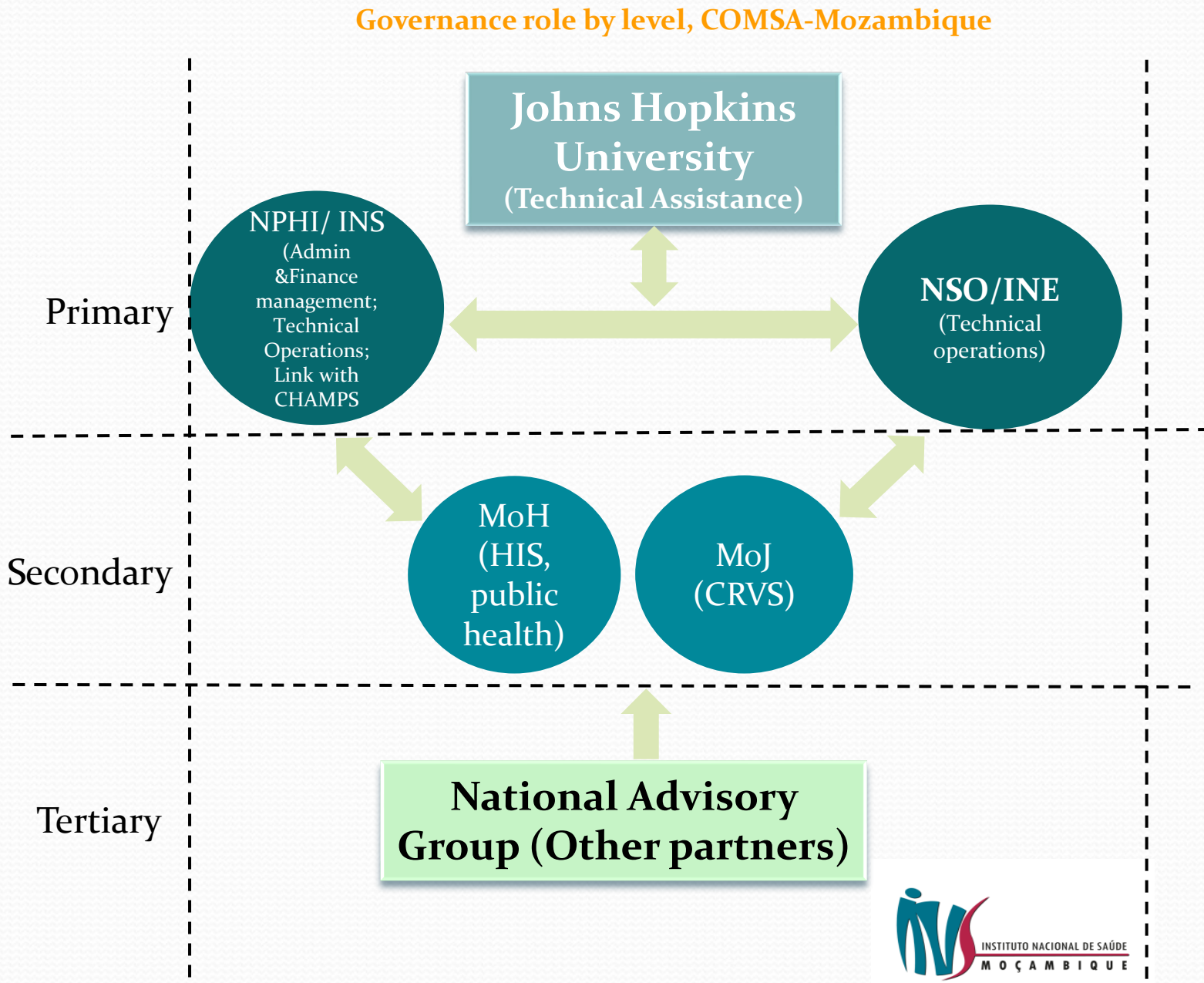
COMSA Mozambique Goals

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



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



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

National Public Health Institute(INS) *

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

National Statistics Bureau (INE)

