

A FAIR Health Information System

Case Study of the Virus Outbreak Data Network (VODAN)-Africa

Prof. Dr. Mirjam Van Reisen

Prof. Dr. Francisca Oladipo

OAI Conference 2021

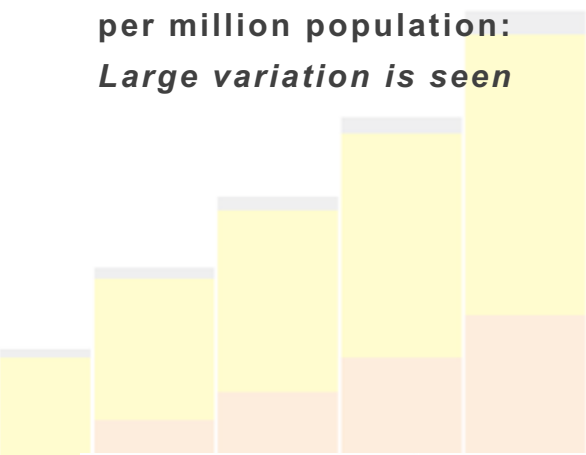


Improving Quality of Healthcare Through Data Ownership and Localization¹

Formulation of the problem

COVID-19 cases and deaths per million population:

Large variation is seen

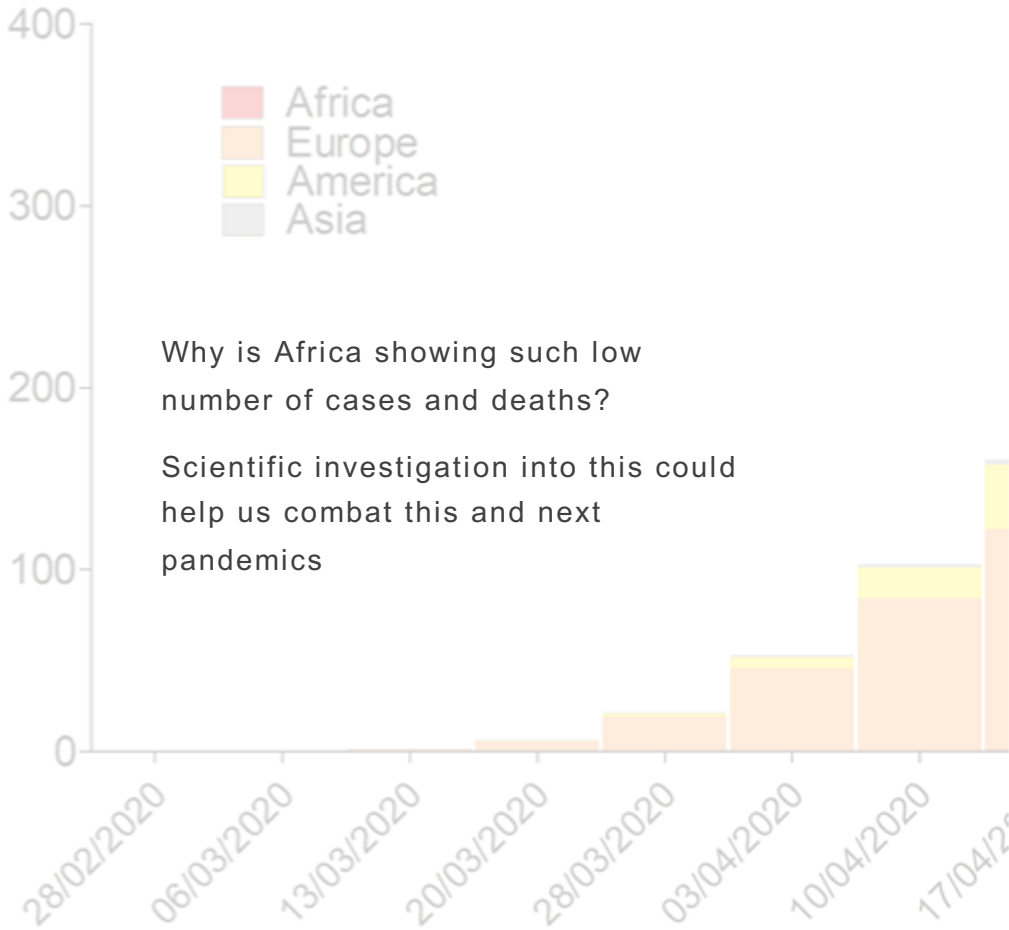
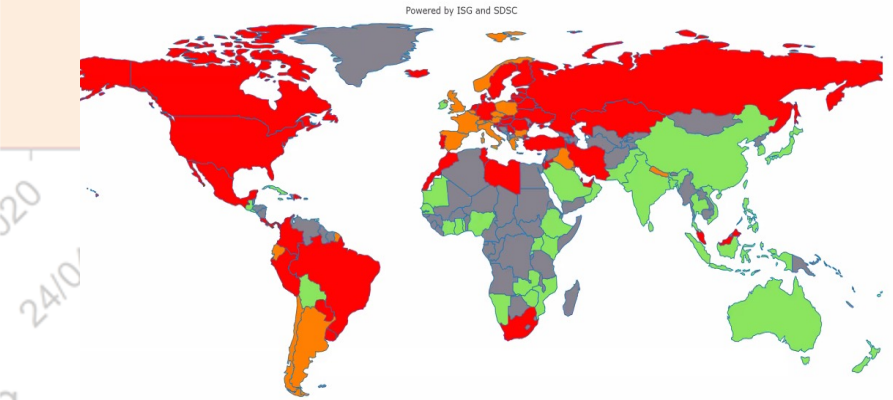


