Did Advances in Global Surveillance and Notification Systems Make a Difference in the 2009-H1N1 Pandemic?

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Objectives

- Identify strengths and weaknesses of the global disease surveillance and notification system in order to improve its performance in the future
  - whether and how advances in global surveillance and notification systems put in place in the last decade made a difference in the public health response to the spring 2009-H1N1 pandemic
  - identify the policy implications

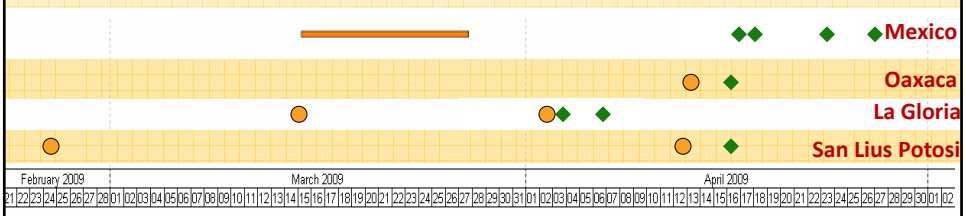
Surveillance vs. notification

- Disease surveillance systems
  - Traditional case reporting
  - Laboratory analysis
  - Syndromic surveillance
- “Notification systems”
  - IHR
  - GPHIN, ProMed
  - HealthMap, Argus, Veratect

Mexico

St. Louis Potosi (SLP)
- 2/24: Patient Zero
- 4/12: 39 y.o. woman dies of viral pneumonia
- 4/16: WHO notified of atypical pneumonia

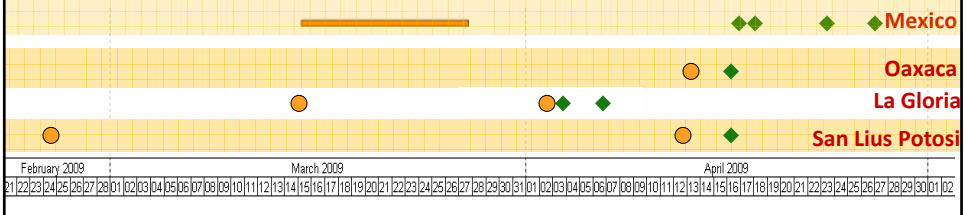
La Gloria
- 3/15: First La Gloria case – outbreak attributed to pig farm
- 4/2: Child severely ill
- 4/3: Samples sent for testing
- 4/6: Alert issued



Mexico

Oaxaca
- 4/13: First H1N1 death

National
- 4/1: Excess flu cases in March noted in IMSS data
- *10/1/08 – 5/31/09: Respiratory disease reports in Argus*
- 4/17: Enhanced surveillance, samples sent to Canada
- 4/18: Samples sent to U.S.
- 4/24: Confirms outbreak, implements control strategy
- 4/27: 7 deaths confirmed

