

SUPPORTING MORTALITY SURVEILLANCE IN AFRICA

COMSA Project Update and Future Plans, Sierra Leone
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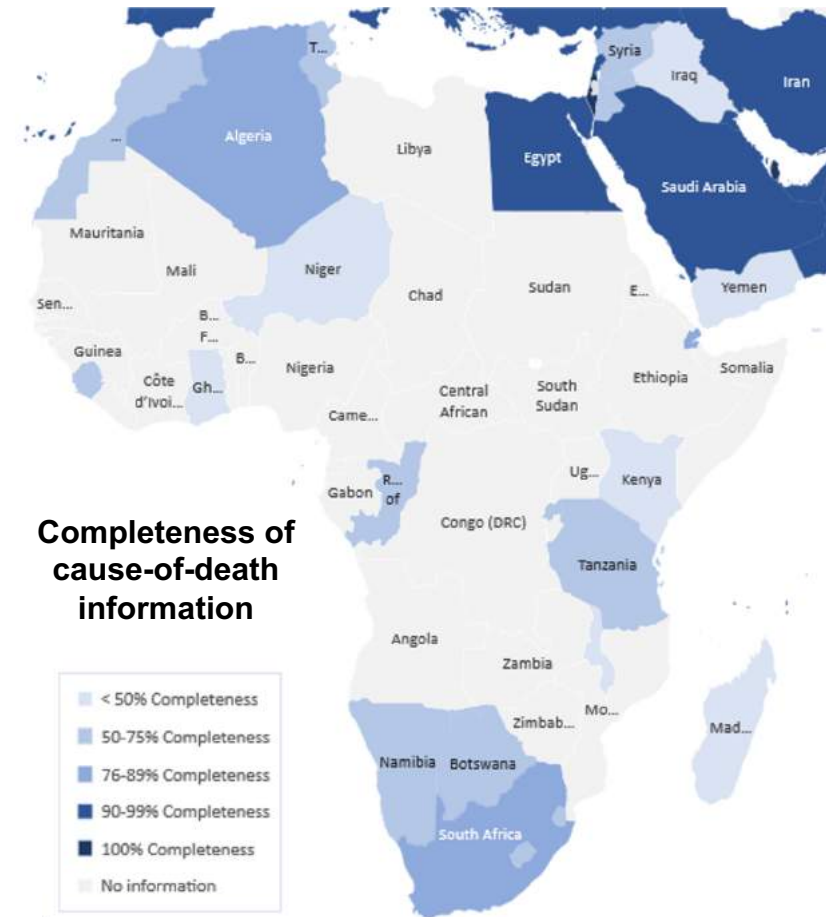


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PREVENTING DISEASE REQUIRES MORE AND BETTER MORTALITY DATA

- COVID-19 pandemic has exposed the weaknesses in our existing disease surveillance systems
- Systems were hampered by: inadequate diagnostic capacity, fragmented data systems, incomplete data, sub-optimal governance
- Information on mortality and causes of death is important for designing disease prevention programs
 - Only 8 African countries have compulsory death registration systems¹
- Reliance on surveys, model estimates, and small studies
- Completeness of data
 - >50% of deaths occur outside of facilities, meaning they are less likely to be counted²
 - Different data collection instruments used across settings; >50% of SSA countries only have paper death records

