What Would a Modern-Day Flu Pandemic Look Like?

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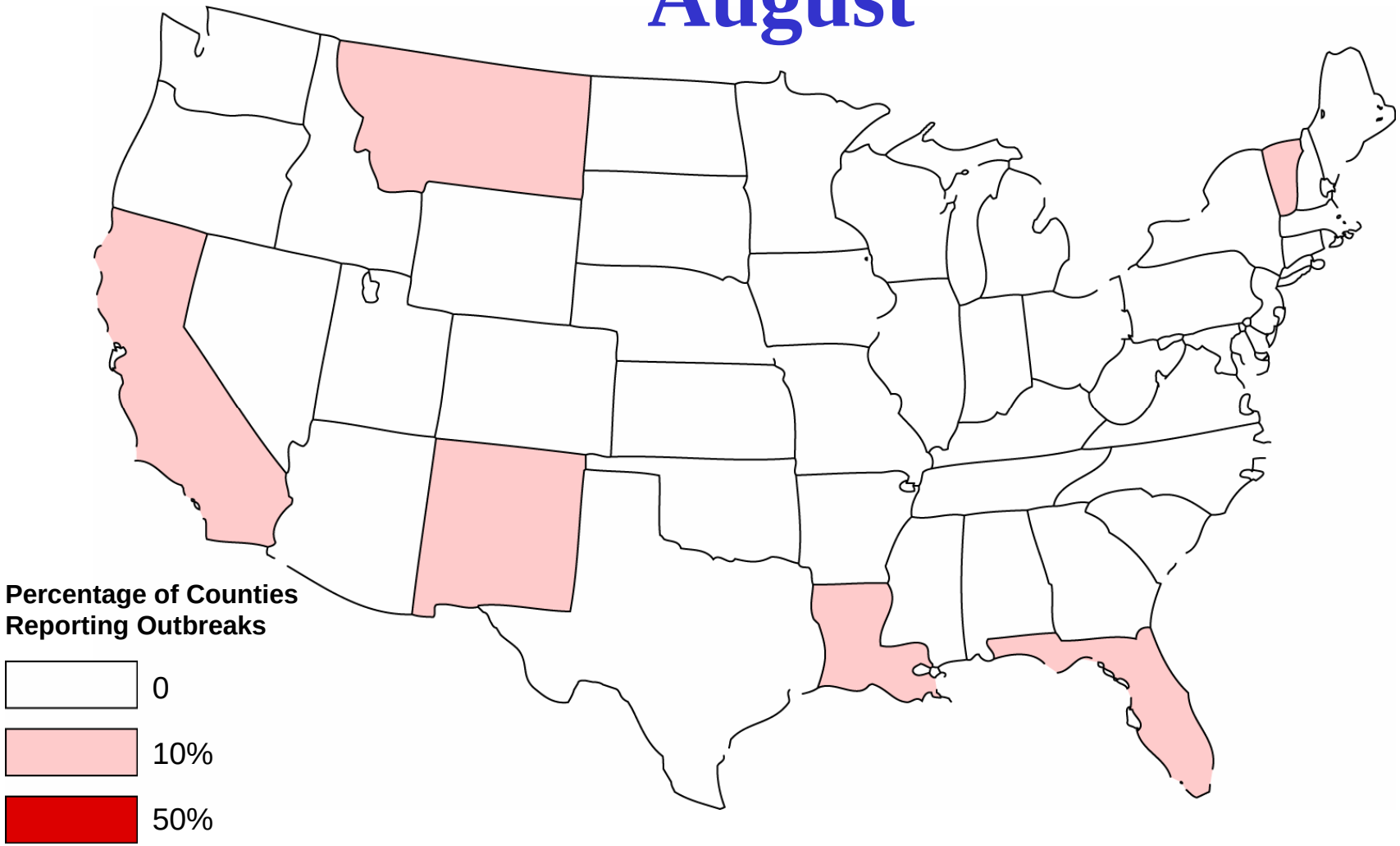
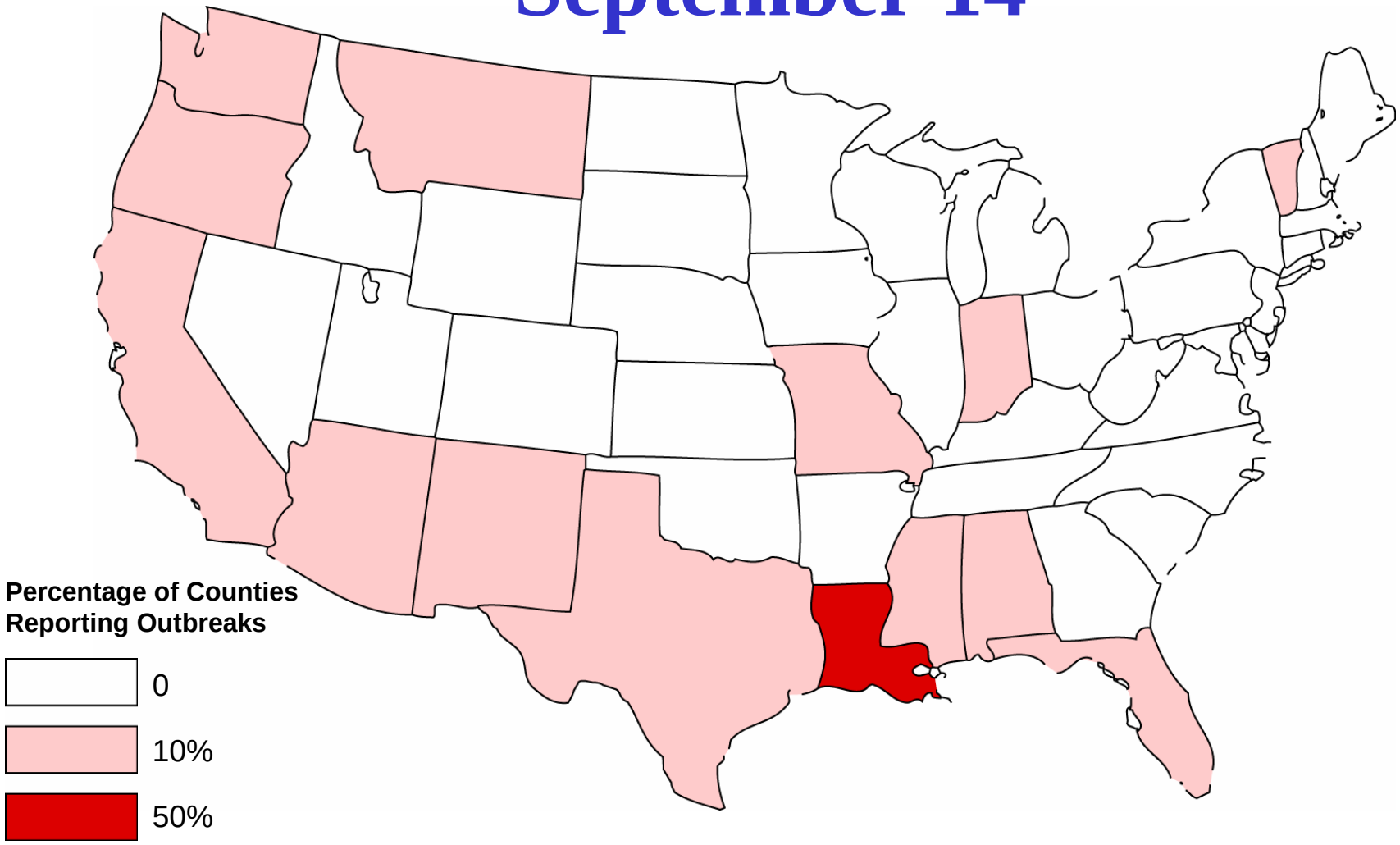