19 deaths per million



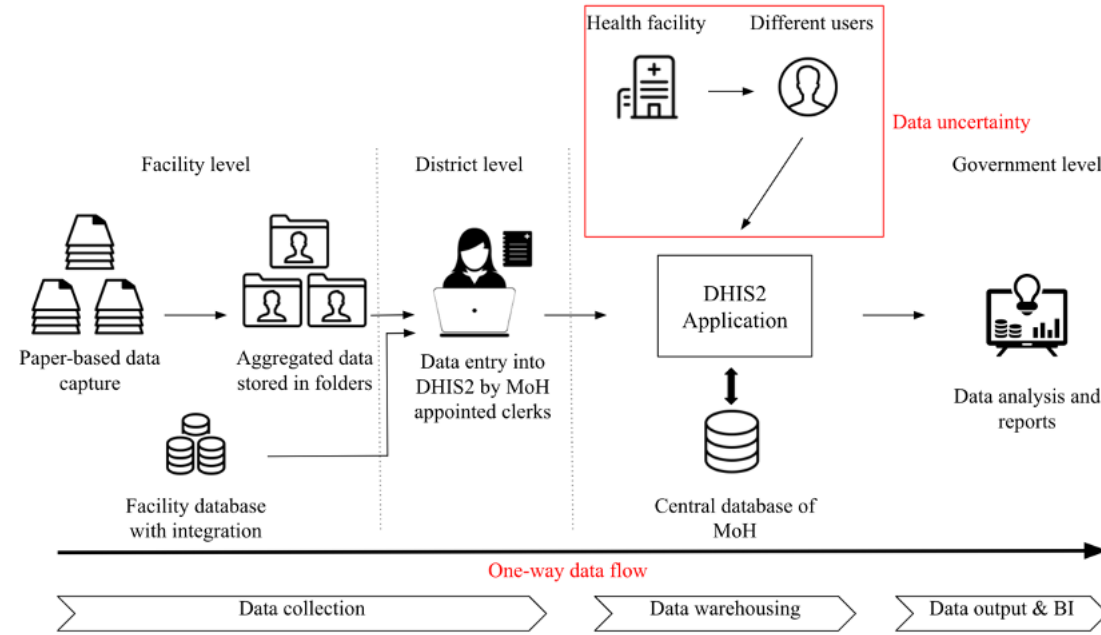
Why is Africa showing such low number of cases and deaths?

Scientific investigation into this could help us combat this and next pandemics



Weekly basis reporting

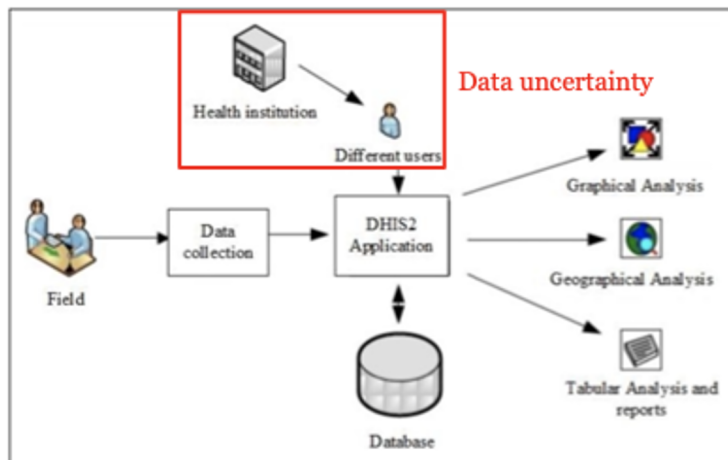
Virus Outbreak Data Network Problem Analysis: lack of interoperability, ownership and security of patient data (graphs: Yi Lin, 2021)



DHIS = District Health Information System

Introduction

Problem statement



Overview of the DHIS2 architecture, source: Manoj et al.