Now is the time to assess what failed and act boldly to implement improvements



References

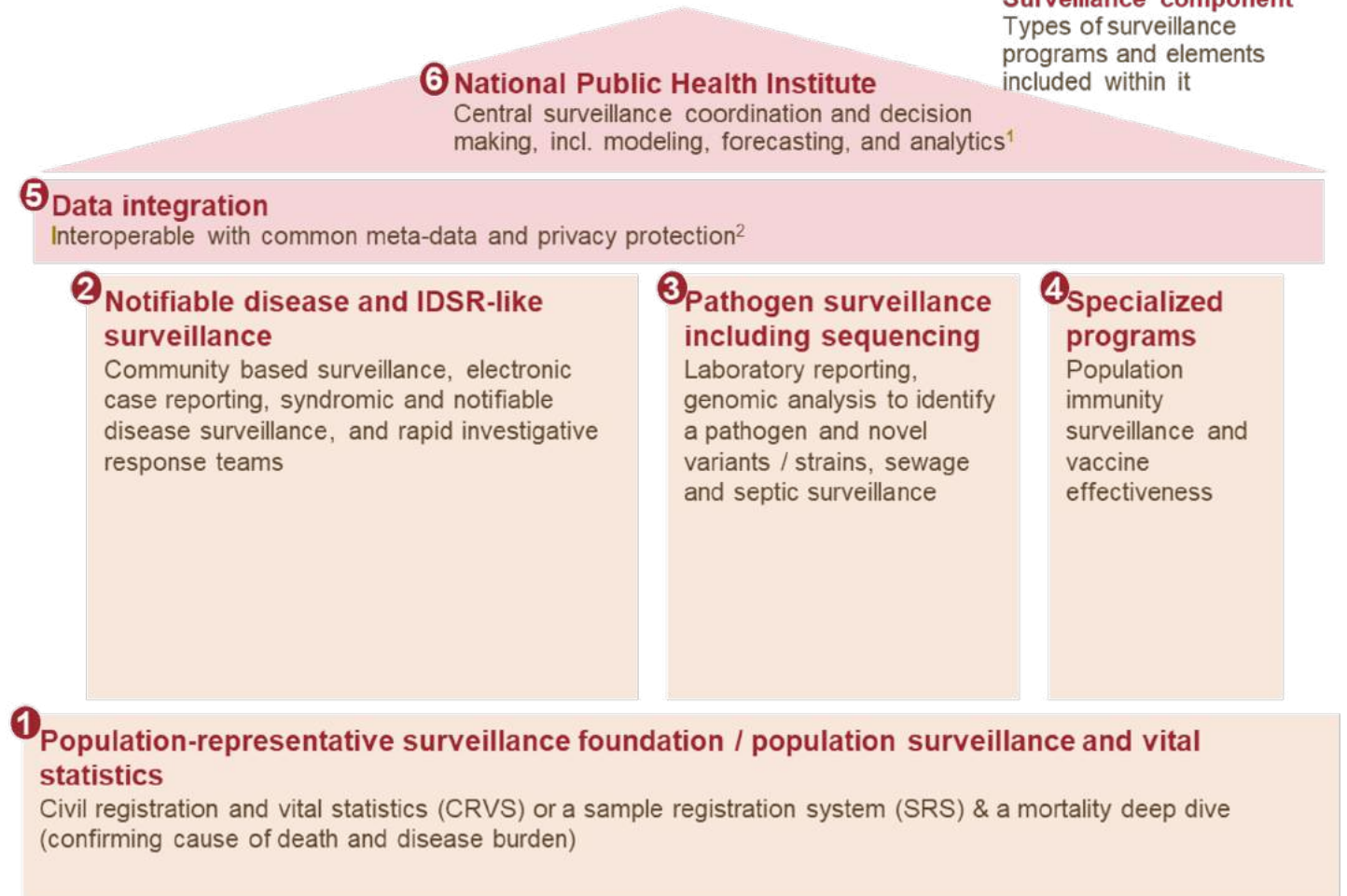
1. <https://www.bbc.com/news/world-africa-55674139>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6815655/>

DISEASE SURVEILLANCE VISION

Surveillance component

Types of surveillance programs and elements included within it

An integrated surveillance system
to support the detection and response of the next pandemic and improve routine disease surveillance



CORE PRINCIPLES FOR INTEGRATED DISEASE SURVEILLANCE*

	Principles	Implications
1	Population-based foundation - CRVS or sample registration system	Denominators for rates and burden
2	Laboratory testing adequately scaled to the threat	Cases accurately tracked
3	All digital with unique health identifiers and core metadata	Systems interconnect and privacy protected
4	Data transparency and automated reporting to NPHI	Full visibility at NPHI and WHO if PHEIC
5	Adequate financing	Countries determine adequate % of GDP needed