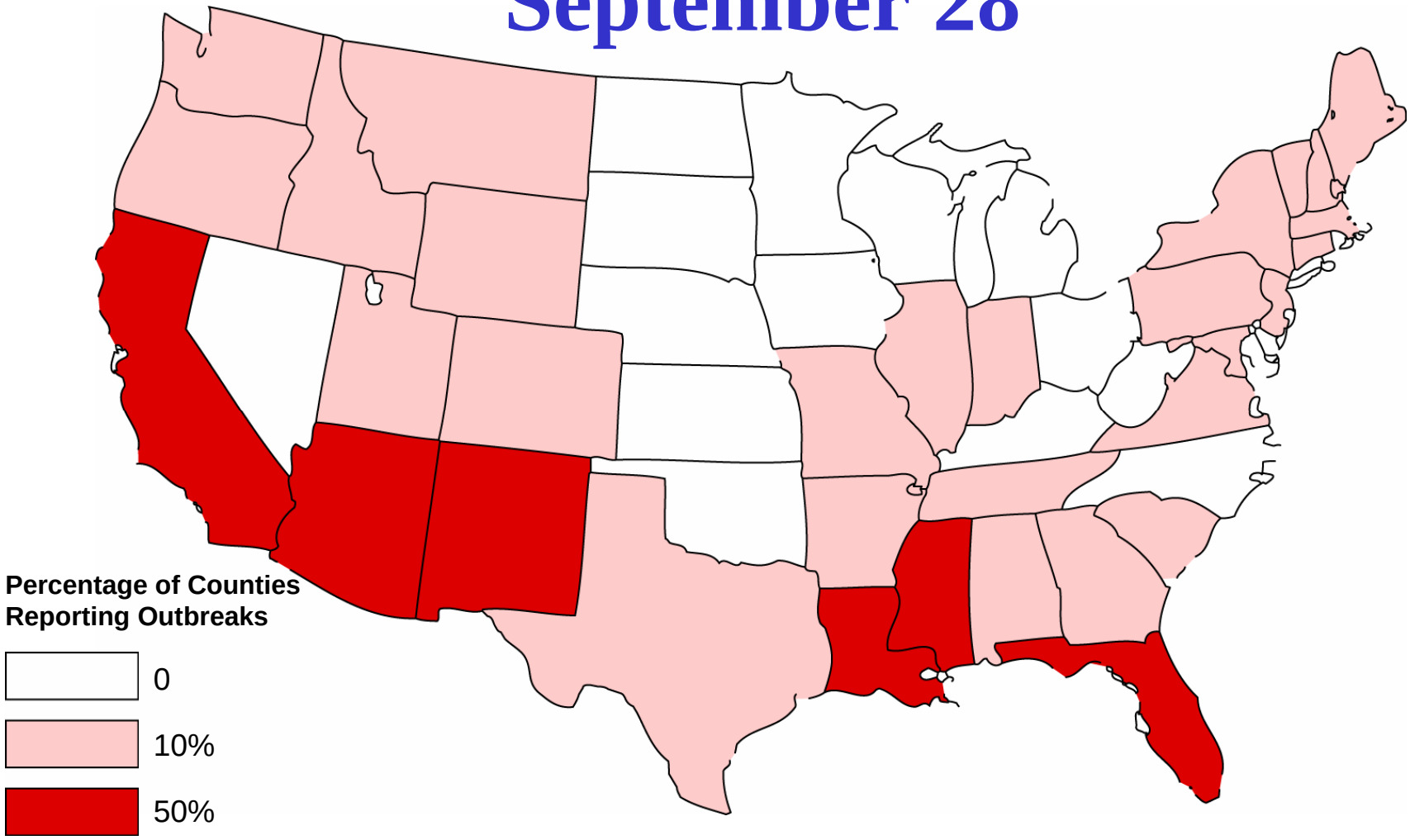
Influenza Outbreaks in 1957: August