- Cartography
- Sampling procedures

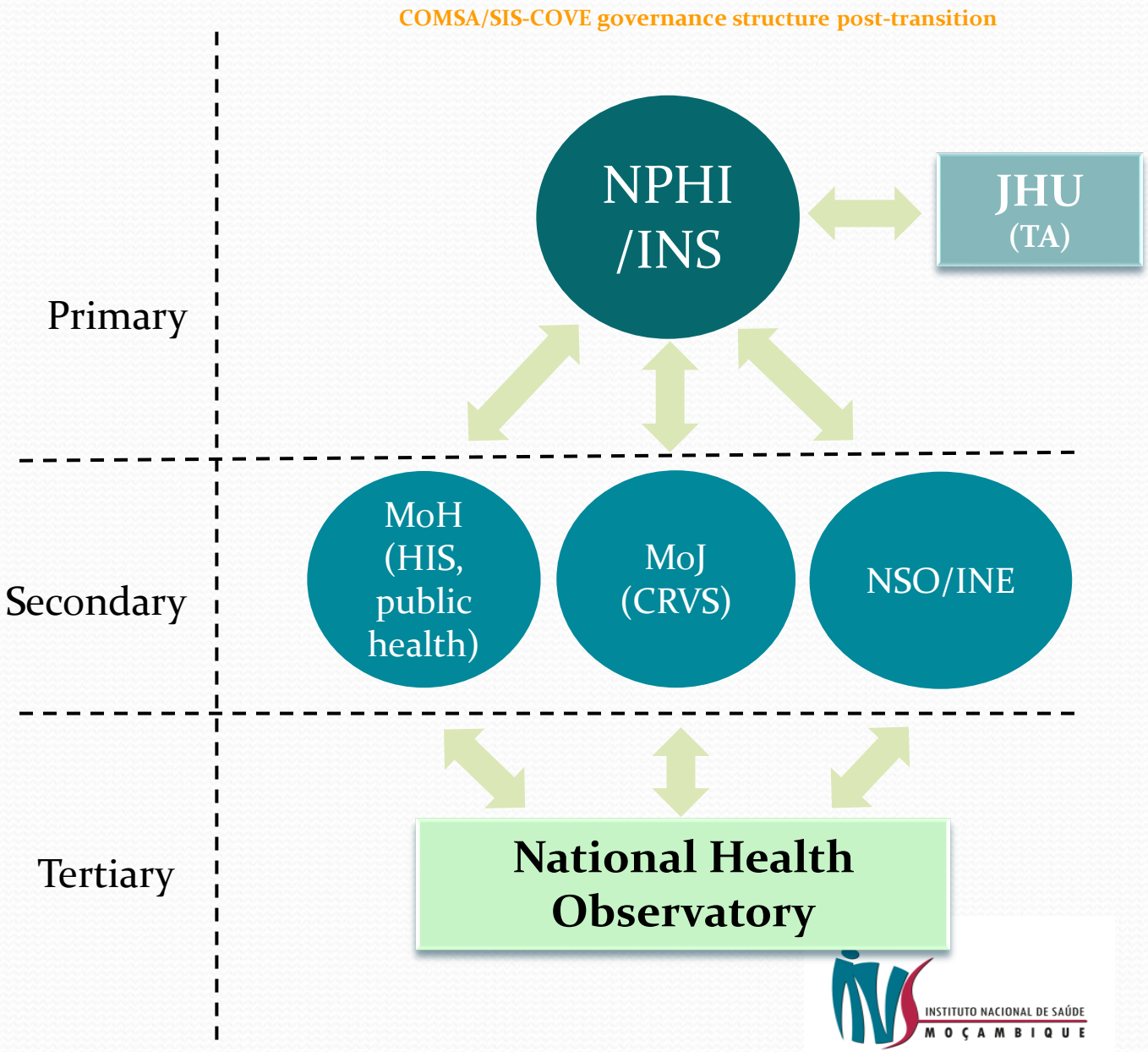
Ministry of Health (MISAU)

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

Ministry of Justice (MJCR)