[*As described in a commentary published in the Lancet](#)

BUILDING THE FOUNDATION OF DISEASE SURVEILLANCE

WE NEED ROUTINE, POPULATION-REPRESENTATIVE PLATFORMS THAT LEVERAGE PATHOLOGY-INFORMED CAUSE-OF-DEATH ATTRIBUTION

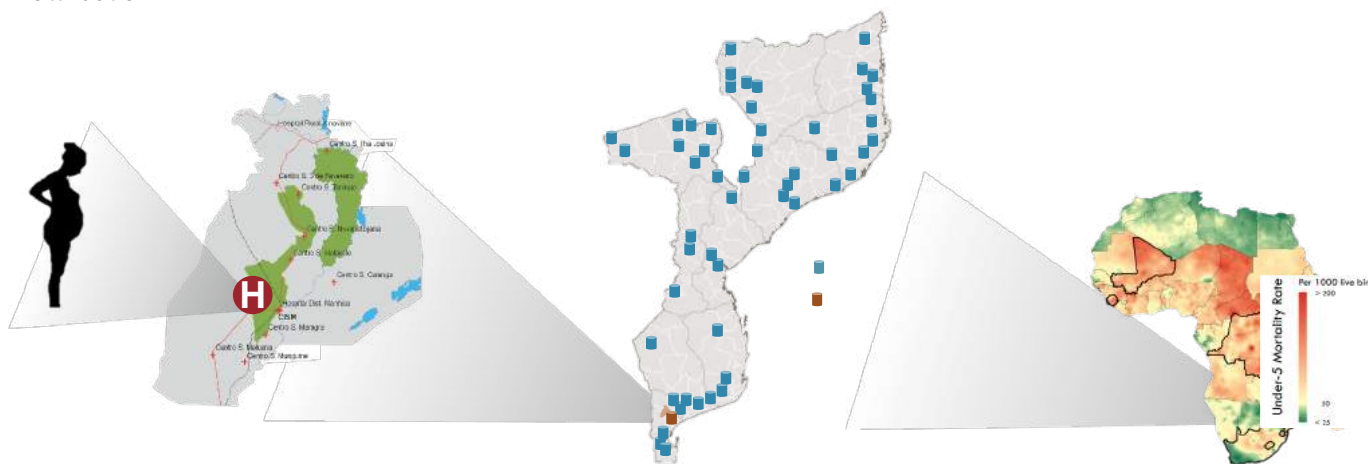
Strategic areas

- 1. Improve accuracy and precision of cause of death attribution in LMICs by better **leveraging pathology-informed cases (using minimally invasive tissue sampling)** at the individual and population levels
- 2. **Lower barrier to entry** for establishing mortality surveillance systems- what tools and guidance are needed by countries to get started to improve completeness and timeliness of death reporting
- 3. Focus on **system integration** for the purposes of building integrated disease surveillance systems- data collection solutions, system architecture that includes exchangeable information, following global reporting requirements

Improving individual cause of death attribution

Building population-representative platforms

Improved global estimates for decision-making



NEED POPULATION REPRESENTATIVE PLATFORMS TO SERVE AS THE FOUNDATION

Benefits of a sample registration systems

- Nationally and sub-nationally representative data of entire population
- Household sampling frame
- Continuous data collection
- Capturing births, pregnancies, and deaths
- Disease agnostic
- Stepping-stone to full CRVS
- Government led