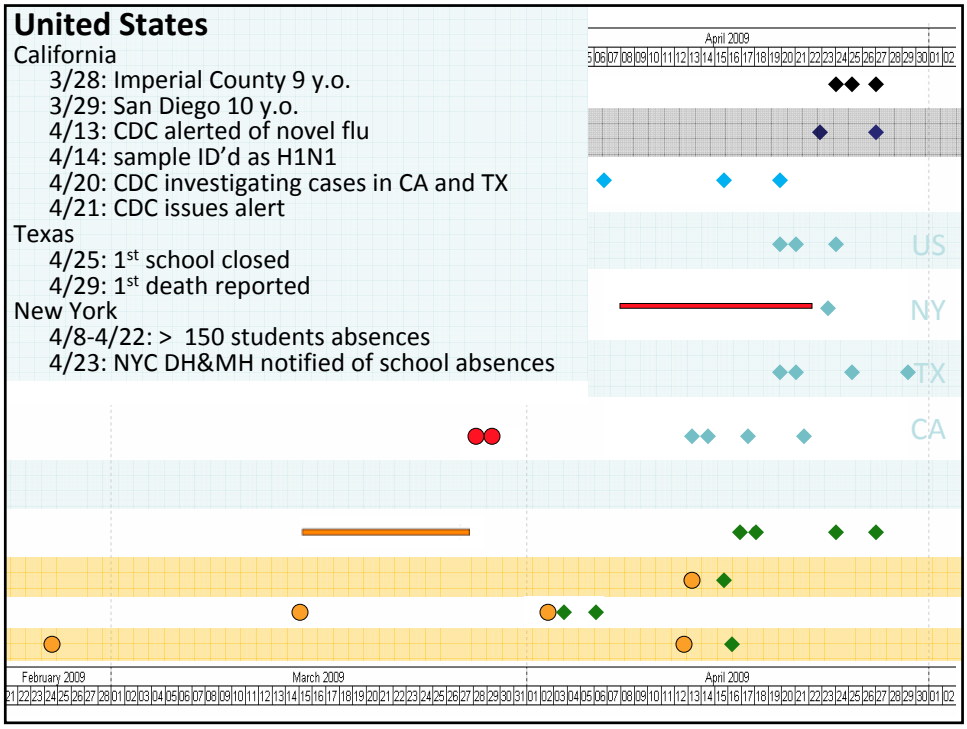


United States

California
- 3/28: Imperial County 9 y.o.
- 3/29: San Diego 10 y.o.
- 4/13: CDC alerted of novel flu
- 4/14: sample ID'd as H1N1
- 4/20: CDC investigating cases in CA and TX
- 4/21: CDC issues alert

Texas
- 4/25: 1st school closed
- 4/29: 1st death reported

New York
- 4/8-4/22: > 150 students absences
- 4/23: NYC DH&MH notified of school absences

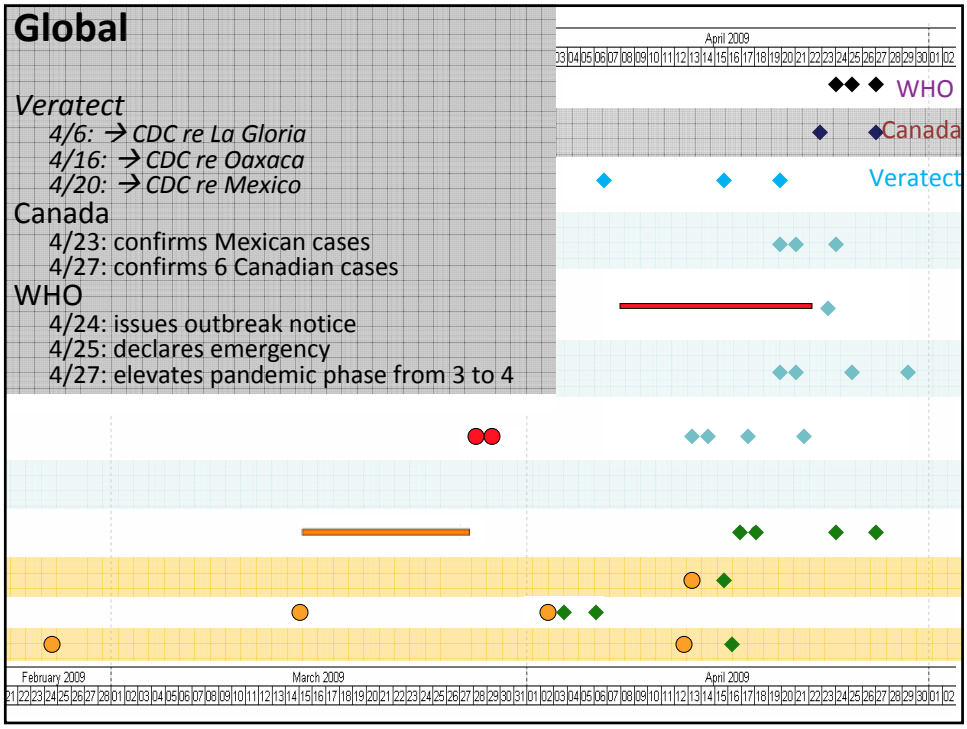


Global

Veratect
- *4/6: → CDC re La Gloria*
- *4/16: → CDC re Oaxaca*
- *4/20: → CDC re Mexico*

Canada
- 4/23: confirms Mexican cases
- 4/27: confirms 6 Canadian cases

WHO
- 4/24: issues outbreak notice
- 4/25: declares emergency
- 4/27: elevates pandemic phase from 3 to 4