Low data ownership



Data security issue



Insufficient interoperability



Missing practical info



Current data management systems -> **Problematic**

Summary of the challenge

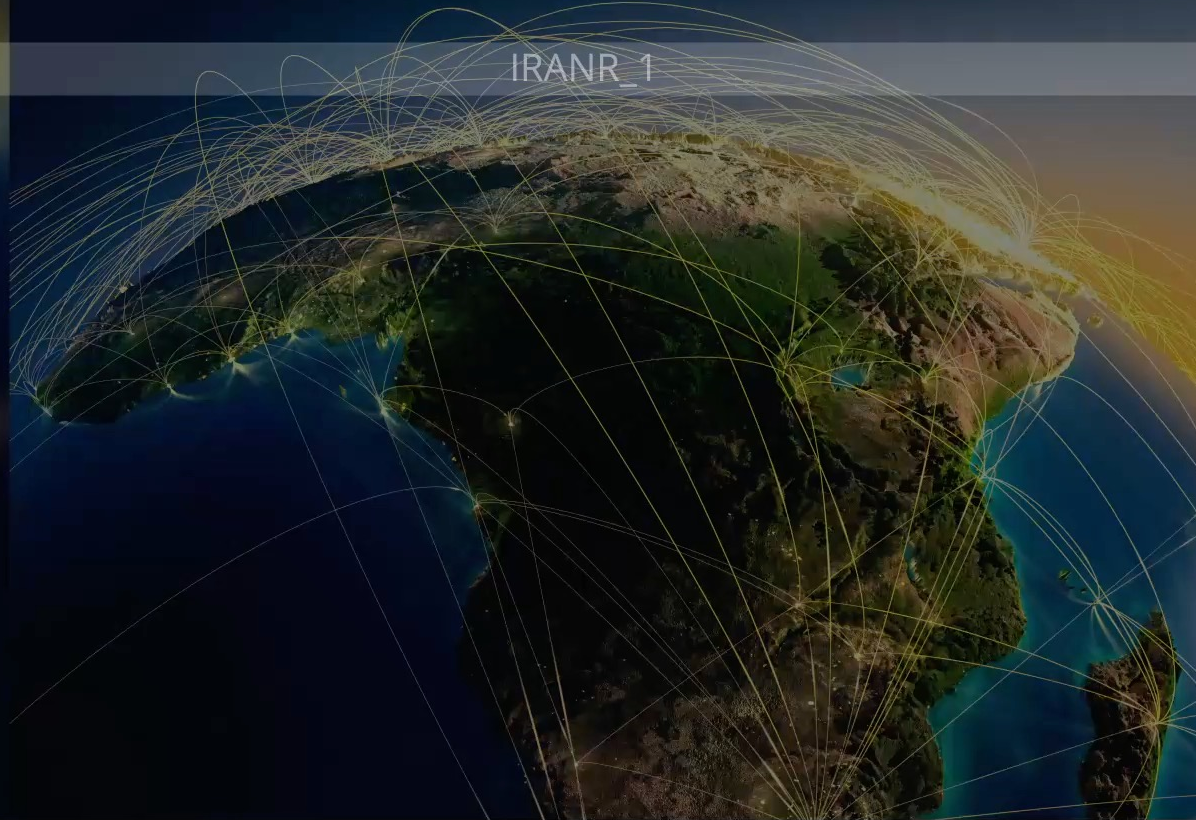
- Data unavailability in vulnerable and remote settings
- Need for data localisation and ownership, data-curation in residence and within regulatory frameworks relevant to settings where data is produced
- Production of data must be relevant to local practices, but this is often not the case at present
- Unresolved digital data challenges such as lack of interoperability
- Lack of capacity and training of data stewards and curriculum development for data science



IRANR_1

IRANR_1

IRANR_1



ADVANCED GENETICS

Open Access

Design of a FAIR Digital Data Health Infrastructure in Africa for COVID-19 Reporting and Research

DOI: 10.1002/GGN2.10050



WILEY

Formulation of the Research Question:

How can we use FAIR Data Science
to solve this Challenge?

Case study: FAIRification of patient
records in health facilities in
selected African countries

Scope of VODAN-Africa in September 2021:

- 85 Health Facilities
- 9 Countries
- Expanding to 15 countries

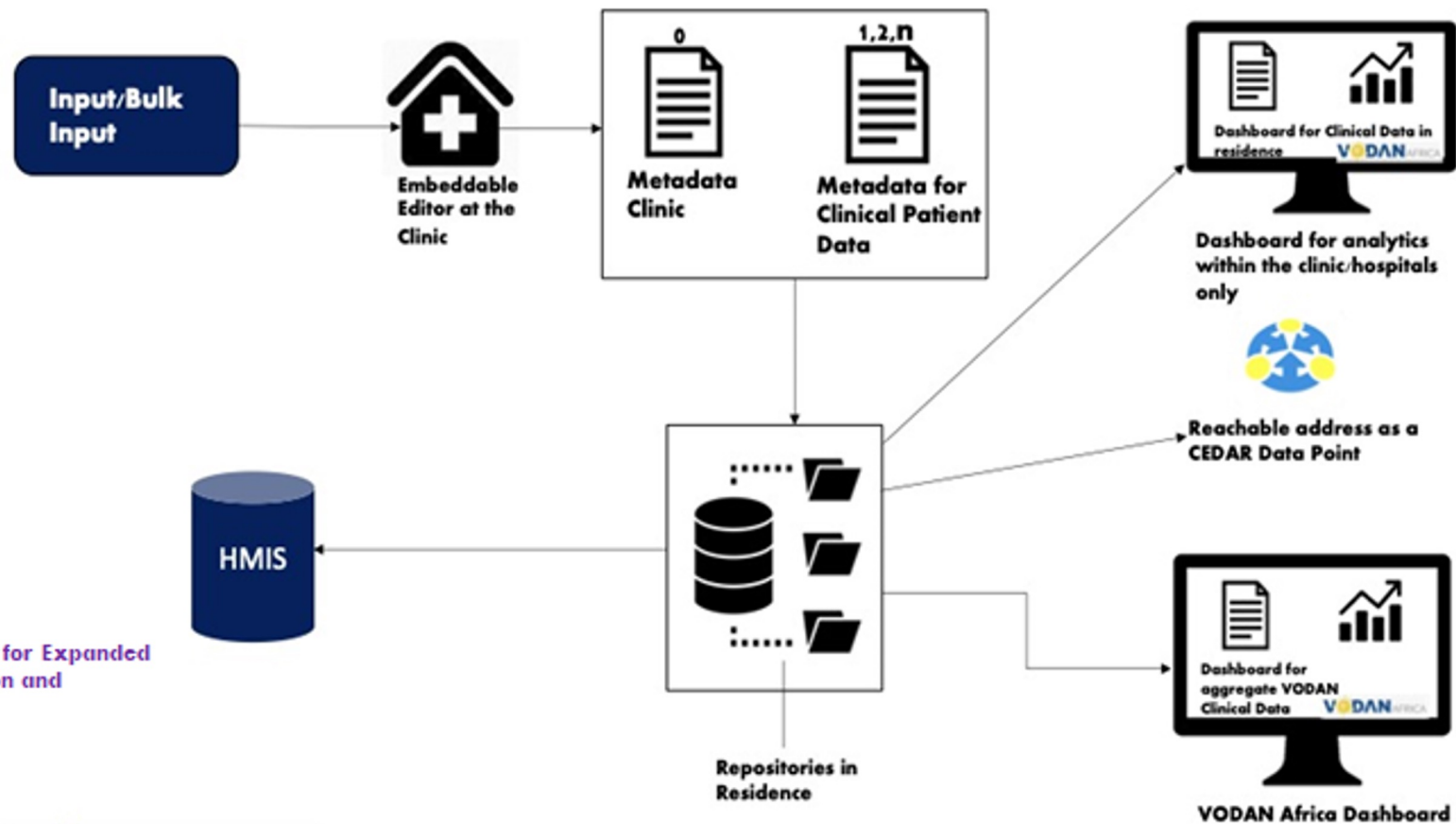


Grouped Facility type (gr..

- Clinic
- Health Center
- Hospital
- Research Center

Development of a FAIR-based architecture

- Data is curated, stored and used within the health facilities where it is produced
- Data security is arranged by the health facility where data is produced
- Efficiencies of data production, processing and reuse is increased by one editing entry into a machine readable editor
- Data is Findable, Interoperable and Reusable
- Data Access Permission is arranged within the context of each facility and recognizing national and other relevant regulatory frameworks