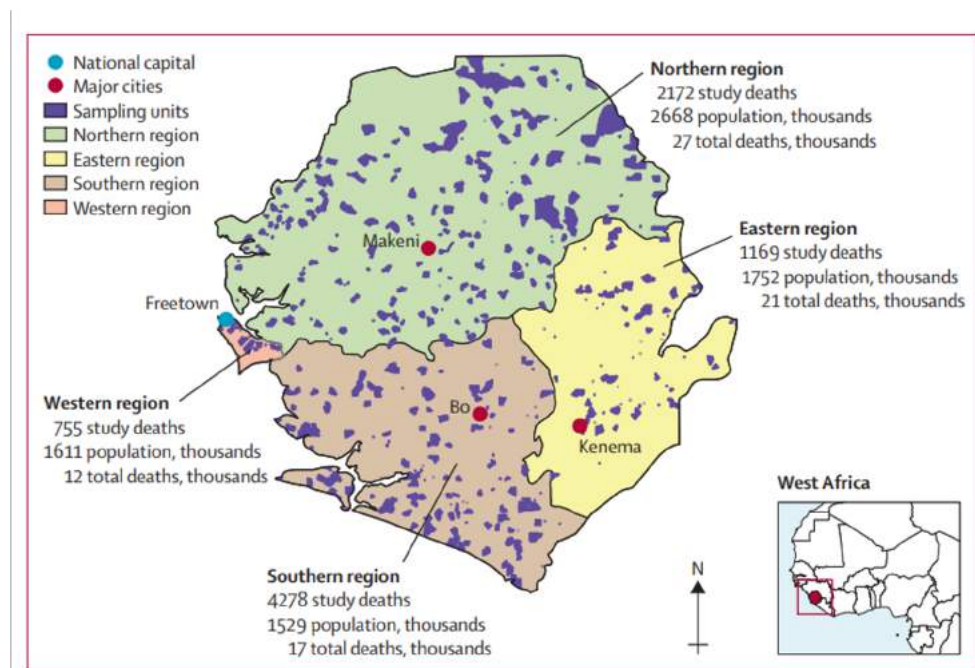


Figure 1: Map of Sierra Leone showing enumeration areas, regions, and numbers of study deaths

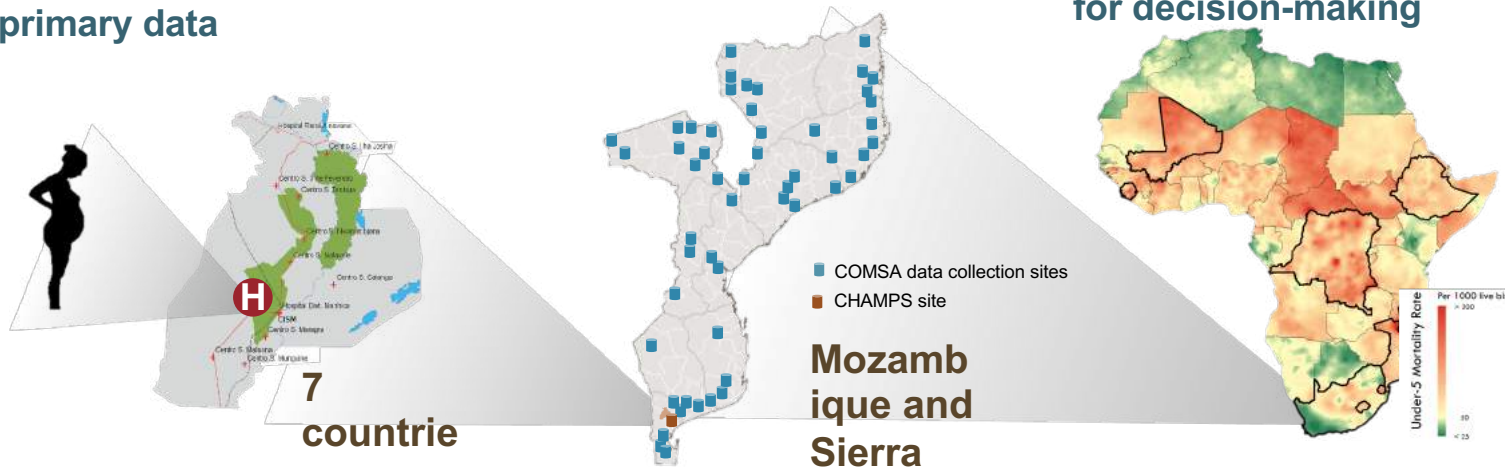
BUILDING POPULATION-REPRESENTATIVE, PATHOLOGY-INFORMED MORTALITY SURVEILLANCE PLATFORMS