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

* With Technical assistance from Johns Hopkins University since 2017



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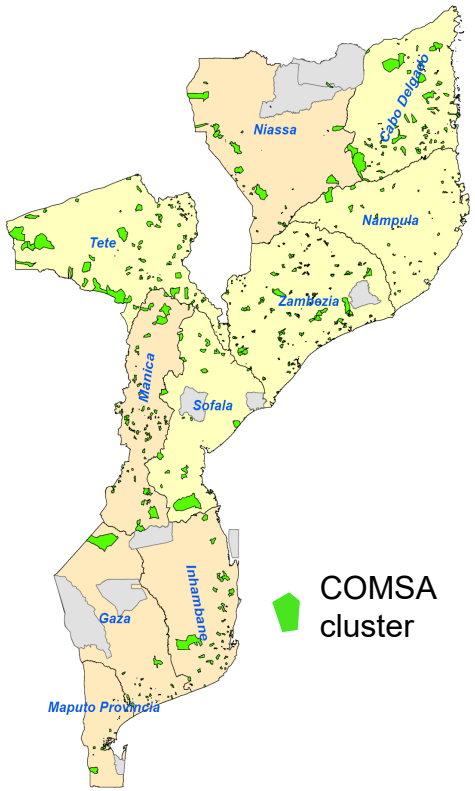
Lesson 4: Define SRS ideal sampling and representativeness

Comparison of COMSA Sample to Existing Survey (PHIA 2015)

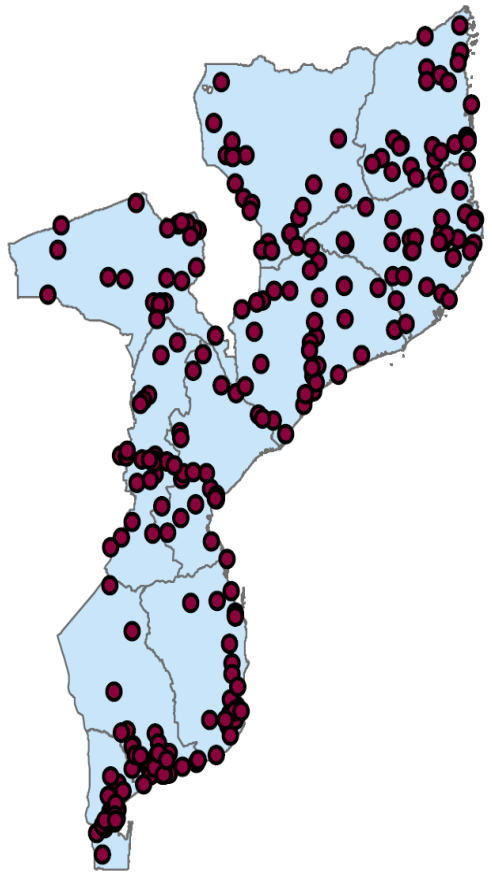
COMSA/ SIS-COVE



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**



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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

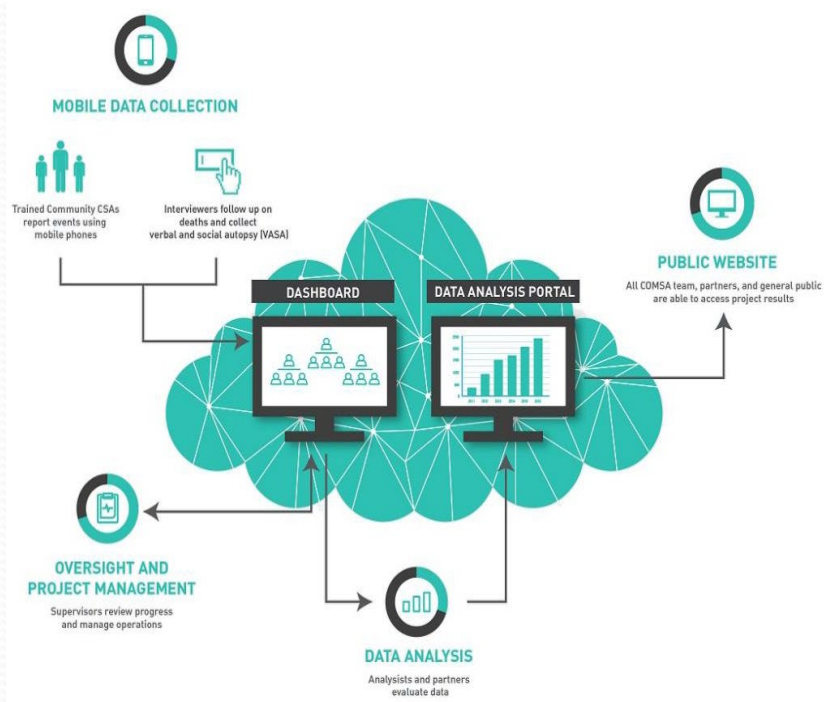
Automated methods for determination of causes of death