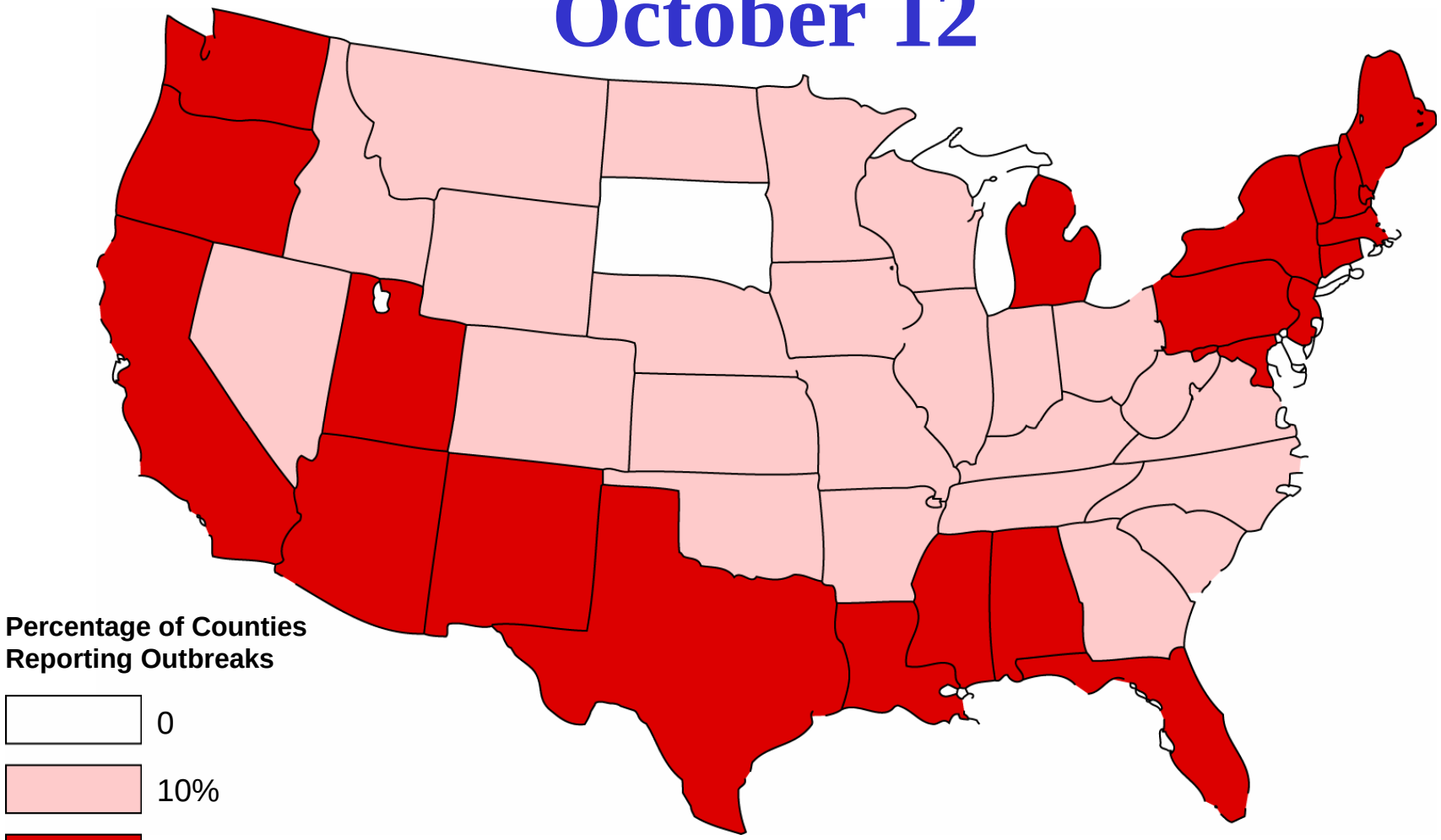
Influenza Outbreaks in 1957: September 14



