Harnessing technology to address national public health surveillance needs in South Africa

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National Institute for Communicable Diseases (NICD) supports the Department of Health (DoH) with advice, resources and expertise for the prevention and control of infectious/communicable diseases
Organised in seven thematic centres and a division for surveillance and outbreak response

- Centre for Vaccines and Immunology
- Centre for Tuberculosis
- Centre for HIV and STI
- Centre for Emerging, Zoonotic and Parasitic Diseases
- Centre for Enteric Diseases
- Centre for Opportunistic, Tropical and Hospital Infections
- Centre for Respiratory Diseases and Meningitis
- **Division of Public Health, Surveillance and Response**
Communicable Diseases - Notifiable Medical Conditions (NMC)

• Notifiable Medical Conditions
  – diseases of public health importance
  – pose significant public health risks that can result in disease outbreaks or epidemics
  – have high case fatality rates both nationally and internationally.

EVERY COUNTRY MUST HAVE EFFICIENT AND ROBUST SURVEILLANCE OF NMC
World Health Organisation (WHO)  
International Health Regulations (IHR)

In the context of exponential increase in

- international travel and trade
- Emergence and re-emergence of international disease threats

- rapid detection public health risks
- prompt notification, risk assessment and verification
- timely and targeted response

PREVENT  DETECT & REPORT  RESPOND
To achieve WHO-IHR goals in South Africa NICD tasked by NDOH to

- to develop, implement and manage an integrated, efficient and real-time NMC national surveillance system
  - with the required communication channels/matrices
  - that build a national data repository for health policy, planning and practice
DISEASE OUTBREAKS!

Disease outbreak news  Source - http://www.who.int/csr/en/

- **Hepatitis E – Namibia**
  15 January 2018
- **Cholera – Tanzania**
  12 January 2018
- **Middle East respiratory syndrome coronavirus (MERS-CoV) – Malaysia**
  8 January 2018
- **Middle East respiratory syndrome coronavirus (MERS-CoV) – United Arab Emirates**
  22 December 2017
- **Outbreak of Salmonella Agona infections linked to internationally distributed infant formula – France**
  22 December 2017

**All disease outbreak news**

- Pandemic H1N1 in 2009
- Ebola in west Africa – 2014
- Malaria- ongoing
- TB – ongoing
- Measles - ongoing

South Africa - annually

- TB – 350 000 cases
- Malaria – 30 000 cases
- Listeria – nearly 1000 cases (2017)
- Measles/typhoid/meningitis/hepatitis
Maintaining a healthy community

• The only way we can control spread of infectious diseases within the population is through
  – Identification of diseased persons
  – Reporting of diseased persons to enable
    • implementation of necessary public health actions
    • ensure that the disease is not spread to other people.

Real-time efficient surveillance and reporting of NMC provides
✓ provides an early warning signal
✓ window of opportunity to interrupt the disease transmission cycle

How has MicroStrategy been instrumental in achieving the set NMC surveillance goals?
Breaking the disease cycle…
Scenario 1 - Malaria
Breaking the disease cycle... Scenario 2 - Tuberculosis

- Prevent M. tuberculosis infection
- Transmission
- Latent infection (2,000,000,000 individuals)
- Postexposure vaccination (one prepared for clinical trial)
- Pre-exposure vaccination (ten in clinical trials)
- Therapeutic vaccination (two in clinical trials)
- Prevent active tuberculosis
- Active tuberculosis (10,000,000 individuals annually)
- Death (2,000,000 individuals annually)
- Cure
Breaking the disease cycle... Scenario 3 - Ebola

Ebola virus is thought to persist in reservoir species in areas where it is endemic. Humans, apes, and other mammalian species develop severe disease and are therefore considered end hosts rather than reservoir species. Viral antibodies and RNA have been identified in three species of fruit bats from the Pteropodidae family (Mopsigalactus mephisto, Epomops franqueti, and Myonycteris). Rodents are also potential reservoirs. Reston ebolavirus has been identified in domestic pigs in the Philippines. Other species may serve as viral reservoirs. Once humans are infected, person-to-person transmission occurs after direct contact with infected bodily fluids or tissues.
New national public health surveillance using MicroStrategy

Electronic reporting platform

- Comprises
  - Mobile based APP
  - Web based APP
NMC APP functionality - Reporting

- Front end data capture screen consisting of the new NMC case notification form
- Real time date inputs from the NHLS labs and private labs
- Real time alerts for clinical and laboratory notified cases – alerts follow a matrix based on geographic location and disease notified
- Acknowledgement of each case notified including the relevant feedback and escalation channels
- Linkage of clinical and laboratory data
- Ability for NICD centres to analyse and confirm cases real-time and send out the relevant alerts with updated information
- Interoperability with other health data collection platforms
  - DHIS, ETR, EDR, EDL, PHC
NMC APP functionality - Versatility

- Data security
  - Patient level confidential data
- Financial cost to the user
  - Reverse billing
- Connectivity issues
  - offline mode
  - Data automatically loads when connectivity is available
- Accessibility of the NMC APP
  - Accessible to all on all platforms
Acknowledgements

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• DOH
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  – Provincial
  – District
  – Facilities
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• NICD
• HPCSA, SAMA, SANC, HASA, IPA, CMS, BMF
• Private hospitals and laboratories
• Behind the scenes crew
Thank you!