Inter-VA 5

InsilicoVA

EAVA

VA Calibration with CHAMPS data



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

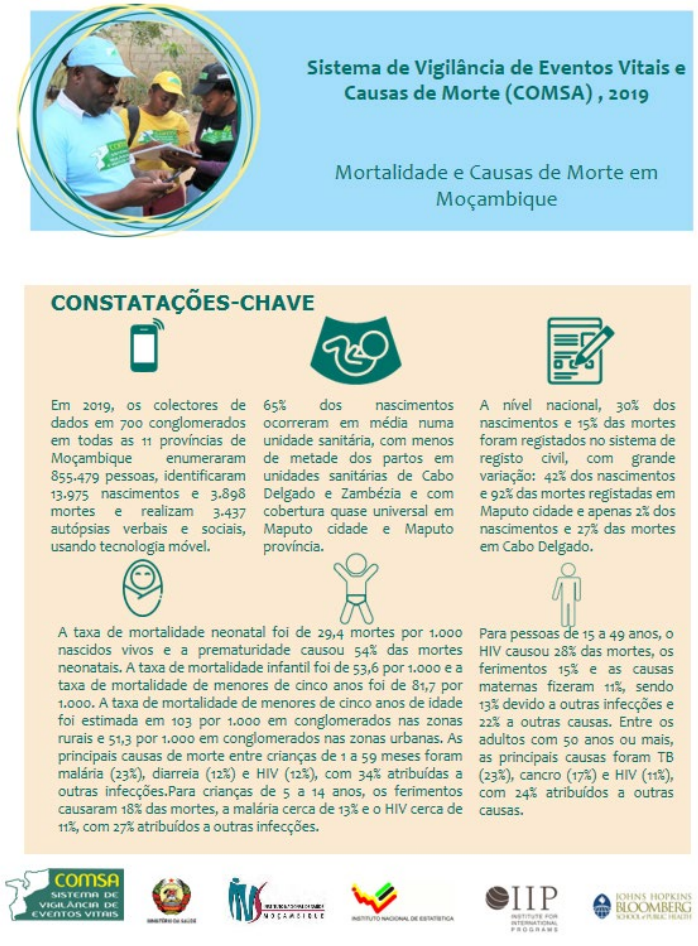
Interoperability between COMSA/SIS-COVE and e-CRVS

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



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

Am. J. Trop. Med. Hyg., 108(Suppl 5), 2023, pp. 40–46
doi:10.4269/ajtmh.22-0438

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

Safia S. Jiwani,[1]* Victor Américo Mavie,[2] Emma Williams,[1] Almamy Malick Kante,[1] and Agbessi Amouzou[1]

[1]*Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland;*
[2]*National Institute of Health (INS), Maputo, Mozambique*

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 = Insituto Nacional de Estatisticas; INS = Insituto Nacional de Saúde; VASA = verbal and social autopsy.

