

## H2N2 influenza –vintage 1957

...an old story or relevant history?

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*Note: this presentation is largely based on one I made at the Institute of Medicine, June 2009. A history of the 1957 pandemic was available on the Center web site beginning in late July.*

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## To set the stage – influenza from 1918

- 1918 pandemic – an H1N1 strain
- H1N1 “seasonal” epidemics occurred every 2 to 3 years up to 1957
  - Weekly reports of pneumonia and influenza deaths from 108 cities (~30% of population)  
(Monitored by National Office of Vital Statistics)
  - Responsible agent - “drifted” genetic strains of H1N1 (plus occasional influenza B strains)

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## CDC –as it was in 1957

- Epidemiology Branch
  - Housed in a small downtown office building with other CDC office staff
  - Alex Langmuir, chief of the branch
  - Staffed primarily by young PHS staff serving 2 years of required uniformed service duty
  - CDC national surveillance, before 1955 Cutter polio vaccine accident – malaria, leprosy, diphtheria

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## Pandemic influenza emerges

- February, 1957 – first reports of pandemic flu
  - Specimens sent to U.S.; H2N2 confirmed in April
    - Vaccine production begins
  - April-June – epidemic spreads across Asia, Europe
  - June – outbreaks in military bases on U.S. coasts
    - Attack rates of 30% to 50% or more
  - Summer – major outbreaks in camps, institutions but little community-wide spread
  - H1N1 strains vanish

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## Challenges of the first pandemic in 40 years

- Questions to be answered
  - When might epidemics begin (September or December)
  - Attack rates in the community, hospitals, industry
  - Rapidity of spread
  - Severity of disease, especially in older age groups
  - Methods for treatment
- What preventive measures should be taken
  - Vaccine production and use
  - Isolation and quarantine policies
  - Closure of schools and industry
  - Cancellation or postponement of events

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## An influenza surveillance unit is created

- June, 1957 – a new influenza surveillance unit
- Strategy
  - Investigation of summer outbreaks— CDC and state
  - Data base for rapidity and extent of spread
    - Weekly deaths due to pneumonia and influenza
    - Report of dates of beginning epidemics by county
    - National health survey data
    - Industrial absentee data
  - Surveillance reports started—published twice weekly

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## Early provisional findings

- By August, a number of observations important to strategic planning
  - Clinically, the disease was far less severe than in 1918
  - Attack rates were high – perhaps 30 to 40% in some communities
  - High absentee rates were common in schools but short-lived
  - Spread was so rapid that little could be achieved by isolation or quarantine procedures
  - It seemed likely that epidemics might begin in September, long before the usual December onset of influenza epidemics
  - Substantial vaccine would not be available until October

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Influenza Outbreaks in 1957: August



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## State Health Directors policy meeting

August 27-28, 1957

### Three important aspects in epidemic planning

- Prevention -- in the absence of means to stop the spread of infection, this implies immunization
- Care of patients and families
  - Medical care at home or hospital
  - Homemaking and feeding programs where needed
- Avoidance of serious disruption of essential services
  - Public safety, public utilities, transportation, health care

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## Outbreak assumptions

- Pandemic planning premises:
  - Proportion of population ill: 25 – 30%
  - Duration of outbreak in an area: 8 weeks
  - Average duration of illness: 10 days
- Maximum % ill on any given day due to influenza would be ~10%

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## State Health Directors policy meeting

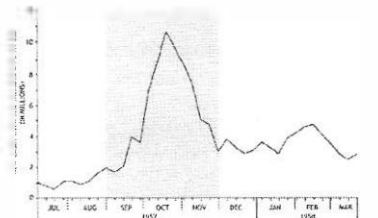
August 27-28, 1957

### Recommendations:

- That the opening of schools and the holding of public gatherings not be delayed or curtailed on the basis of prevention and control of Asian influenza.
- In some instances there may be administrative reasons for closing schools due to illness of teachers, bus drivers, large absentee rates

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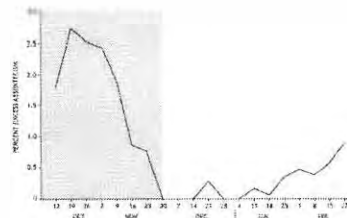
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Respiratory illnesses (febrile and 1+ days in bed)  
National Health Survey — July 1957–March 1958

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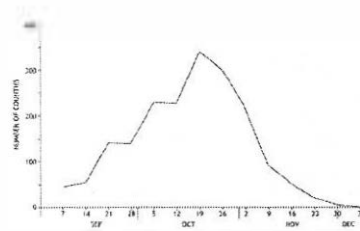
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Excess industrial absenteeism  
60,000 AT&T employees in 37 major cities

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Influenza by week of onset in counties  
Sep–Dec 1957

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Influenza Outbreaks in 1957: September 14



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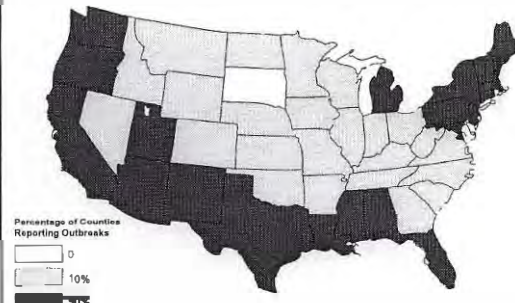
Influenza Outbreaks in 1957: September 28



