Digitalization of the National Reference Laboratory of Rwanda

Integrated management of data for better health response to COVID-19

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Covid-19 laboratory testing challenges

- High sample volumes
- Limited (often centralized) testing capabilities
  - NRL + 5 screening centers (sample collection)
- Need for integrated data management
  - Diagnostic and care oriented lab test data (RDT, RT-PCR, O2sat...)
  - Clinical care data (signs & symptoms, comorbidity, treatment...)
  - Epidemiological & health policy data (monitoring & evaluation, contact monitoring, ICU bed occupancy...)
- Guideline implementation
  - Triage and care algorithms based on integrated data
High sample volumes

- **Full automation of lab information management** from order form to results distribution

1. User enters **lab order** in OpenClinic GA in a screening center or at NRL
2. User adds **relevant clinical and epidemiological information** in OpenClinic GA in a screening center or at NRL
3. Lab orders are securely (asymmetric encryption) **transmitted to NRL using HL7 FHIR standard**
4. At NRL, **lab samples receive a unique barcode ID** produced by OpenClinic GA
5. After sample identification, **lab orders are sent to lab analyzer middleware from Abbott (AMS)**
6. AMS sends testing **work lists to automatic lab analyzers**
7. AMS receives **results from lab analyzers**
8. AMS sends **results to OpenClinic GA at NRL**
9. OpenClinic GA integrates **lab results with patient record** based on barcode ID
10. OpenClinic GA forwards **test results to screening centers** that produced the lab order
Integrated data management

- Merging of lab results with specialized Covid-19 care record in OpenClinic GA
- Implementation of (dynamic) clinical guideline algorithms (triage & care)
  - Criteria for performing diagnostic testing
  - Criteria for quarantine
  - Criteria for hospitalization
  - Criteria for ICU admission
  - Risk assessment for cytokine storm
  - Criteria for immunosuppressive therapy (HLH)
Epidemiological reporting

- Integrated Disease Surveillance and Response (IDSR)
  - WHO & CDC
  - Case report transmission integrating lab, clinical and epidemiological data
  - Automated extraction of IDSR content from central OpenClinic GA database at NRL
  - IDSR reporting module generates individual case reports in PDF format and summary tables in CSV format for transmission to WHO Afro

- Secondary use of lab & clinical information advantages
  - No extra labor for doing double data entry
  - 100% match between reported information and source data
  - No transcription errors
  - Timely reporting
Covid-19 clinical record demo

- Also on YouTube
  - English:  
    https://www.youtube.com/watch?v=vrPmjJldm5k
  - French:  
    https://www.youtube.com/watch?v=F7PqOqAMfZ4
  - Spanish:  
    https://www.youtube.com/watch?v=dxx8JqmBmgM
  - Kinyarwanda:  
    https://www.youtube.com/watch?v=4rdnK-ITmqY