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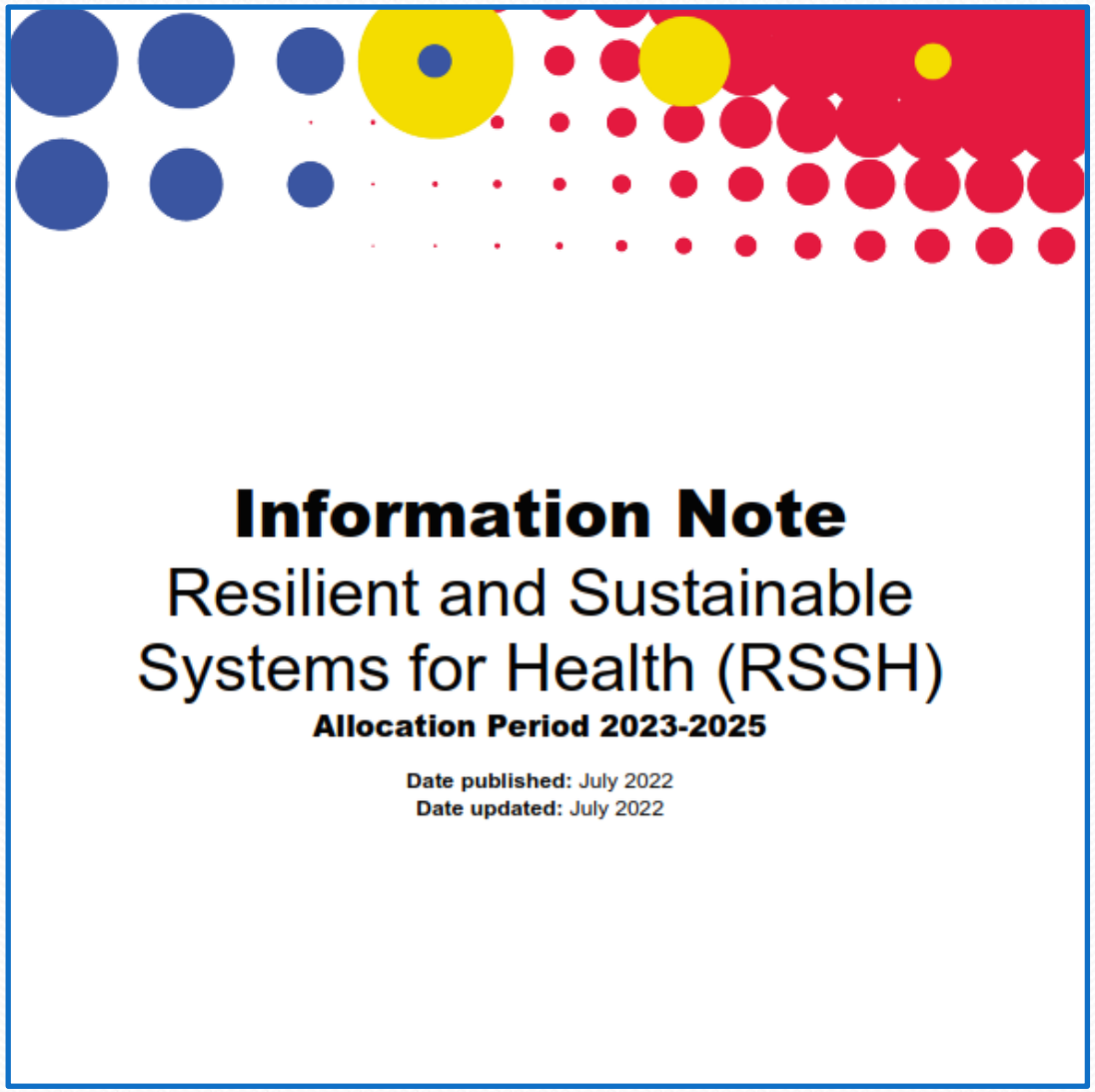
Lesson 9: Map potential SRS funders according to their interest and scope



- **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 UN Inter-agency Group for Child Mortality Estimation

Levels & Trends in Child Mortality — Report 2022

Estimates developed by the United Nations Inter-agency Group for Child Mortality Estimation

Levels & Trends in Child Mortality — Report 2023

Estimates developed by the United Nations Inter-agency Group for Child Mortality Estimation

Levels & Trends in Child Mortality — Report 2024

Estimates developed by the United Nations Inter-agency Group for Child Mortality Estimation

COVID-19

Annex II: Excess mortality analysis

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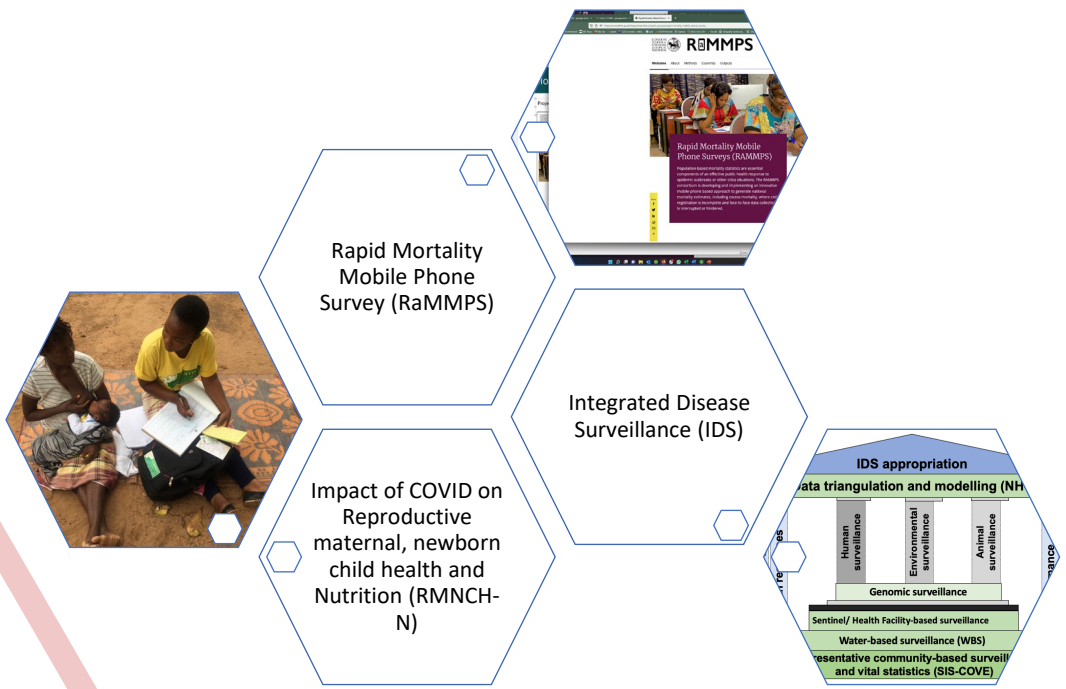
Lesson 12: Leverage SRS to implement other public health related initiatives



