



Diagnostic Preparedness Platform (DPP)

Blueprint for Priority Infectious Diseases with Epidemic Potential

May 4th, 2017

Aim

- Surveillance and monitoring of pathogens with high epidemic potential in resource limited settings
- Capacities for fast ramp up of diagnostic testing in central lab settings of epicentres of an outbreak and at the point of need

Strategy

- Early detection of onsets of outbreaks by diagnostic tools in decentralized settings
- Corresponding central lab based confirmatory tests
- Scalability of production and implementation of POC and central lab based tests
- Capacity building and training in epidemiological hot spots



Diagnostic Preparedness Platform



Solution

- Merge existing Alere and Altona technologies
- Extension of existing RealStar® real-time PCR assay portfolio to complete WHO high priority list → transfer to the AltoStar automated workflow
- Extension of Alere® q assay portfolio by tests for WHO listed pathogens
- Creation of a scientific network of reference laboratories on a global scale



Alere q Technology



Multiple
Assays

add sample
direct from
patient



Molecular POC



Connected



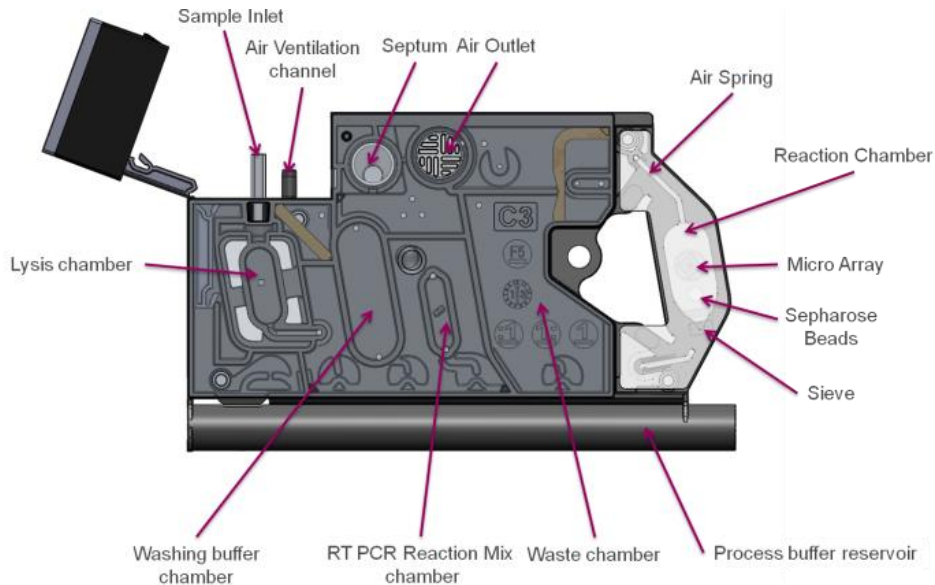
Single use
Cartridge



Array based
detection

Automatic:
Extraction
Purification,
Amplification
and detection

Onboard
device and
assay controls



- No cold chain requirements
- Real multiplexing capabilities
- Enables for diagnostic test panels
- SNP Detection

Integrated Cartridge Workflow

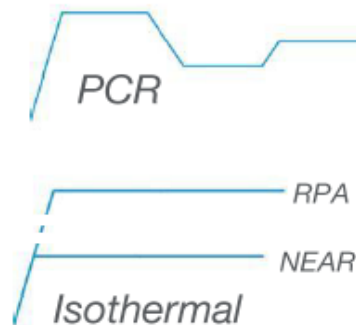
Extraction

- Chemical lysis
- Mechanical lysis
- Heat lysis

Target Isolation

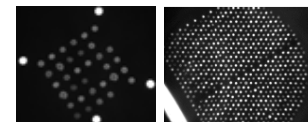
- Specific target capturing (e.g. RNA) using biotinylated probes on sepharose beads
- Unspecific DNA binding on silica beads