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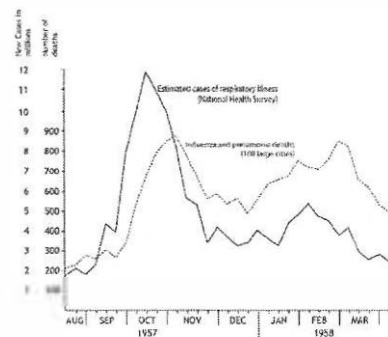
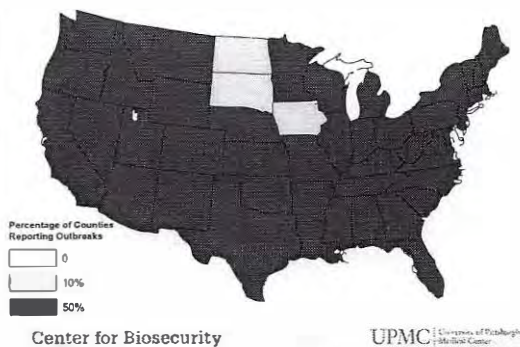
Influenza Outbreaks in 1957: October 12



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### Influenza Outbreaks in 1957: October 26



### Excess deaths

|              | Oct-Dec 1957 | Jan-Mar 1958 | Total   | Jan-Mar 1960 |
|--------------|--------------|--------------|---------|--------------|
| Flu-Pneumo.  | 12,100       | 6,000        | 18,100  | 10,600       |
| Cardio-renal | 18,700       | 13,000       | 31,700  | 12,200       |
| All other    | 8,500        | 1,000        | 9,500   | 3,900        |
|              | 39,300       | 20,000       | 59,300* | 26,700       |

\*60% over 60

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### Mortality Characteristics of Type A Influenza Epidemics, United States, 1937-1963

| Period of Excess Mortality | Number of Excess Deaths |            |
|----------------------------|-------------------------|------------|
|                            | Pneumonia and Influenza | All Causes |
| Dec 1943-Jan 1944          | 21,000                  | 53,000     |
| Mar-Apr 1947               | 4,300                   | 13,000     |
| Mar-Apr 1950               | 3,200                   | 11,000     |
| Feb-Apr 1951               | 4,000                   | 15,000     |
| Jan-Mar 1958               | 10,000                  | 30,000     |
| Oct 1957-Mar 1958          | 18,000                  | 52,000     |
| Mar-Apr 1960               | 1,500                   | 4,100      |
| Jan-Mar 1960               | 12,000                  | 27,000     |
| Feb-Apr 1963               | 12,100                  | 57,000     |

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### The contribution of vaccine -1957

- May 13 – Specimen received from Hong Kong
  - May 22 – Definitive identification of new strain
  - July 7– Tests of vaccine began: 700 subjects
- Vaccine production – 6 licensed manufacturers
- Sept. 4 – First shipment of 2.3 million doses
  - End Sept – 9.4 million doses
  - End Oct – 29.0 \* (17% of population)
  - End Nov – 44.0 \* (26% of population)

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### Economic impact

- CBO Report--2008
  - 1957/68 outbreaks reduced GDP by about 1%
  - The result of a 2009 outbreak might not differ from normal variations in economic activity
- Finance Canada–
  - Absenteeism rose to 3.8% in peak month
  - Industrial production was 1.2% below trend
  - GDP impact in 2009 might be .08%
  - Conclusion: small economic impact

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## Overall impact on the population

- Regarded by most as a minor event
  - Clinics were crowded and hospitals stressed
  - Autumn pandemic lasted about 90 days; in communities, 60 days or less
  - New York Times day-by-day review – few articles except on the sports pages
  - Pittsburgh Medical Center and Hopkins Hospital records are remarkably silent
  - Responsible CDC surveillance staff recall the period as generally quiet
  - Major disruption – the football schedules

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## A final word

"...the most immediate and largest economic impact of a pandemic might arise not from death or sickness but from the uncoordinated efforts of people to avoid becoming infected...disruption and costs caused by emergency public measures such as quarantines and restrictions on domestic and international travel and trade..."

Milan Bahmhatt, World Bank—June 29, 2006  
1st International Conference on Avian Influenza in Humans

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## 1918 Economic impact

- A major recession did not occur
- Oct. retail sales declined but rebounded in Nov.
- Economic impact was modest ~5%
- Sectoral failures did not occur
- "A hit and run epidemic that produced only a brief slow down"

R. Hatchett, October 17 2006

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## Time scale – 1957 and 2009

|                    | 1957                                            | 2009                    |
|--------------------|-------------------------------------------------|-------------------------|
| 1st cases detected | April in Hong Kong                              | April in Mexico         |
| April cases        | Western Pacific                                 | Mexico, U.S.            |
| May cases          | Scattered through Asia and Europe; coastal U.S. | Mexico, U.S. world wide |
| Summer:            |                                                 |                         |
| Epidemics          | Southern Hemisphere                             | Southern Hemisphere.    |
| Sporadic outbreaks | U.S., Europe                                    | U.S., Europe            |
| September-October  | Major outbreaks                                 |                         |

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