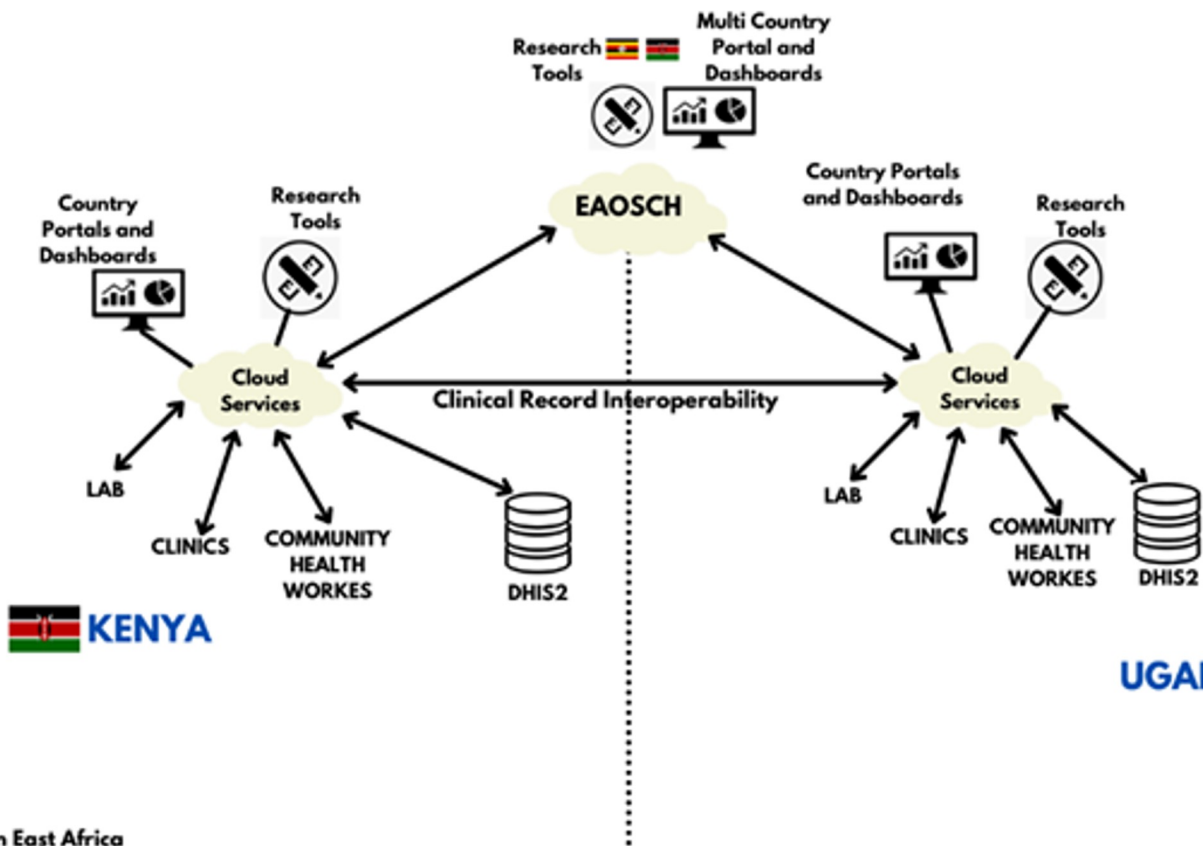
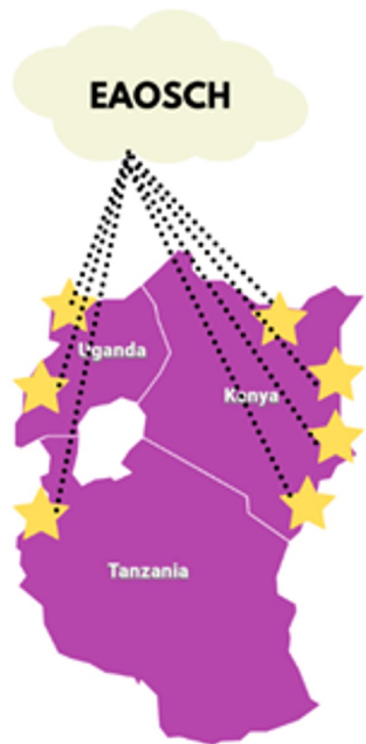


CEDAR - Center for Expanded
Data Annotation and
Retrieval




VODAN-Africa Architecture: Clinical Data (Van
Reisen, Oladipo & Osigwe, 2021)

DRAFT ARCHITECTURE OF THE EAST AFRICA OPEN SCIENCE CLOUD FOR HEALTH DATA ACCESS (EAOSCH)