Amplification



Array Detection

Real time & end point, Melting curves
CMA technology; high density arrays



| Alere Test Report | |
|-------------------------|------------------|
| Alere™ q HIV-1/2 Detect | |
| Sample ID | 22-07-2014-ABC |
| HIV-1 M/N | Detected |
| HIV-1 O | Undetected |
| HIV-2 | Undetected |
| Result No. | 107 |
| Date / Time | 2014-07-22 15:50 |
| Cartridge ID | 0123456789 |
| Operator | Sam Miller |
| Device Serial | Nat-04000035 |
| Software | 0.20.0 |
| QC | |
| Sample Detection | Pass |
| Device | Pass |
| HIV-1 Positive Control | Pass |
| HIV-2 Positive Control | Pass |
| Negative Control | Pass |
| Analysis | Pass |
| Signature | |



altona RealStar Technology



Laboratory high throughput – altona RealStar / AltoStar

- RealStar: Open platform
 - Application on commonly used real-time PCR instruments
 - Proven fast response to outbreaks (SARS, MERS, flu, CHIKV, EBOV, ZIKV)
 - Most test have CE IVD, FDA EUA, WHO EUAL approval
- Flexible parallel testing for target organism and differential diagnostic
- Parallel testing of symptomatically similar pathogens: shared PCR profile, shared internal control
- AltoStar workflow: Automated NA extraction from different sample matrices and automated PCR set-up



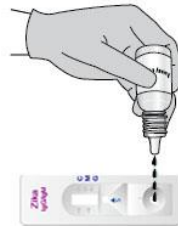
■ Product Specification

- Sample Type : serum, plasma and whole blood
- Sample Volume : 10 uL
- Interpretation Time : 15-20 min

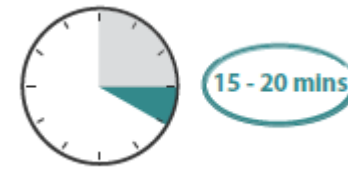
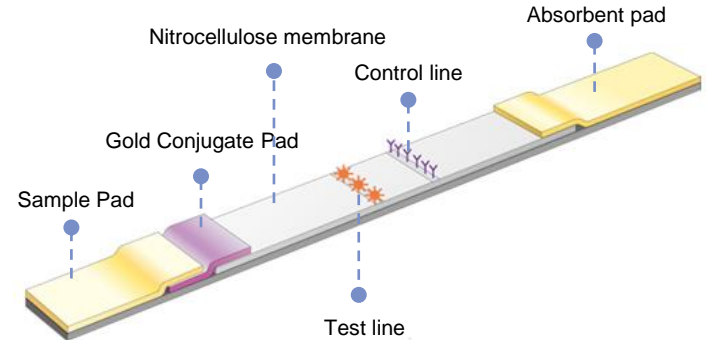
■ Test procedure



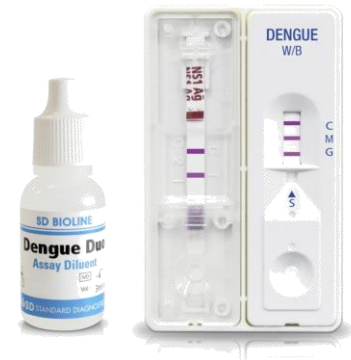
(1) Dispense 10 uL of specimen into the sample well (S).



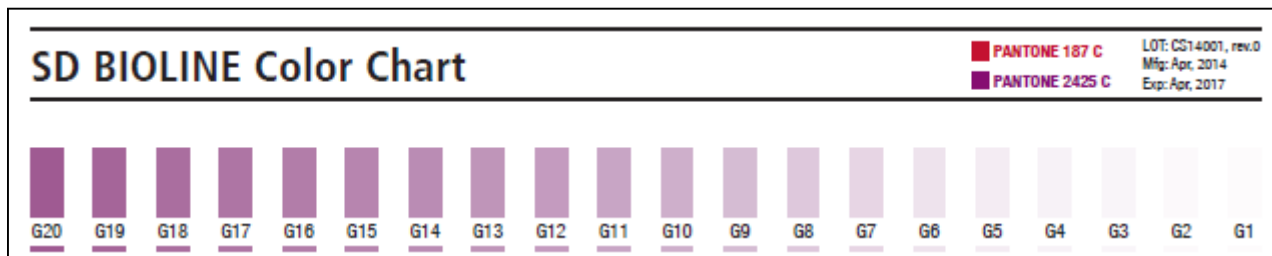
(2) Dispense 4 drops of assay diluent vertically into the assay diluent well.