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

Received: 12 December 2024

Accepted: 18 July 2025

Published online: 26 August 2025

Check for updates

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

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

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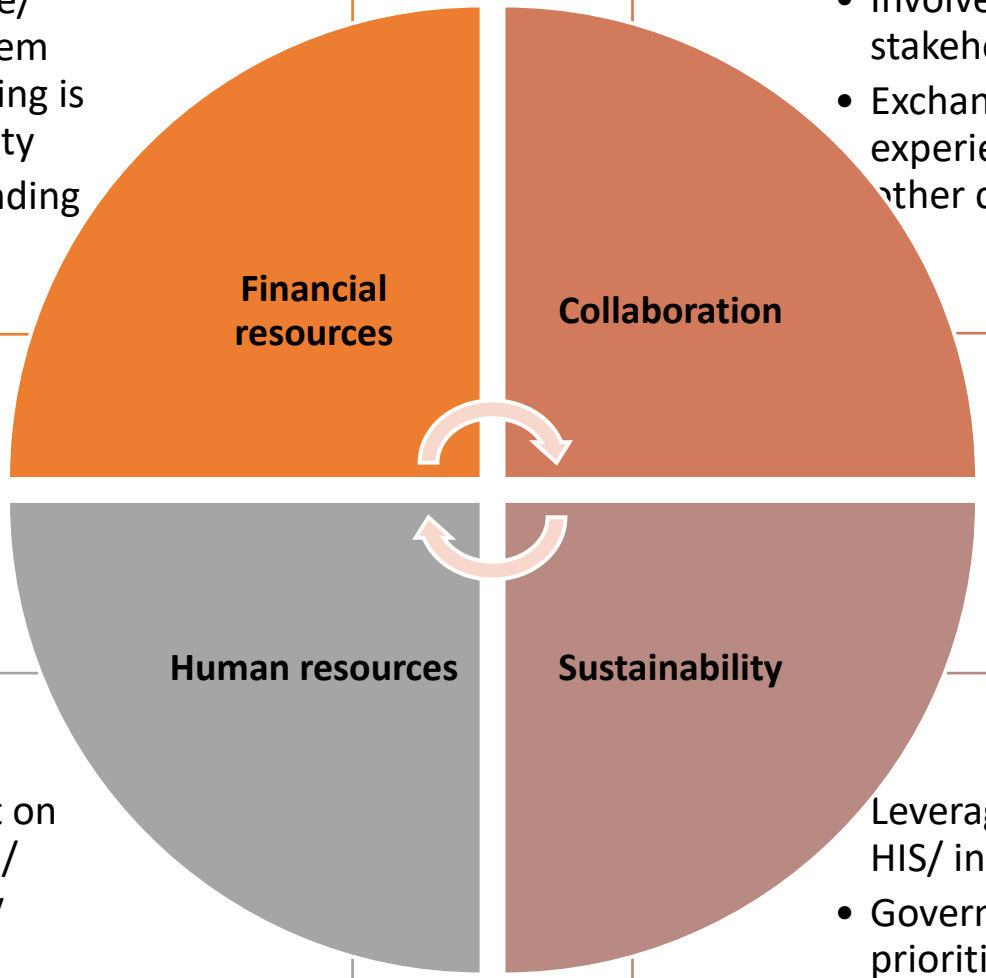
General Lessons learned/ challenges/ opportunities while implementing COMSA/ SIS-COVE in Mozambique

