One Health: Addressing the Challenges of Global Health and Food Security

The Perspective of Operational Biosurveillance

James M. Wilson V, MD
Co-Founder, Executive Vice President
AscelBio
Detection *Versus* Warning
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What is “Health Security”?  

- Promotion of *resilience* and *adaptive fitness* at a local community level in the face of infectious disease hazards.
  - Attribution is not the primary concern, but rather recognition of the unusual or non-routine that may be associated with significant compromise of indigenous response capacity
  - An ability to resolve uncertainty in a timely, credible manner
  - Effective, integrated warning systems that are net-centric as opposed to hierarchical and siloed
  - Social habituation to infectious disease event forecasting and early warning
The Emergence of *Operational Biosurveillance*

- Novel analytic discipline that processes indicators of unusual infectious disease event activity to produce actionable warning
  - Signal processing
  - Signature libraries
  - Exigence sequence recognition
  - Decoding the “social behavioral DNA” of the world
  - A different operational lexicon to describe infectious disease events
    - “Crisis” and “disaster” versus “outbreak” and “epidemic”
    - Event impact scales: Infectious Disease Impact Scale (IDIS)
Timeline:

1. Apr 2nd - "strange" outbreak of acute respiratory infection, which led to bronchial pneumonia in some pediatric cases. Residents claimed that three pediatric cases, all under two years of age, died from the outbreak.

2. Apr 6th - Veratect analysts assess the source above in context with 5 additional sources and post a report online [YELLOW ARROW]; this information was available to CDC, WHO Geneva and PAHO, and several US city and state public health officials.

3. Apr 9th and again on Apr 10th - PAHO/WHO senior health intelligence analyst accesses the Veratect April 6th report.

4. Apr 16th and again on Apr 17th - emails sent to ten individuals in the CDC EOC describing an attempted SARS rule-out for "atypical pneumonia" in Reforma, Oaxaca State. Emails sent due to proximity to international airport connected to Houston by direct, non-stop air traffic [Orange Arrows]. State of California notified. State of Texas unresponsive.

5. Apr 20th - urgent phone call from ground truth partner in US public health community - received a tip the Canadians were planning to deploy to Mexico and was concerned none of the southern US states were aware of the situation; Veratect phones CDC EOC and urges immediate and full attention be applied to Mexico [Red Arrow].

6. Apr 21st - Veratect alerts the International Federation of the Red Cross; Veratect contacts PAHO and WHO/Geneva to inform them we were operationally on maximum alert - WHO/Geneva indicated they were aware and concerned about the situation.

7. Apr 22nd - Canada issues a National Advisory; Veratect alerts the US physician online social network managed by Ozmosis.com.

8. Apr 23rd - Canadian authorities and many US physicians inquire why CDC had not issued a public statement.

9. Apr 24th - Veratect alerts the UK Ministry of Health; response from the senior health intelligence officer indicates no awareness or apparent concern; Veratect activates a Twitter feed to enable more rapid updating of information until WHO and CDC were able to come up to date with their public reporting. **WHO and CDC issue the first public release on Mexico.**
HEAS: Involvement in Attribution of Cholera

- Day -1 (Oct 19): First known cases of cholera appear in Artibonite
- Day 3: DOD alerts CDC of suspicious epidemiological patterns, requests genomic analysis
- Day 6: HEAS’ Haitian analysts forward Kreyol Twitter reports of local awareness of attribution question; Embassy/DOS, NSC, other elements of USG, CDC, DHS, WH notified-concern about triggering civil unrest with implications for UN peacekeeping operations
- Day 9: awareness of PFGE results
- Day 25: Cap Haitien medical response grid collapses
- Day 26: Incendiary rioting in Cap Haitien v. UN; response in the region halted
- Later… HEAS team nearly killed deep in the Sud Est Mountains… locals believed the blan were in the countryside poisoning their water supply
Alert, Verification, Response Cycles (AVRCs)
The Future on The Cutting Edge

1. Like meteorology 40 years ago, a rapidly emerging market for young analysts in *operational biosurveillance*

2. The chance to do good for the world, save lives, and contribute significantly to global security

3. Extremely rewarding work