(3) Interpret test results in 15~20 minutes.



■ SD Color scale chart

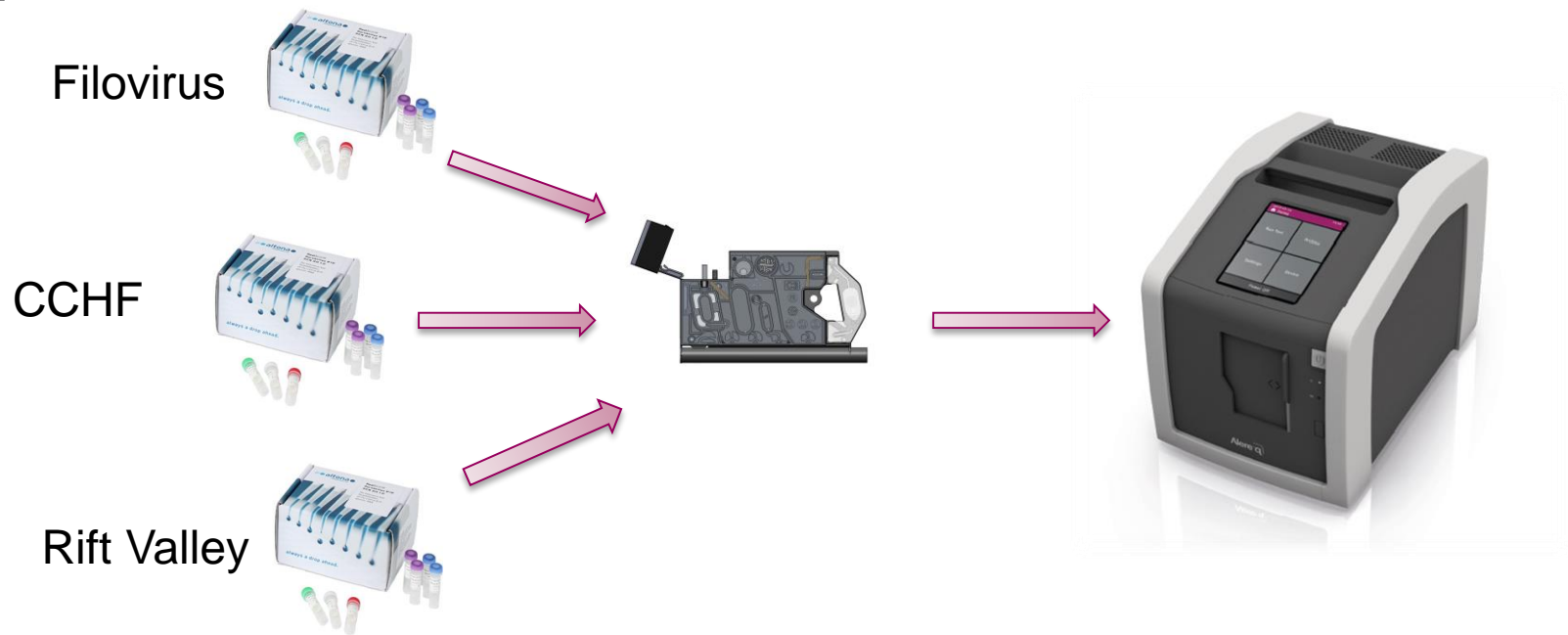


*Score rating

1+ positive: G1~G8
2+ positive: G9~G14
3+ positive: G15~G20

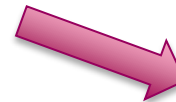
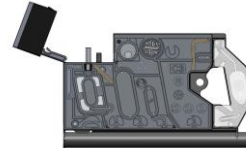
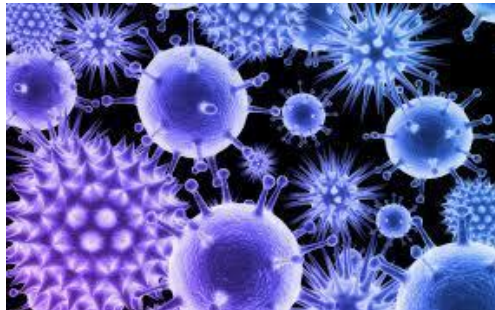
Transfer of existing RealStar assays to multiplexed Alere® q POC system