- Surveillance/ health system strengthening is not a priority
- Vertical funding

- Involvement of all stakeholders
- Exchange of experience with other countries

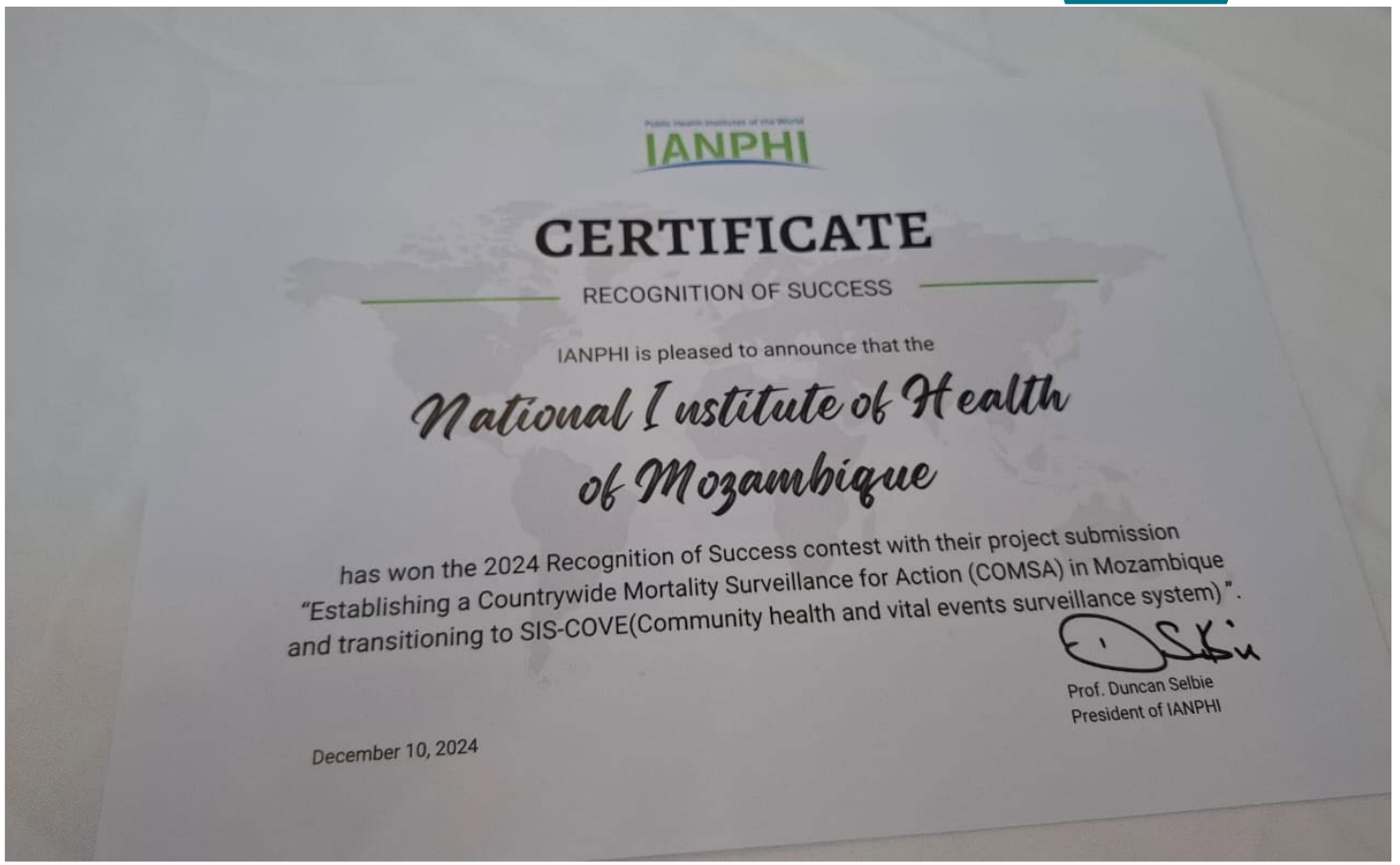


- Investment on health care/ community workers
- Capacity building

Leveraging existing HIS/ initiatives

- Government prioritization

IANPHI Africa Regional Network: 2024 Recognition of Success



Obrigado(a)!
Khanimambo!