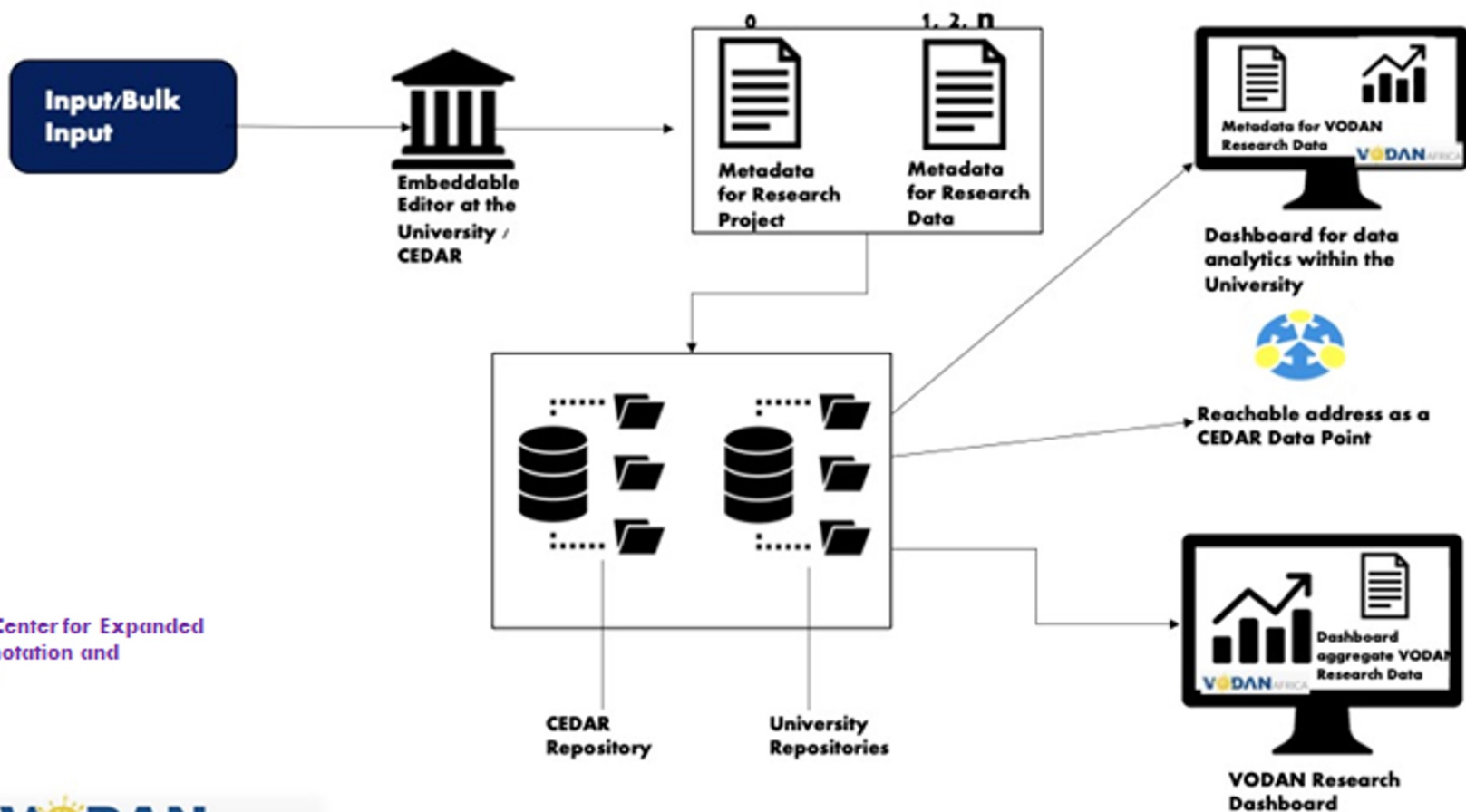


 **KENYA**

UGANDA 

 — Health facilities in border areas in East Africa

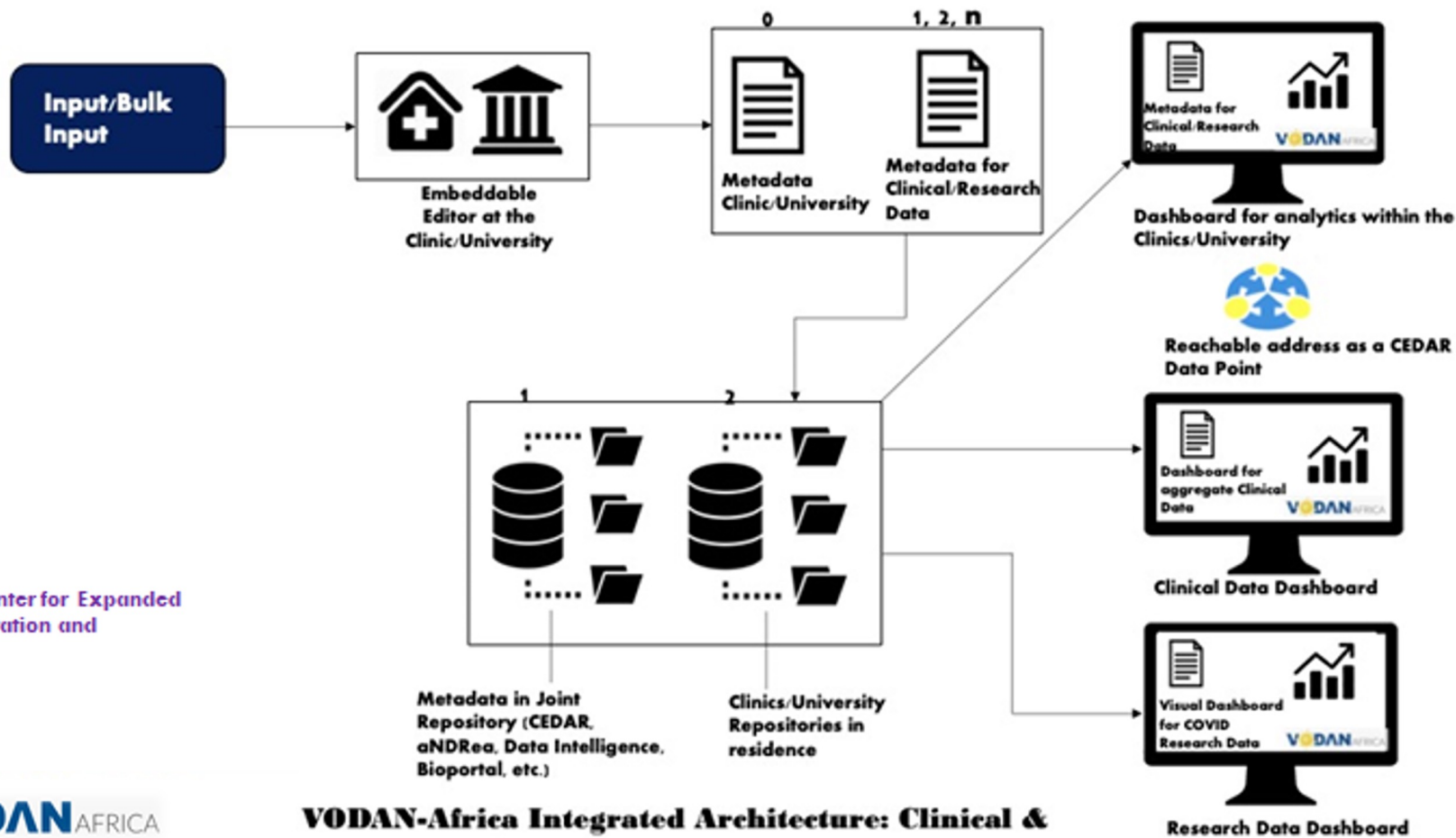
 — District Health Information System 2



CEDAR - Center for Expanded
Data Annotation and
