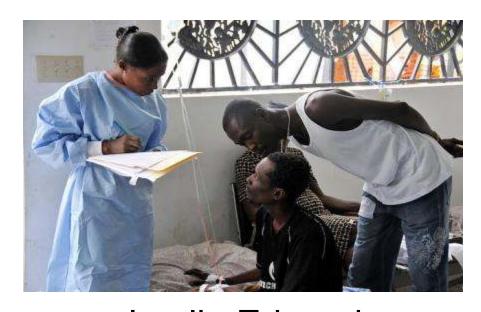# Surveillance Systems for Diarrhoeal Disease and Cholera

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14 Steps in Cholera Investigations*

- <mark>Detection</mark>
- <mark>Confirmation</mark>
- Response
- Information
- Treatment
- Mortality
- Hygiene
- Community
- Water

- Food
- Sanitation
- Funeral
- <mark>Surveillance</mark>
- Partners

Outbreak Detection

- First cases could be reported by any one of the following
  - Surveillance system
  - "Hot tip" in newspaper, on television
  - Information sources (local MD, RN, ICP)
- Ensure communication channels for reporting cases are well established

Outbreak Detection

- First case(s) may present as
  - A local clinician from your country who traveled to an endemic area to help care for patients
  - Persons from an endemic area with recent travel to and from your country
  - Local person who recently had family visit from an endemic area

Outbreak Detection

- Take measures to rapidly identify and diagnose suspected cases
- Depending on the level of water sanitation in your country, any delay in detection of the first cholera cases could result in a much larger group of persons exposed and/or ill

Outbreak Confirmation

- First cholera cases (or suspect cases) may be
  - Laboratory confirmed
  - Meet clinical case definition only
  - Epidemiologically linked to a person who meets the clinical case definition

WHO Case Definition: Suspect Cholera Case

- In areas where there is no endemic cholera, a suspect case is a patient aged > 5 years with severe dehydration or dies due to acute watery diarrhoea

- In areas where there is a cholera epidemic, a patients aged > 5 years with acute water diarrhoea with or without vomiting
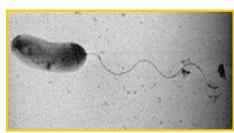
WHO Case Definition: Confirmed Cholera Case

- A case is confirmed when *Vibrio cholerae* 01 or 0139 is isolated from any patient with diarrhoea.

- <u>Note</u>: Case definitions should be
  - Standardized within the region
  - Publicized with clinicians (worry that 1 person's suspect case = rice water stool while another = vomiting alone in a traveler from an area with endemic cholera transmission)

Other Surveillance Points to Consider

- What system is in place to immediately report suspected cases from health facilities to the MOH?

- How will deaths due to acute gastroenteritis be reported to the MOH?
  - Question: is this currently reported?
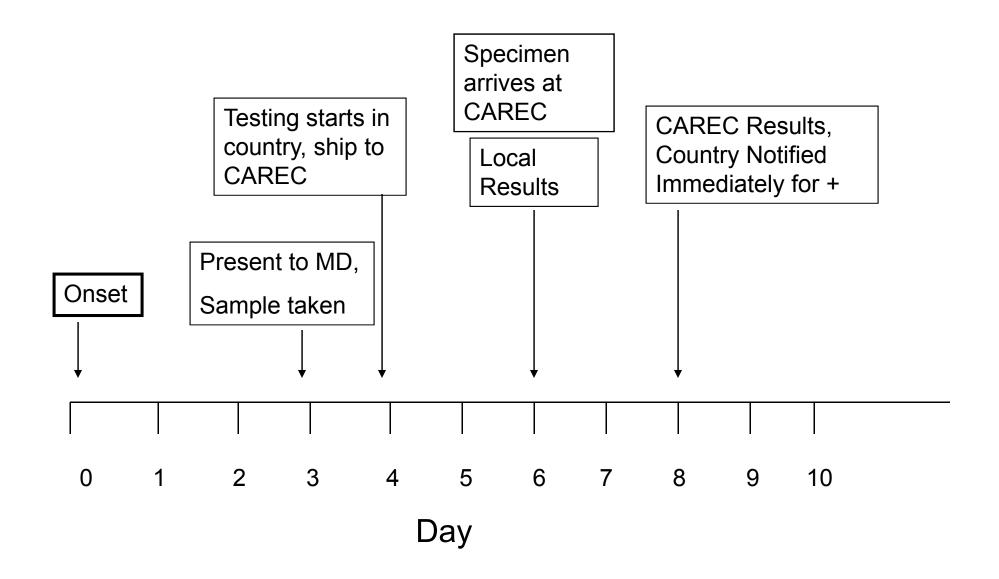 - Timeliness of reports