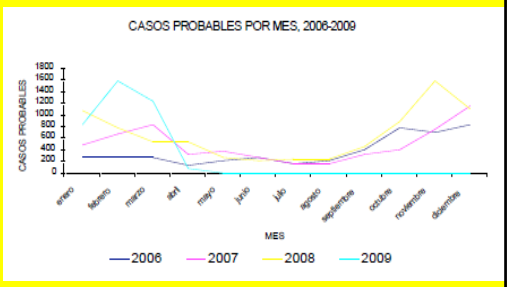


Disease surveillance

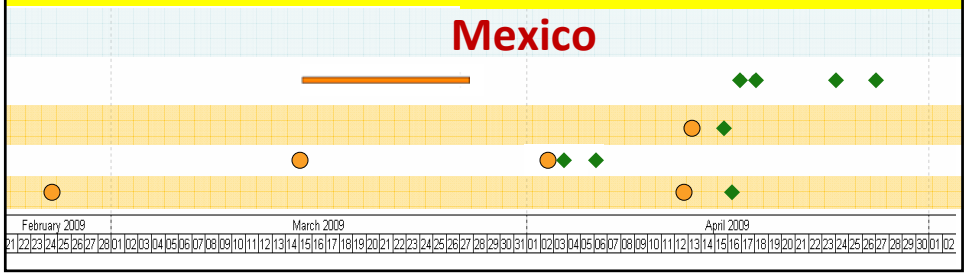
LaGloria observed in late March by traditional methods
- Atypical ages and deaths but differences across Mexican sites

Laboratory capacity
- California cases in mid-April
- Confirmation of Mexican cases in mid-April

Excess flu cases observed in IMSS data in early April
- Syndromic surveillance?

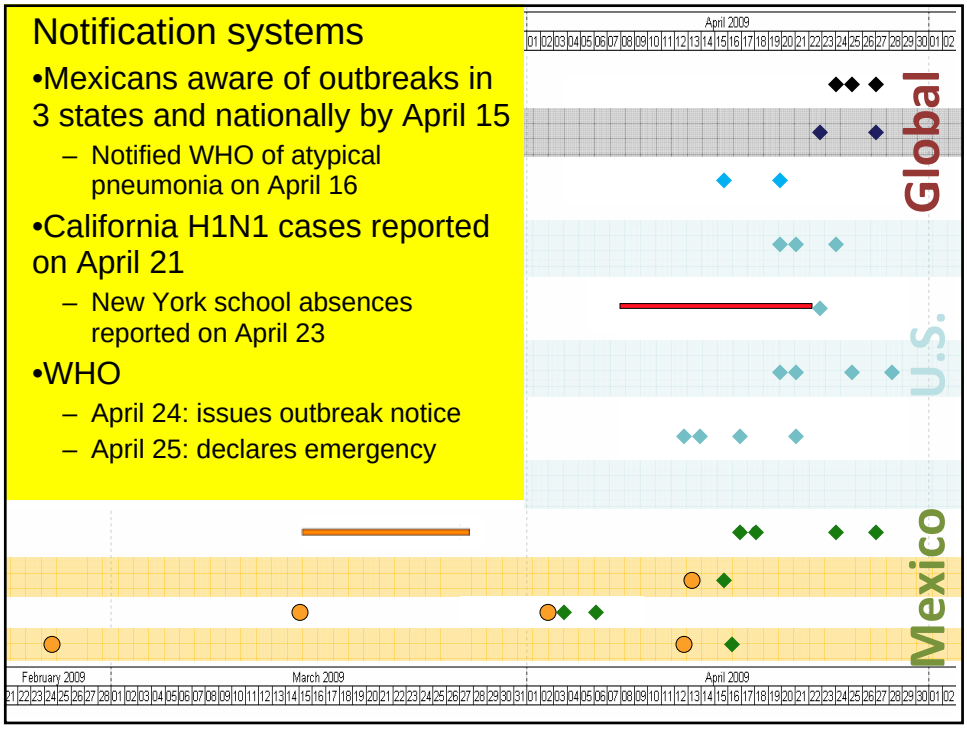


Sistema de vigilancia epidemiologica de influenza (SISVEFLU)