Building platforms to serve as the foundation for disease surveillance

Collecting better primary data

Countrywide integration

Improved global estimates for decision-making



7 countries

Mozambique and Sierra Leone

MITS Surveillance Alliance

- ~5 sites MITS-VA feasibility projects
- MITS Kits
- Training and capacity building
- Data quality assurance of tissues samples

Child Health and Mortality Surveillance (CHAMPS)

- Most accurate cause-of-death data for children <5 years, using MITS
- Sub-nationally representative sites across 9 countries in Africa and South East Asia

Countrywide Mortality Surveillance for Action (COMSA)

- Sample registration system providing representative causes-of-death using verbal autopsy, all ages
- Subset of death w/MITS
- Integrated serosurveillance using dried blood spots

Institute for Health Metrics and Evaluation (IHME)

- Improved modeling of causes of death and global burden of disease
- Geospatial mapping to guide interventions and highlight data gaps

Africa CDC's Mortality Surveillance Program Secretariat

- TA across Member States
- Developed continental mortality surveillance framework

Digital Mortality Tool Assessment

- Developing guidance and standards on mortality data collection

Post-COVID-19 Investments Measuring excess-mortality

- **Burial Site Surveillance**
 - Bangladesh
 - Pakistan
- **Mobile Phone Surveys**
 - Mozambique
 - Bangladesh
 - Burkina Faso
 - Malawi
- **HDSS Sites**
 - 18 sites across SSA and SEA (4 CHAMPS sites)

COMSA DATA HAS DRIVEN NEW RESEARCH QUESTIONS ON MALARIA DEATHS AMONGST ADULTS

22% of deaths under age 70 years in 2020 due to malaria

- U-shaped curve for malaria mortality by age
- Leading cause of death for all ages, except neonates
- Mortality rate from malaria x2 higher than WHO estimates

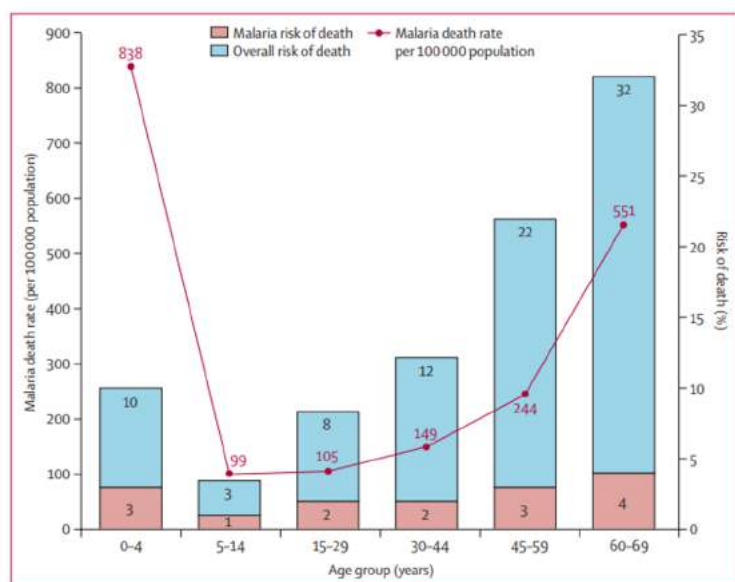


Figure 2: Annual malaria mortality rate by age group in Sierra Leone

The overall malaria risk of death at ages 30-69 years was 7.48% and total risk of death in the same age group was 53.45%. Malaria risk of death is a proportion of the overall risk of death for each age group, with the UN life tables¹ used to determine the overall risk of death and the Sierra Leone Sample Registration System used to determine death proportions due to malaria.