Example:

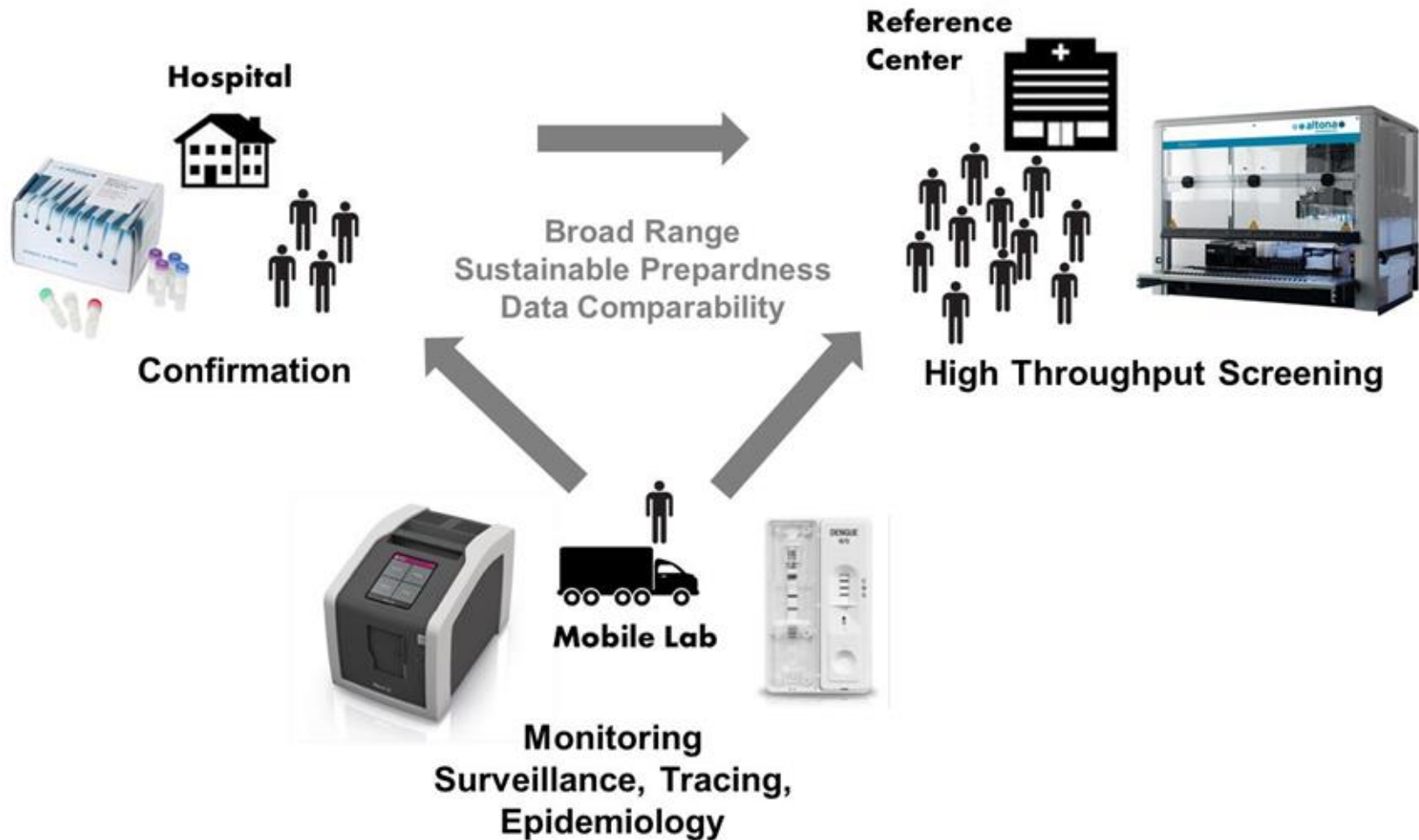


Advantage: Same controls and uniform post-market-surveillance, relatively low development risk

In case of emerging new pathogens and new genotypes parallel development of lab based and POC system.