Laboratory Confirmation

- Treatment of dehydrated persons should not be delayed until laboratory testing of samples has been completed

- Microbiological confirmation of *V. cholerae* by direct observation cannot be done immediately

- It takes ~2 days to get culture results once the sample has reached CAREC

Laboratory Testing Timeline

Specimen arrives at CAREC

Testing starts in country, ship to CAREC

CAREC Results, Country Notified Immediately for +

Local Results

Present to MD, Sample taken

Onset

0   1   2   3   4   5   6   7   8   9   10

Day

Laboratory Confirmation

- The reasons to culture confirm cases (for most settings, particularly the Caribbean) are….
  - To identify the serogroup of *Vibrio*
  - To monitor the antibiotic sensitivity patterns in order to better guide treatment

Number of Specimens Required

- <u>Before an outbreak has been confirmed</u>
  - Must confirm the first 10-20 cases in order to ascertain that you do have a cholera outbreak
- <u>During the outbreak</u>
  - Not necessary to take a sample from every patient with acute diarrhoea once the outbreak is confirmed
  - Importantly to continue to take some samples randomly during the outbreak to make sure that the sensitivity has not changed over the course of the outbreak

Number of Specimens Required

- At the end of the outbreak
  - Collection of stool samples from about 20 suspect cases is necessary to confirm the end of an outbreak
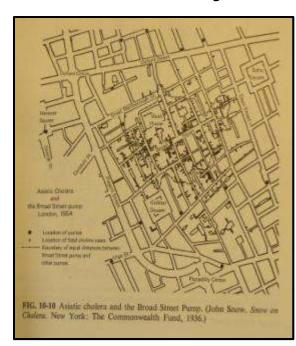
Surveillance

- To be better prepared, review epidemiology of prior outbreaks in order to have some clues as to what can happen in your setting
  - Example: large number of cases in Venezuela and other locations following a wedding in DOR in December 2010
  - Example: in 1990s Andean region outbreaks, increase in cases over Easter period due to increased travel and mass gatherings

Surveillance

- For suspect and/or confirmed cases, review data according to person, place, and time

- Person - # cases per age group

- Place – look at spot map of residence of cases

- Time – plot cases by week to identify if trend is increasing or decreasing
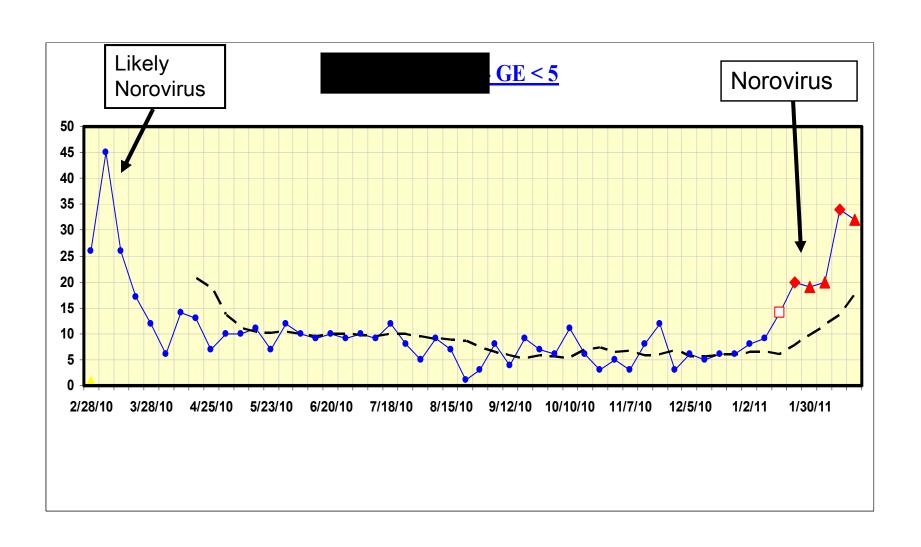
Surveillance

