COVID-19 Response

Empowering Digital Health
Leverage and coordinated approach:
VODAN-Africa / Training of Trainers (ToT)

Prof. Dr. Mirjam van Reisen
28 April 2020, BDVA

#VODAN
Outline

Philips Foundation

Covid-19 Response

Virus Outbreak data Network (VODAN)

Training of Trainers

Next steps
Philips Foundation – supporting the fight against COVID-19

More than ever, the Philips Foundation is striving to help provide access to critical care for those most in need, by leveraging Philips’ expertise, innovative products and solutions.

Check out our interactive map* to find out where and how the Foundation is addressing the COVID-19 pandemic. A grasp of the many initiatives the Foundation is currently working on:

*Map updated April 16, 2020
Netherlands: Philips Foundation has provided a loan to the Refugee Company in Amsterdam, enabling the organization to start producing large quantities of high-quality facemasks made from filter material used in Philips vacuum cleaner bags (among other materials. The masks fully comply to the RIVM requirements).

India: As the onset of the COVID-19 outbreak and resulting lockdown have dried up all sources of income for India’s rural population, the Philips Foundation will be providing welfare support to those most in need, as well as frontline healthcare workers.

Netherlands: Philips Foundation provides a grant and Philips’ procurement expertise to support AidInnov Foundation in scaling their open platform for humanitarian procurement and tendering, adding modules for the coronavirus pandemic response. The platform aims at making procurement and innovation in the aid sector more efficient by translating response scenarios into concrete product- or solution specifications, including service and maintenance. By our early step-in, the initiative has attracted co-funders, including the Dutch Development Bank FMO.

Turkey & Lebanon: To alleviate the rising pressure on hospitals and health professionals in Turkey and Lebanon in the face of the COVID-19 crisis, the Philips Foundation is supporting the Lebanese Red Cross and the Turkish Society of Intensive Care by donating crucially needed medical equipment for diagnosis and patient monitoring.

Romania: Through the Philips Foundation, local humanitarian organization Children’s Heart Association can provide Romanian hospitals with medical equipment to treat people with COVID-19 and supply essential tools to prevent people from being infected.

Europe: Mobile Isolation Care Units: To alleviate overburdened hospitals in European countries most impacted by COVID-19, the Philips Foundation has procured and put at disposal five temporary 20-bed mobile hospital units.

Spain: In response to one of the greatest mobilization of resources and capabilities in the history of Spain and Portugal triggered by the COVID-19 crisis, the Philips Foundation is supporting the Red Cross to build hospital infrastructure and purchase protective equipment.

United States: To support marginalized groups in the United States during the COVID-19 crisis, Philips Foundation has teamed up with MedShare to help set up and equip local primary care clinics, shelters and hospitals with the necessary protective supplies.

Kenya: The Philips Foundation has supported the roll out of a WHO chatbot in Africa that provides reliable information on COVID-19, by adapting it to audiences with different levels of literacy and with respect for local cultural sensitivity.

Italy: Philips Foundation supported the purchase of personal protective equipment (PPE), medical equipment and ventilators for intensive care units, through Italy’s national Civil Protection organization and humanitarian organization Cesvi.

Virus Outbreak Data Network: To enable early detection of COVID-19 outbreaks in Africa, Philips Foundation has contributed to the establishment of the Virus Outbreak Data Network (VODAN), which facilitates the findability, accessibility, interoperability and reuse of crucial data across the continent.

Kenya: In an attempt to slow the spread of the novel coronavirus pandemic on the African continent, the Philips Foundation has provided an immediate loan to social enterprise Sagitarix, enabling rapid testing of travelers on coronavirus near the international airport of Kenya.