Advantage: Faster availability of outbreak control measures on all levels.





The MOFINA Project Showcase



The goals

Develop, validate and deploy a fully integrated, POC, molecular pan-Filovirus assay based on the Integration of widely used, CE-IVD, FDA EUA, WHO EUAL altona RealStar® Filovirus assay onto the Alere® q analyzer

The partnership

- Alere Technologies (an Alere Inc. company)
- altona Diagnostics
- Bernhard Nocht Institute for Tropical Medicine (BNITM)
- Istituto Nazionale Malattie Infettive (INMI) Lazzaro Spallanzani
- Public Health England Porton Down
- The Foundation for Innovative New Diagnostics (FIND)

With support from



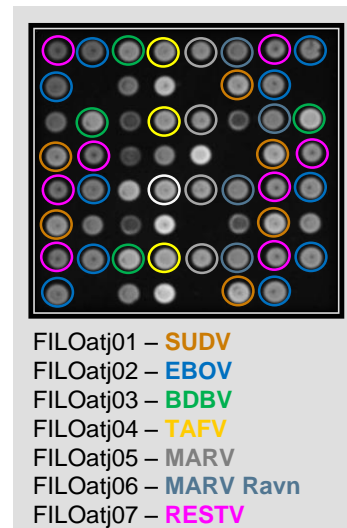
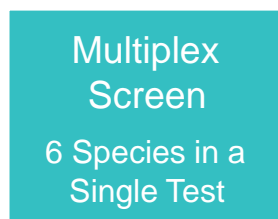


Alere q Filovirus Detect



The only POC Pan-*Filovirus* assay which **detects and discriminates all known Ebola species** and **detects both known Marburg species**

- Development, validation and clinical In-field (Sierra Leone) testing completed
- FDA EUA submission completed, CE IVD submission completed approval planed for Q2 2017



Test Report

Alere™ q Filovirus Detect

Sample ID
123456-AB

| | |
|-----------|-------------------|
| EBOV | Detected |
| SUDV | Undetected |
| TAFV | Undetected |
| BDBV | Undetected |
| RESTV | Undetected |
| MARV/RAVV | Undetected |

Result No. 123

Date / Time 2015-03-23 15:50

Cartridge ID 123456789

Operator Sam Miller

Device Serial nat-04000101

Software 0.21.5

QC

| | |
|--------------------------|------|
| Sample Detection | Pass |
| Device | Pass |
| Internal Process Control | Pass |
| Negative Control | Pass |
| Analysis | Pass |

Signature

For Investigational Use Only
The performance characteristics of
this product have not been established.

Proposed assay panels for Nucleic Acid Testing

- 1. VHF panel** mandatorily including Ebola and Marburg viruses, Lassa virus, Rift Valley fever virus, and CCHF virus
Optionally: Zika virus, dengue virus, and chikungunya virus, as well as malaria
- 2. Respiratory panel**, mandatorily including SARS-CoV, MERS-CoV
Optionally: pandemic Influenza viruses, RSV, MPV, PIV
- 3. Encephalitis panel**, mandatorily including Nipah virus
Optionally: Japanese encephalitis virus, Enterovirus species, rabies virus, herpesviruses and measles virus

The lateral flow assays:

- Malaria and dengue on market
- Zika IgM/IgG/A EUA submission completed
- Chikungunya in development.
- Other LF tests will be evaluated case by case to ensure appropriate use of RDT's within their performance specifications.