- MITS can help define the role of malaria as contributor to adult mortality
- COMSA and CHAMPS plan to investigate cause-specific mortality amongst Sierra Leoneans and Kenyans
 - Population: Consecutive adult patients identified through passive and active surveillance at hospitals and in the community
 - Sample size: 200-250 adults
 - Timeline: 1 year, to capture seasonality
 - Procedures: MITS and VA performed
- Will provide valuable information in the near-term
- Co-funded with Malaria PST

LEVERAGING PATHOLOGY-INFORMED CASES FOR MORE ACCURATE CAUSES OF DEATH FOR POPULATIONS

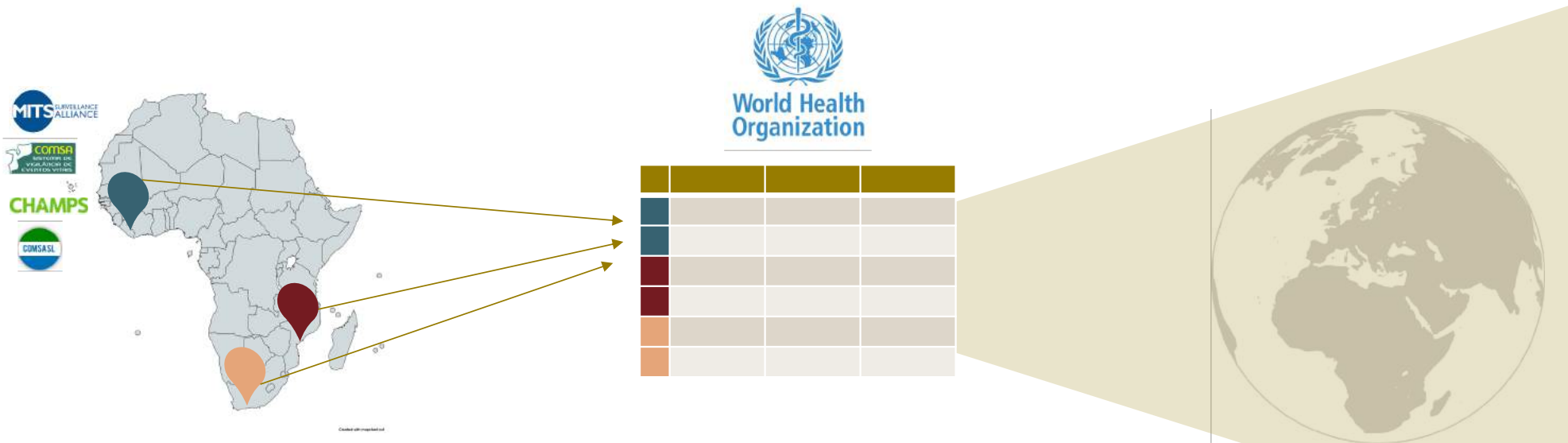
Error Matrix for DeCode vs. VA algorithm from COMSA Mozambique

DeCode Panel w/MITS



- Expanding **MITS-VA calibration methods** to test if error matrices can be used across settings to correct VA data
- **Integrating MITS into routine surveillance** by institutionalizing the use of MITS
- Pathology-informed VA by developing a **reference death archive** with symptom cause information that can be used to inform attribution methods/algorithms
- **Digital mortality tools** to facilitate development of software-agnostic data standards and integrated systems
- **Consortiums** to bring together partners and agree on standardized practices, analysis approaches, and research needed

USING HIGH-QUALITY CAUSE OF DEATH DATA TO IMPROVE ATTRIBUTION METHODOLOGY GLOBALLY



- Have limited sites producing high-quality MITS-VA pairs
- MITS-VA calibration methodology being developed within academia

- Collating the MITS-VA pairs within a reference death archive provides opportunities for improving VA tools and algorithms used globally

- Reliant on influential levers like WHO to expand use of methodology and continue to update it as more MITS-VA pairs are collected over time

THANK YOU

MORE INFORMATION ON SPECIFIC PROJECTS

CHAMPS: CHAMPSHEALTH.ORG

COMSA MOZAMBIQUE: COMSAMOZAMBIQUE.ORG

COMSA SIERRA LEONE: COMSASL.ORG

MITS SURVEILLANCE ALLIANCE: MITSALLIANCE.ORG

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