China: Philips Foundation donated health equipment and supplies in January to an emergency hospital in Wuhan, leveraging critically important Philips expertise in the field of respiratory diseases and health technology.
Enormity of the crisis in Africa:

- Undetected infection and spread
- Food shortage and threat of famine
- Serious economic down-turn and collapse
- Underinvestment in health care
- Lack of disposable income
Opportunities

- Window of opportunity for the digital connect
- Large youth population
- Entrepreneurial
- Health at the centre
Virus Outbreak Data Network (VODAN):  
**VODAN** is a [GO FAIR](https://www.gofair.org) Implementation Network set up to help fight the COVID-19 Corona virus, that is causing a worldwide epidemic.

**VODAN-Africa** – coordinating group:

- Kampala International University (KIU) – Uganda (coordination)
- Tangaza University College – Kenya
- Great Zimbabwe University – Zimbabwe
- Addis Ababa University and Mekelle University – Ethiopia
- Olabasi Onabanjo University - Nigeria
- Université de Sousse – Tunisia

Expansion in discussion with:
- South Africa
- Rwanda

Support from RavelWorks, Kenya
San Diego Centre for SuperComputing, US

In collaboration with: Philips Foundation
Leiden University, Tilburg University
I. Objectives
"One of the main problems is the duplication of data and lack of coordination between countries", said Mirjam van Reisen, who is part of the Virus Outbreak Data Network (VODAN) at the University of Leiden.
COVID-19

How to use data?
Vodan Training of Trainers

Institutional Support for Vodan Africa

- "Vodan is learning from our strategies that worked elsewhere to explore the best models for improving access to health services for communities. There are many other best practices being adopted in other countries that we believe can help us. Our approach is to work closely with governments and health workers in Africa to identify and implement the best practices that are effective in their context. This will help us to provide guidance and support to countries as they implement these strategies."

  - Dr. Usman Audu, Permanent Secretary, Ministry of Health, Nigeria

- "We hope to help governments improve the quality of health services and reduce morbidity and mortality rates. Through a combination of training programmes and ongoing technical assistance, we aim to support the implementation of effective health policies and strategies."

  - Dr. Mohamed Noman, UNICEF Delegate, Tanzania International University

- "The initiative is supported by the Philips Foundation whose mission is to provide hardware, access to technological solutions. With this initiative, the Philips Foundation supports the establishment of a virus-Detection-Easy-System (VODEAS) to ensure that data from the community is available to support the response to the pandemic."

  - Arjan van der Heijden, Director of the Philips Foundation
Lack of common data approach: defining the problem

- Increasing (unconnected) digital health data:
  - Patient data
  - Research data
  - Published articles
- CORD-19 is a resource of over 47,000 scholarly articles, including over 36,000 with full text, about COVID-19, SARS-CoV-2, and related coronaviruses
- Too much for manual handling, but current internet not equipped for machine-readability of data
- Data need to be prepared for human- and machine-readable
  Findability, Accessibility, Interoperability, Re-usability (FAIR)
- This constitutes the basis for the Internet of FAIR Data And Services
Internet of FAIR Data and Services - Connecting Principles

Australian Research Data Commons
Data Science meets AI:

Quality data for Federated AI Ready (FAIR) solutions

- Distributed data
- Data remain in their place of origin
- Data are managed and stewarded in their place of origin
- Allows contextualized data analytics
- Fake data are detectable and traceable
- Allows Data sovereignty within legal and policy framework of the location where data is produced
- Connects fragmented data depositories
- Algorithms (tools) visit the data
- Computes and analytics on the basis of data visiting
Specific benefits of VODAN for Africa

- Avoid digital data removal to warehouses elsewhere
- Strengthen data-informed Health Systems
- Ensure data ownership and handling
- Strengthen digital data stewardship and tooling
II. Training for Trainers:

Building a Community fit for purpose
VODAN: Establishing a solid network of trust and purpose

Step 1: Decide
• countries for FDPs: Uganda, Ethiopia, Zimbabwe, Tunisia and Nigeria

Step 2: Identify
• Training of Trainers’ hubs

Step 3: Inform
• Bureau of Health and or Ministry of Information and build a contact with them