Data Management and Epidemiology

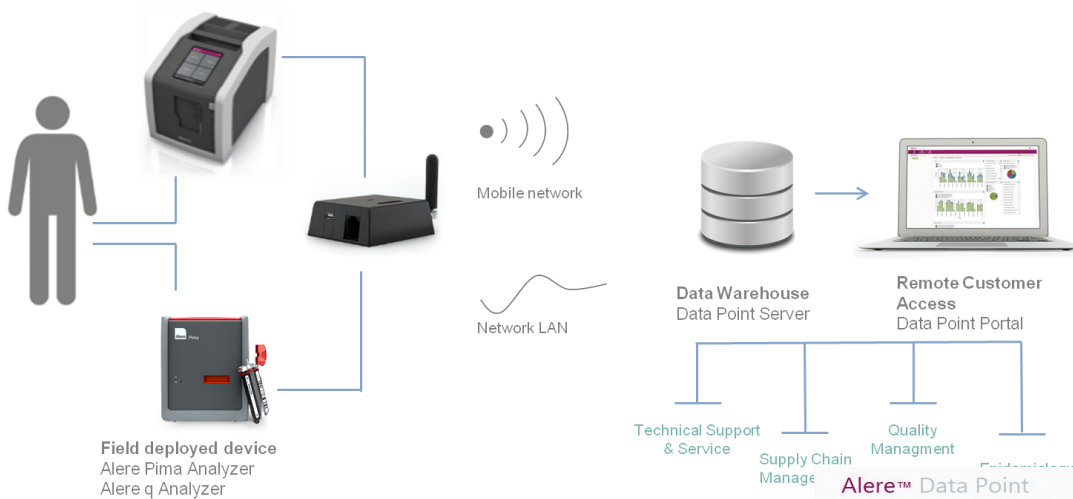


Collect Data

Transmit Data

Store Data

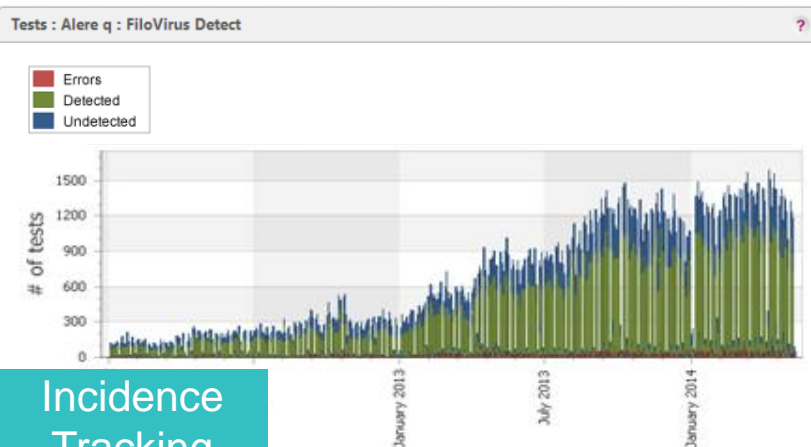
Access Data



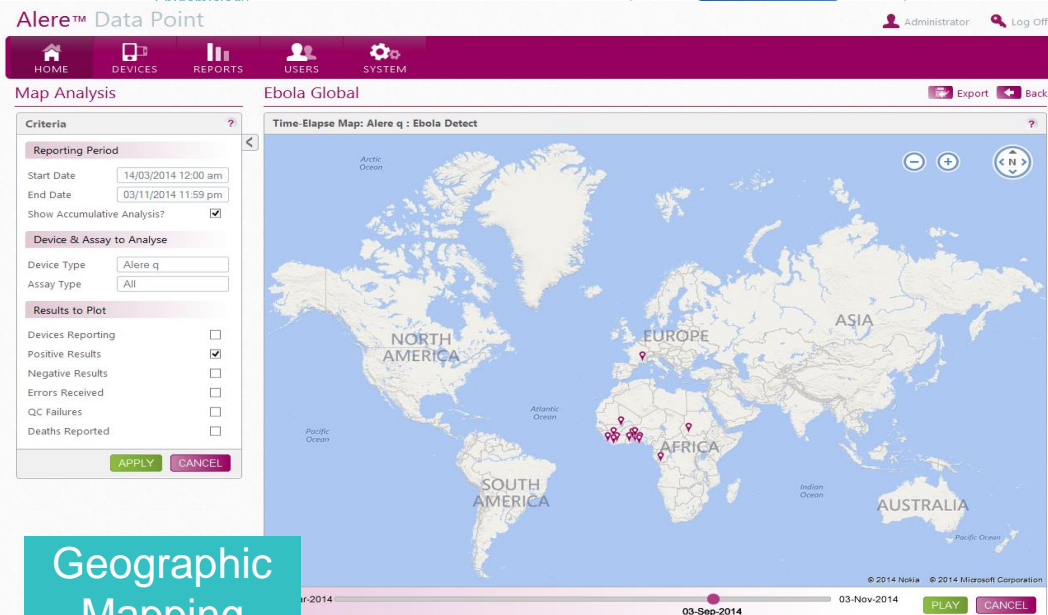
Extends quality laboratory services to decentral effectively maintaining central laboratory core

