

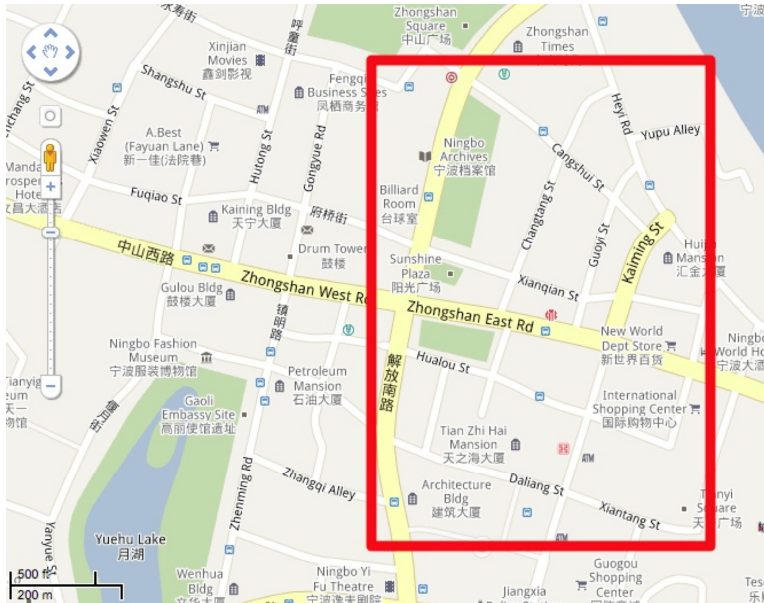


# One Health: Addressing the Challenges of Global Health and Food Security

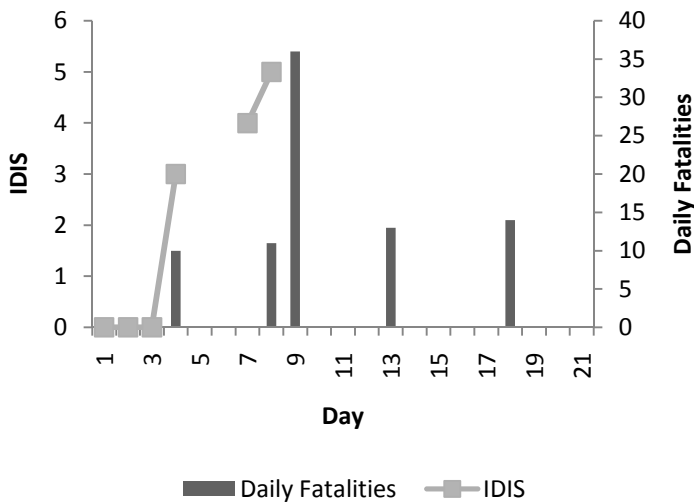
## The Perspective of Operational Biosurveillance

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# Detection Versus Warning



Address	Street	Total Number of Residents at Address	Number of Suspect Cases at Address	Number of Fatal Cases at Address	Mortality	Notes
248	Zhongshandong Rd.	4	1	1	100%	
250	Zhongshandong Rd.	10	0	0	n/a	
252	Zhongshandong Rd.	12	2	2	100%	
254	Zhongshandong Rd.	10	0	0	n/a	
256	Zhongshandong Rd.	4	3	3	100%	
258	Zhongshandong Rd.	4	1	1	100%	
260	Zhongshandong Rd.	10	10	9	90%	Entire family infected
262	Zhongshandong Rd.	11	2	2	100%	
264	Zhongshandong Rd.	8	4	3	75%	
216	Zhongshandong Rd.	20	6	5	83%	
268	Zhongshandong Rd.	7	2	2	100%	
64	Kaiming St.	5	2	2	100%	
66	Kaiming St.	5	5	5	100%	
68	Kaiming St.	2	2	2	100%	Entire family died
70	Kaiming St.	4	4	4	100%	Entire family died
72	Kaiming St.	5	1	1	100%	
74	Kaiming St.	1	1	1	100%	
76	Kaiming St.	2	2	2	100%	Entire family died
78	Kaiming St.	2	0	0	n/a	
80	Kaiming St.	3	0	0	n/a	
82	Kaiming St.	4	2		unknown	
128	Donghou St.	3	1	1	100%	
130	Donghou St.	9	2	2	100%	
133	Donghou St.	6	6	4	67%	Entire family infected
134	Donghou St.	3	3	3	100%	Entire family died
136	Donghou St.	6	6	6	100%	Entire family died
138	Donghou St.	None			n/a	
140	Donghou St.	2	1	1	100%	
142-Jia	Donghou St.	3	3	3	100%	Entire family died
142-Yi	Donghou St.	5	5	5	100%	Entire family died
142-Bing	Donghou St.	3	3	2	67%	Entire family infected
<b>Total</b>		<b>173</b>	<b>78</b>	<b>74</b>	<b>95%</b>	<b>82 Kaiming entry excluded</b>