- Examine number of cases and deaths by
  - Area
  - Time period
  - Population subgroups
- Calculate attack rates
  - AR = # cases/population
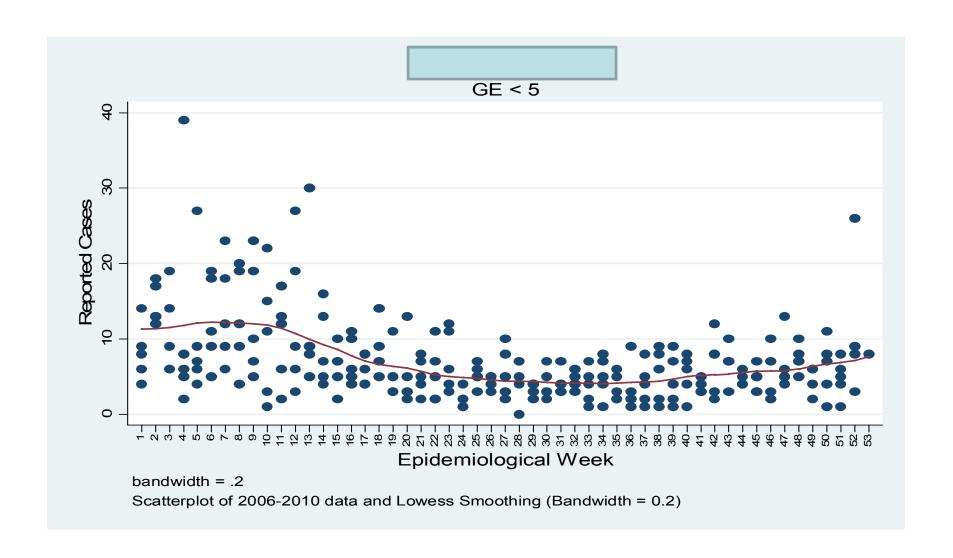- Calculate case fatality rates
  - CFR = # case DEATHS/# cases

FIG. 10-10 Asiatic cholera and the Broad Street Pump. (John Snow, *Snow on Cholera*. New York: The Commonwealth Fund, 1936.)

Syndromic Surveillance

- Health facilities report the # of people with syndromes each week (most countries have 5-10 sites)
  - Gastroenteritis (by age)
  - Fever & Respiratory (by age)
  - Undifferentiated Fever (by age)
  - Fever & Haemorrhagic
  - Fever & Neurologic
- Note increase or decrease each week for each country
- Trend analysis

Syndromic Surveillance

GE < 5

GE < 5

bandwidth = .2

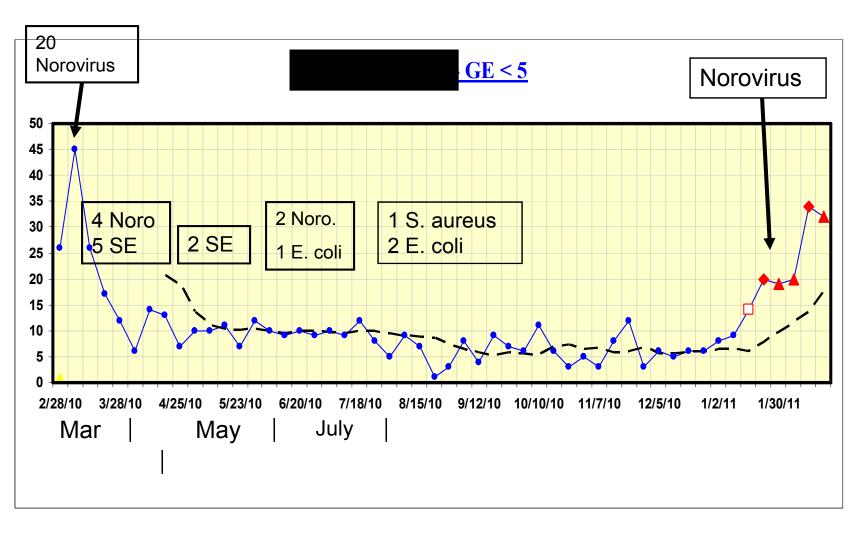Scatterplot of 2006-2010 data and Lowess Smoothing (Bandwidth = 0.2)

Routine Laboratory Sampling

- Recommend to get 6 samples per week (at least) for the most common syndromes
  - Gastroenteritis (stool)
  - Fever & Respiratory (sputum)
  - Undifferentiated Fever (serology)

- *Question: Why is this recommended?*

- *Question: After the lab confirmations, what next?*

Laboratory Sampling: Answers

- Test >6 stools per week in order to help identify what organisms are circulating in the community.

- Findings will help guide disease control efforts (very different actions to take for v. cholera vs. norovirus vs. salmonella)

Ideal Laboratory Sampling: Data Review

Final Thoughts

- Current syndromic surveillance system yields important information – data should be monitored closely with enhancements
  - Publicize cholera case definitions to clinicians
  - Request immediate notification to Health Department for all suspect cholera cases
  - Consult background syndromic surveillance data (CAREC Epidemiologists can assist) to identify expected number of cases
  - Consult with CAREC Laboratory to confirm initial cases

Thank you