| Test Summary | | Detection by Species | |
|----------------------------|--------|----------------------------|------|
| Alere q : FiloVirus Detect | | Alere q : FiloVirus Detect | |
| Total Successful Tests | 15814 | Bundibugyo (BDBV) | 0 |
| Total Errors | 1324 | Reston (RESTV) | 0 |
| Total Detections | 10161 | Sudan (SUDV) | 387 |
| Detection (%) | 64.26% | Tai Forest (TAFV) | 0 |
| Non-Detection (%) | 27.37% | Zaire (EBOV) | 9625 |
| Errors (%) | 8.37% | Marburg (MARV) | 149 |
| | | Ravn Virus (RAVV) | 0 |

| | |
|------------------------|------------------------|
| <div></div> BDBV (0%) | <div></div> RESTV (0%) |
| <div></div> SUDV (4%) | <div></div> TAFV (0%) |
| <div></div> EBOV (95%) | <div></div> MARV (1%) |
| <div></div> RAVV (0%) | |



Incidence Tracking



Geographic Mapping

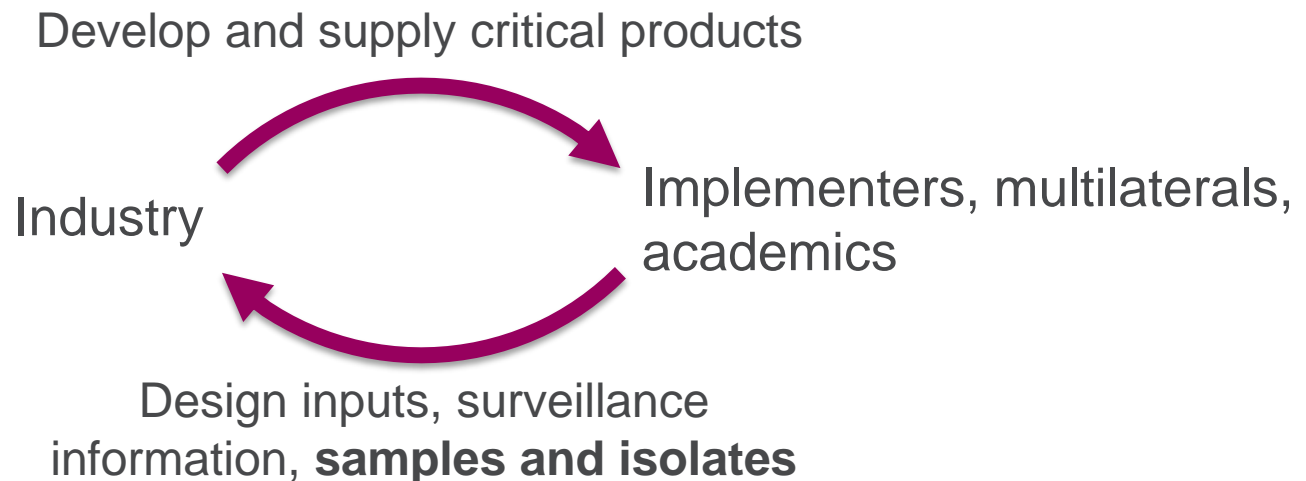


Access to isolates and clinical specimens

- Despite intentions by stakeholders to establish repositories and banks access to pathogen isolates and clinical specimens remains a major challenge for product developers

Sustainability

- Lack of current business case for potential assay makes justifying R&D spend and occupying precious R&D time very difficult
- Support in form of external financing of R&D and/or assay volume guarantees need to be explored





●● altona ●●
DIAGNOSTICS



Thank You!