# Detection *Versus* Warning

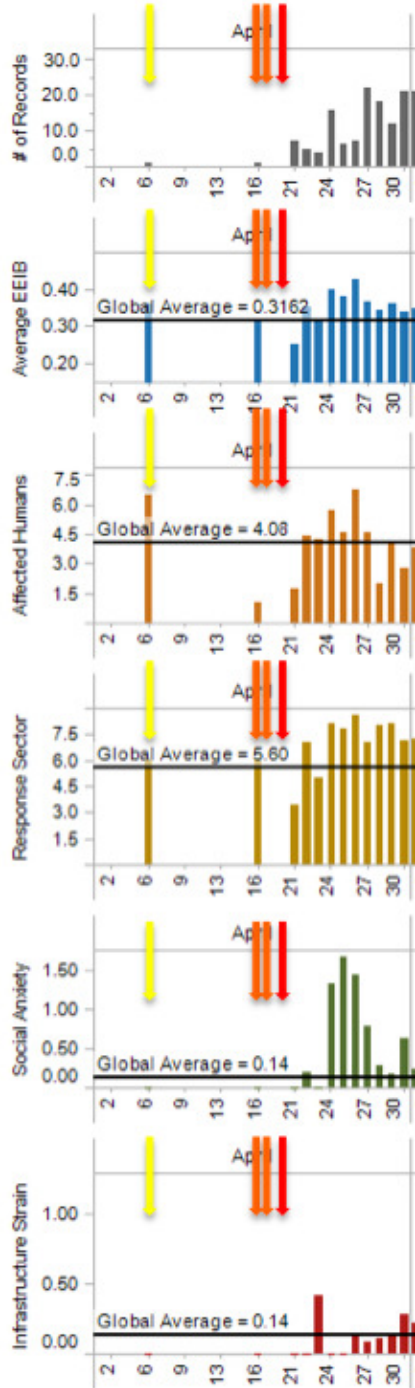


# What is “Health Security”?

- 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)