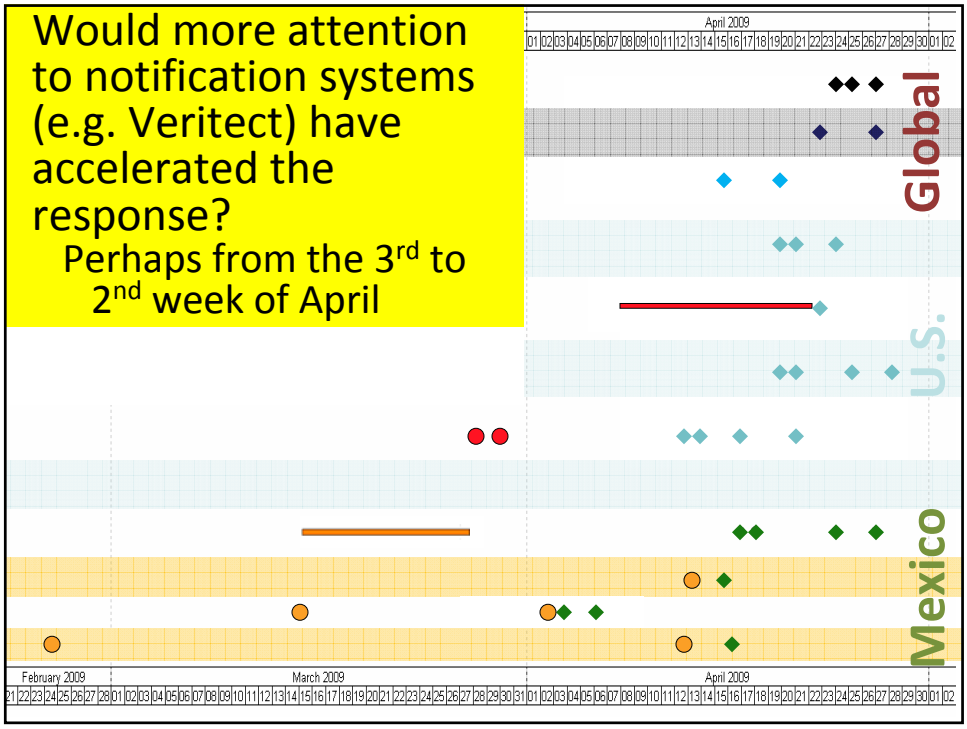
Notification systems

- Mexicans aware of outbreaks in 3 states and nationally by April 15
  - Notified WHO of atypical pneumonia on April 16
- California H1N1 cases reported on April 21
  - New York school absences reported on April 23
- WHO
  - April 24: issues outbreak notice
  - April 25: declares emergency



Would more attention to notification systems (e.g. Veritect) have accelerated the response?

Perhaps from the 3rd to 2nd week of April



Conclusions

- Enhanced surveillance and laboratory capacity led to earlier identification and characterization of 2009 H1N1
  - Navy lab in Southern California
  - Mexico-Canada-US lab network
  - Traditional surveillance in Mexico
- Earlier characterization of viral strain → quicker development of vaccine
- Syndromic surveillance
  - US: too few insufficiently differentiated cases during normal flu season
  - Mexican IMSS data (?)
  - Situational awareness (?)

Conclusions

- Notification systems led public health officials to take local epidemiologic signals more seriously
  - Connect Mexican outbreak with U.S. cases (?)
  - Close schools in New York City
  - Perhaps report to WHO sooner, knowing that someone else will if they don't
- Would more attention to notification systems (e.g. Veritech) have accelerated the response?
  - Perhaps from the 3rd to 2nd week of April
    - Beware 20/20 hindsight!
  - Outbreak had already spread globally

Conclusions

- Other issues
  - Severity ("how bad is it?") is multidimensional
  - Changing and variable case definitions and ascertainment depending on
    - Patient decisions to seek care
    - Physician decisions to test samples
    - Media and official recommendations
  - Are children really at "higher risk"?
- Challenges of early detection and characterization in the "fog of war"
  - Outbreak of new pathogen intrinsically characterized by uncertainty that takes weeks to months to resolve
  - Expect uncertainty