Step 4: Contact
• the hospital/clinic to work with in your environment

Step 5: Explain
• What the project is about

Step 6: Establish
• A working relation with the hospital/clinic
### Set up information channel with MoH / Bureau of Health

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach</td>
<td>Approach the MoH / Bureau of Health</td>
</tr>
<tr>
<td>Provide</td>
<td>Provide information on VODAN and who are involved</td>
</tr>
<tr>
<td>Arrange</td>
<td>Arrange how you will communicate progress</td>
</tr>
<tr>
<td>Ask</td>
<td>Ask for their feedback</td>
</tr>
<tr>
<td>Request</td>
<td>Request endorsement</td>
</tr>
</tbody>
</table>
Determining the governance & regulatory framework

<table>
<thead>
<tr>
<th>Identify</th>
<th>the relevant policy documents and regulations on medical data handling;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categorise</td>
<td>categorise the do's and don'ts of the medical data regulatory framework;</td>
</tr>
<tr>
<td>Involve</td>
<td>involve relevant people who understand laws and regulations on medical data handling;</td>
</tr>
<tr>
<td>Explain</td>
<td>the purpose of the task to the experts in MoH and hospital/clinic;</td>
</tr>
<tr>
<td>Ask</td>
<td>ask colleagues in MoH &amp; hospital &amp; clinics to review the document and improve it;</td>
</tr>
<tr>
<td>Check</td>
<td>if you have all the right people on board to determine the regulatory framework;</td>
</tr>
<tr>
<td>Involve</td>
<td>any senior people if necessary to do final check;</td>
</tr>
<tr>
<td>Present</td>
<td>a regulatory framework</td>
</tr>
</tbody>
</table>
Training of Trainers:

Questions to consider for identification of the hospital or clinic (health data producer)

• What is the hospital/clinic you will work with?

  • Preferably there is a working relationship and trust with the hospital management

  • Ensure clear communication on the reason for the involvement of the hospital

  • The data-manager of the hospital/clinic is invited to the training so that knowledge is transferred

  • Alternatively follow up training is arranged with the data-manager of the hospital/clinic

  • Multiple hospitals/clinics can participate, but for the first step it should be a manageable number of participating outfits – expansion will happen after the first successful steps are implemented
Compilation of information flow charts

<table>
<thead>
<tr>
<th>Understand</th>
<th>where the repository of the information is</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify</td>
<td>the different forms/templates for information</td>
</tr>
<tr>
<td>Interview</td>
<td>the key resource persons (this can be by phone) and ask how information is compiled</td>
</tr>
<tr>
<td>Request</td>
<td>access to key resource persons handling information in the hospital/clinic</td>
</tr>
<tr>
<td>Explain</td>
<td>that you do not need to have access to the data itself (only the forms)</td>
</tr>
<tr>
<td>Ask</td>
<td>permission from hospital/clinic to compile an information flow chart on clinical data (written permission would be best)</td>
</tr>
</tbody>
</table>
Understanding the information flow
Training of a COVID-19 Data Community

1. To establish the basics of the FAIR Data Point:

- Officials in health administration (governance, regulatory framework)
- Health professionals (to work with the information flow and data handling in hospitals and clinics)
- Data scientists, semantic data modelers, interdisciplinary data stewards (to define and model the data in human and machine-readable ontologies and determine informative models)

2. In subsequent phase:

- Experts in Machine Learning and Artificial Intelligence, text mining tooling
- Experts in Algorithm auditing
- Experts with Legal knowledge for regulatory embedding of the use of the FAIR Data Point
- Clinicians and health analysts for health data analytics
- Researchers, experts for the formulation of hypotheses and judging cardinal assertions derived from data analytics
III. Next Steps: implementation
Decision-making in FAIRification of the COVID-19 Data Community

- Application of FAIR Principles based on:
  - Technical specifics (infrastructure) – code red
  - local authorities (governance and regulations) and domain specialists (doctors, virologists, researchers) – code blue

The COVID-19 Data Community determines:
Data as Open as Possible and as Closed as Necessary
As Distributed as Possible, as Centralised as Necessary
Information structure of COVID-19 semantic model of patient data:

1. Digital Data Entry at hospital/clinic
2. Machine Readable interoperability of existing digital entries (ensuring interoperability and reusability)
3. Defining metadata (ensuring findability and establishes conditions for accessibility)
VODAN Project: Social-Technical Specification

Phase 1
Phase 2
Phase 3

Regional FAIR Data Point

Metadata pointing to eCRFs (VODAN standard as RDF)

M4M 1
M4M 2
M4M 3
...