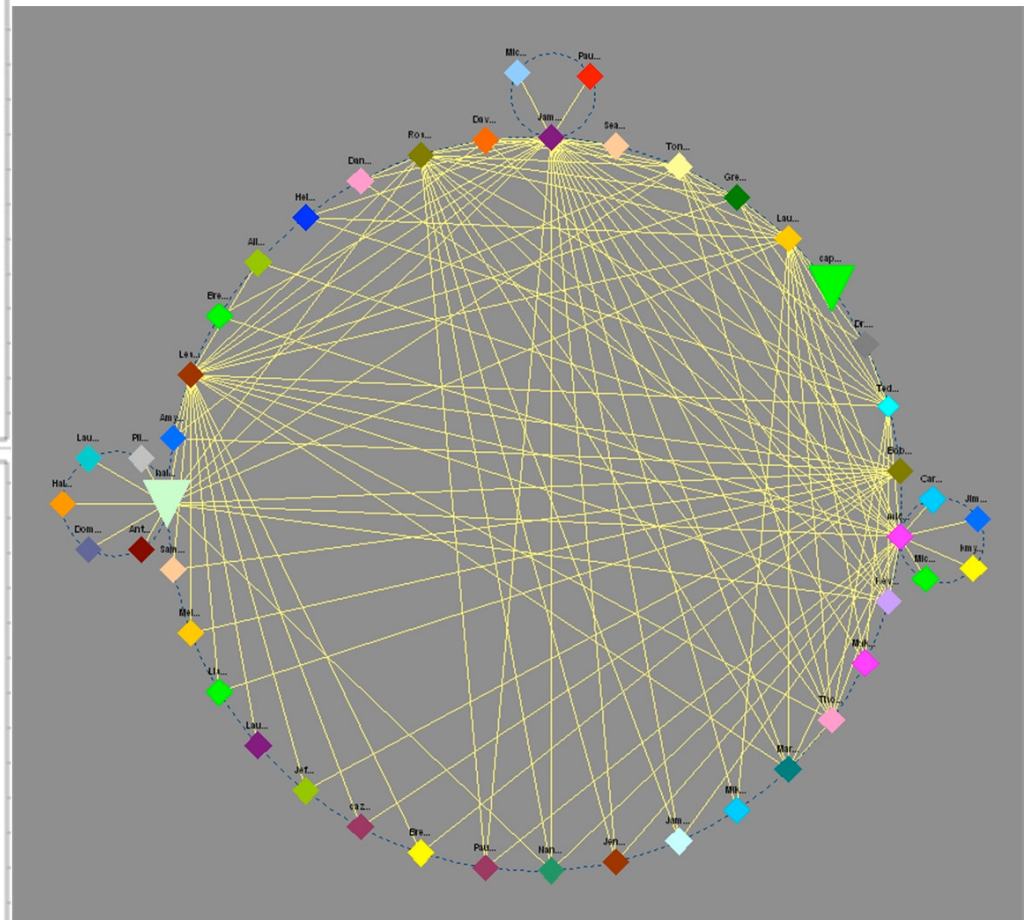
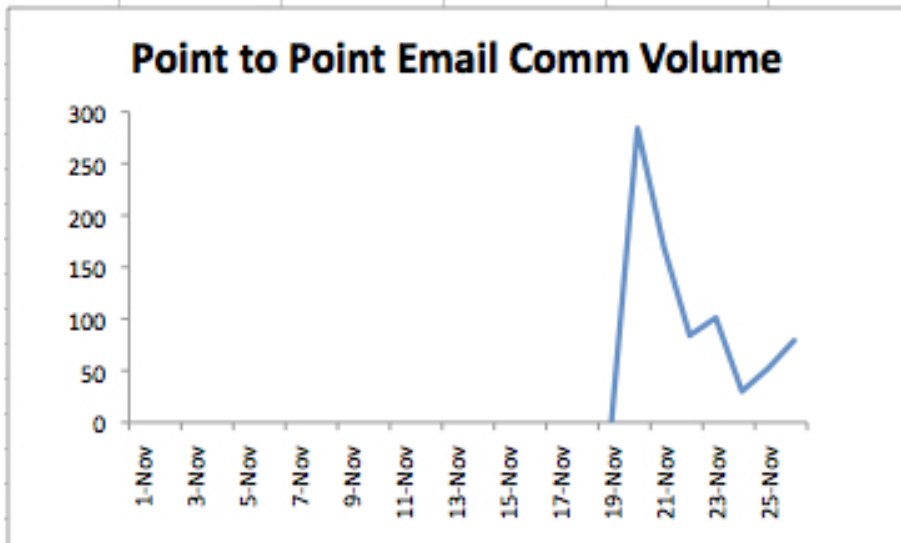
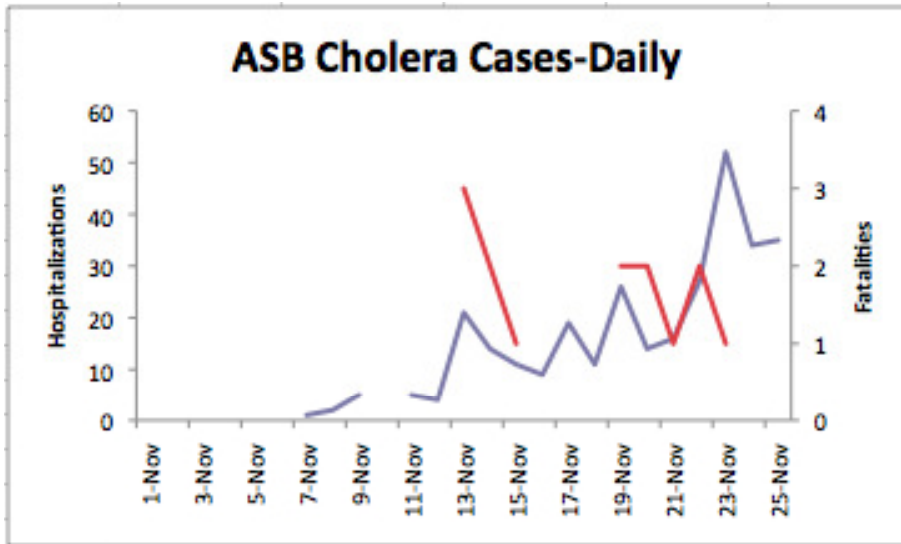
Timeline:

1. Apr 2<sup>nd</sup>- "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 6<sup>th</sup>- 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 9<sup>th</sup> and again on Apr 10<sup>th</sup>- PAHO/WHO senior health intelligence analyst accesses the Veratect April 6<sup>th</sup> report
4. Apr 16<sup>th</sup> and again on Apr 17<sup>th</sup>- 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 20<sup>th</sup>- 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 21<sup>st</sup>- 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 22<sup>nd</sup>- Canada issues a National Advisory; Veratect alerts the US physician online social network managed by Ozmosis.com
8. Apr 23<sup>rd</sup>- Canadian authorities and many US physicians inquire why CDC had not issued a public statement
9. Apr 24<sup>th</sup>- 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