Retrieval



VODAN-Africa Architecture: Research Data
(Van Reisen, Oladipo & Osigwe, 2021)



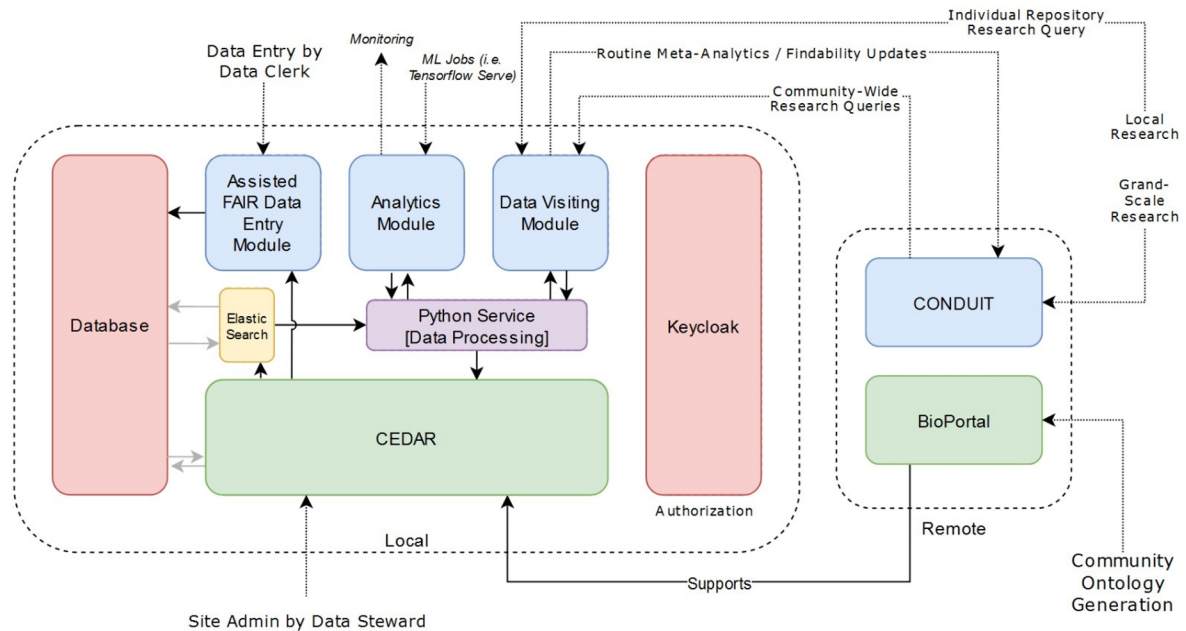
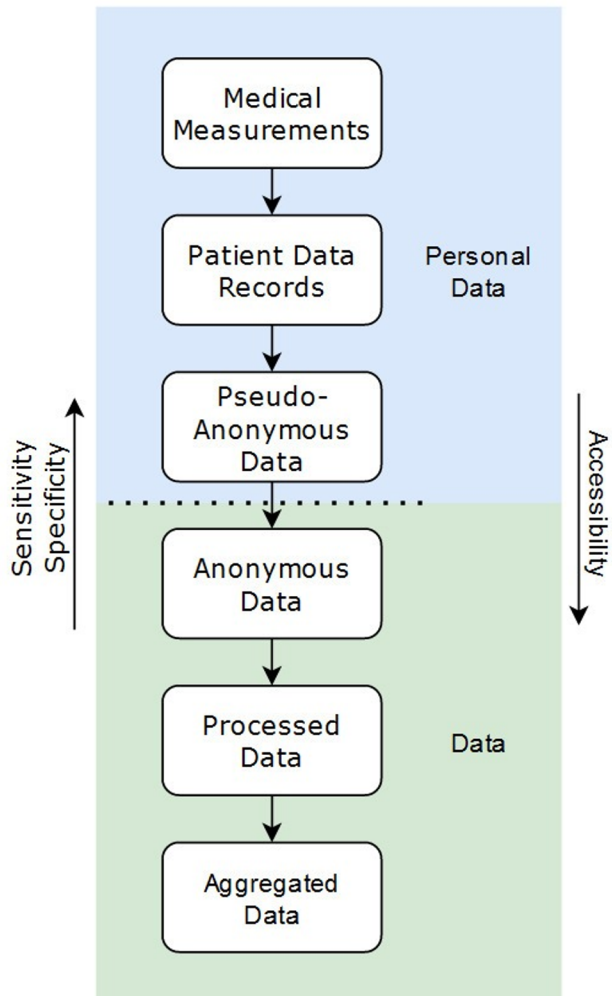
CEDAR - Center for Expanded Data Annotation and Retrieval