FIP development:
- Community schema
- FIP RDF
- FIP presentation schema

Designation 1
Designation 2
Designation 3
...

FDP development:
- search
- Access

Information Stream:
Local process of recording patient data, often with paper and pencil

FAIR-at-source Data / Metadata capture tools

eCRFs (WHO standard as RDF)

DSW castor CEDAR
OUR SPEAKER: LUIZ BONINO

Luiz Bonino, International Technology Coordinator at the GO FAIR International Support and Coordination Office, will lead a technical webinar guiding interested VODAN Africa participants in the installation of a FAIR Data Point. This is a technical discussion, and will result in a locally running FAIR Data Point that hosts machine-actionable metadata pointing to electronic Case Report Forms (eCRF) that will likely be stored elsewhere (perhaps even the clinical facility that collected the patient data). Over the coming weeks, ongoing effort will be devoted to “loading” the FAIR Data Point with relevant data and metadata content (for example, names of participating organisations, getting patient data into the eCRF, local governance and regulations, etc).

APRIL 30TH
2:00PM – 4:00PM CET

FAIR DATA POINT INSTALLATION

HOSTED BY VODAN AFRICA
There is no FAIR Data without Machine-actionable Metadata
OUR SPEAKER: ERIK SCHULTES
There is no FAIR data, without machine-actionable Metadata. Erik Schultes, International Science Coordinator at the GO FAIR International Support and Coordination Office will lead a series of weekly webinars to guide stakeholders from each of the participating YODAN Africa unsolutions in the creation of machine-actionable metadata describing the FAIR Data Point and its resources (such as the electronic Case Report Forms generated in local clinical facilities).

APRIL 28TH
2:00 – 3:00 PM CET

METADATA FOR MACHINES (M4M)

HOSTED BY YODAN AFRICA
Metadata for Machines Workshops

Domain Experts + Metadata Experts = Machine-actionable Metadata

The creation of community specified, reusable metadata templates that prevent the reinvention of the wheel and drive convergence and interoperability.
## Metadata for Machines Workshops

<table>
<thead>
<tr>
<th>Question</th>
<th>FAIR Principle</th>
<th>Metadata decisions</th>
<th>National</th>
<th>Regional</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F1</td>
<td>What is the persistence policy for identifier systems used for data elements?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F2</td>
<td>What are the minimal data elements needed to ensure Findability?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>A2</td>
<td>What is the persistence policy for the metadata?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>R1.1</td>
<td>What usage license(s) will be used?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>R1.2</td>
<td>What are the minimal provenance metadata needed to ensure reuse?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>R1.3</td>
<td>Give a machine-actionable FIP.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Key Aims of the FAIR Principles

- Data to be as open as possible and as closed as necessary
- Protect personal data! Always!
- Embedded in local regulatory frameworks
- Maximize freedom to operate: Do not generate more work for the hospital/clinic
- Use the data recording mechanisms in place in the medical facility
- Build on any tool already available
- Ensure transparency of algorithmic tools
- Develop new Tools
- Triangulate cardinal assertions!
Important links

- https://www.philips-foundation.com/
- https://www.vodan-totafrica.info/
Virus Outbreak Data Network – Africa and Ambassadors

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- Technical Support Group lead: Mariam Basajja, Leiden University/Kampala International University
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- Support ambassadors Implementation Network: Aliya Aktau, Leiden University
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- GO FAIR International Support and Coordination Office: Erik Schultes
Thank you!