CLINICAL HEALTH DATA INTEROPERABILITY

RESEARCH / UNIVERSITY

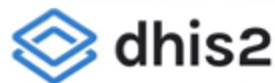




Data Model and architecture: VODAN-Africa (R. Plug, M. van Reisen, 2021)

BI & HMIS

HMIS Capacity Comparison



Since 1995



DATA WAREHOUSE

DHIS2 Capacity



Profile management



BI solution



Metadata management



Customization



Message system



Mobile solution



GIS



Support Microsoft



Since 2020



VODAN Capacity



Diagnosis data management



Metadata & vocabulary



Support research data



Data Governance



BI solution within & across facilities

Letters of Support

1. Letter of Support from the Ministry of Health, Niger State Government of Nigeria
2. Letter of Support from Pr. Lotfi Belkacem, President of the University of Sousse, Tunisia
3. Letter of Support from Kenya Medical Research Institute (KEMRI)
4. Letter of Support from Mount Kilimanjaro Christain Medical Centre
5. Letter of Support from the Ethiopian Minister For Health, Dr. Lia Tadesse
6. Letter of Support from Somali Ministry of Health
7. Letter of Support from the Uganda Ministry of Health
8. Letter of Support from The Government of the National Regional State of Tigray, Bureau of Health
9. Letter of Support from Ayder Comprehensive Specialized Hospital Mekelle University College of Health Sciences
10. Letter of Support from Centre for Community Technologies, Nelson Mandela University
11. Letter of Support from Physicians associated with VODAN Africa
12. Letter of Support from National Agency for Digital Infrastructure and the Digital Transformation Initiative in Burkina Faso
13. Letter of Support from Prof. Dr. Pancras Hogendoorn, Dean Leiden University Medical Center (LUMC)
14. Letter of Support from Hidde Onstein, Managing director division 2, Leiden University Medical Center (LUMC)
15. Letter of Support from Prof. Dr. Mouhamad Mpezamihigo, Vice-Chancellor Kampala International University
16. Letter of Support from Tolbert Nyenswah, John Hopkins Bloomberg School of Public Health
17. Letter of Support from the President Mekelle University

Important Links

- VODAN Africa Website - <https://vodan-totafrica.info/>
- List of health participating facilities - <https://bit.ly/38aYDYO>
- Research Article on the Design of a FAIR digital data health infrastructure in Africa for COVID-19 reporting and research - <https://onlinelibrary.wiley.com/doi/10.1002/ggn2.10050>
- Letters of Support - <https://bit.ly/3sPET6D>

On Mirjam van Reisen:

- LUMC personal page: <https://www.lumc.nl/org/lucid/medewerkers/mirjamvanreisen?setlanguage=English&setcountry=en>
- Leiden University personal page: <https://www.universiteitleiden.nl/en/staffmembers/mirjam-van-reisen#tab-2>
- Tilburg University personal page: <https://www.tilburguniversity.edu/staff/m-vanreisen>
- CV page: <https://mirjamvanreisen.wordpress.com/>



Universiteit
Leiden



Philips
Foundation



FMO
Entrepreneurial
Development
Bank

Google.org



LU
MC