Influenza Outbreaks in 1957: September 28



Influenza Outbreaks in 1957: October 12



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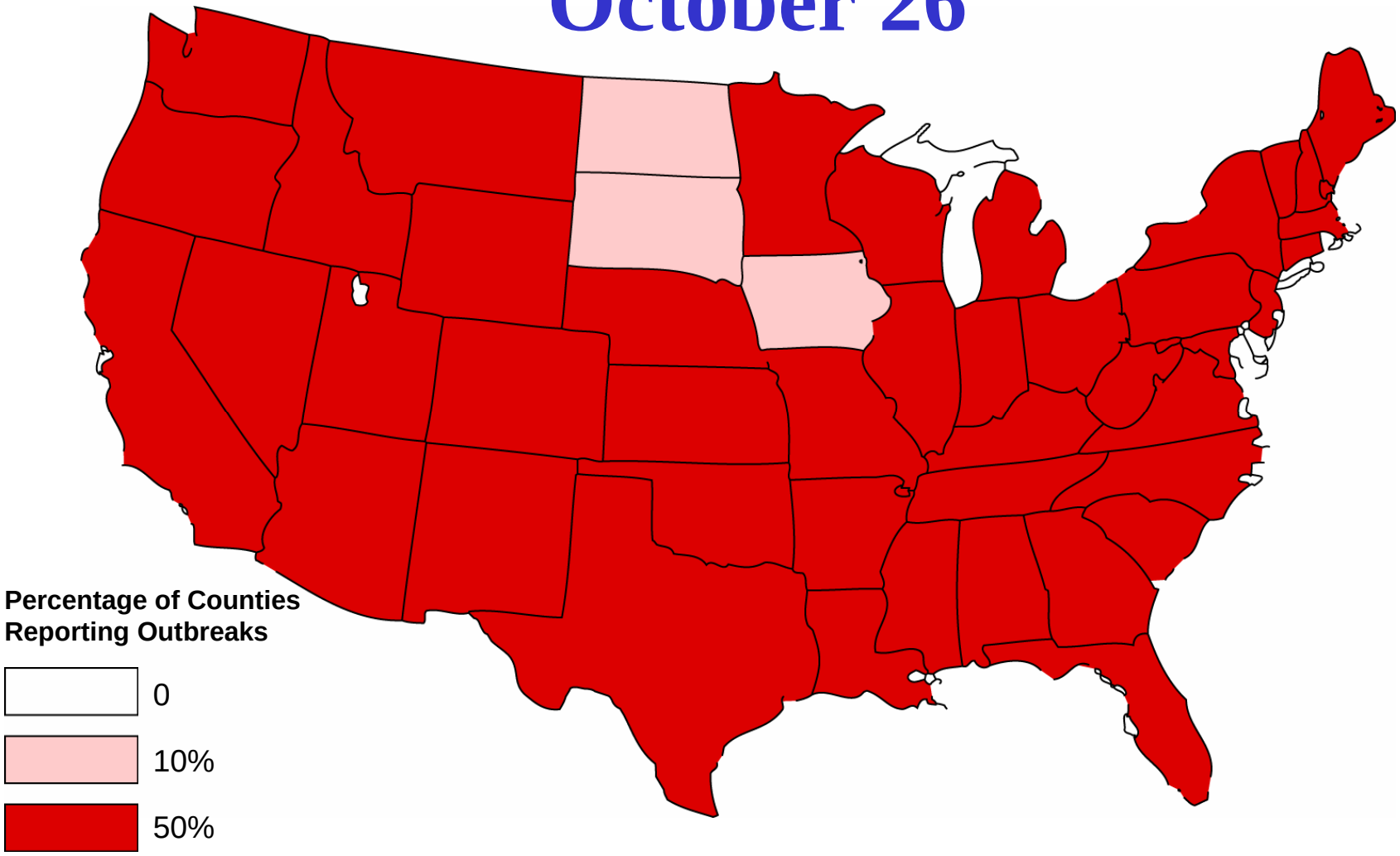
Influenza Outbreaks in 1957: October 26



What Are The Epidemiological Predictions For A Moderate To Severe Pandemic Today?

HHS Planning Assumptions:

Moderate Scenario (1968-like)	**Severe Scenario** (1918-like)
90 M sick	90 M sick
45 M needing medical care	45 M needing medical care
865,000 hospitalizations	9.9 M hospitalizations
129,000 needing ICU	1.5 M needing ICU
209,000 deaths	1.9 M deaths

Pandemic Influenza Impact on U.S. Hospitals

- FluSurge model (CDC)
- HHS planning assumptions
- At peak (week 5 of 8) with 25% attack rate

Moderate Scenario (1968-like)	**Severe Scenario** (1918-like)
19% of non-ICU beds	191% of non-ICU beds
46% of ICU beds	461% of ICU beds
20% of ventilators	198% of ventilators

Is it realistic to expect that *public health* interventions will thwart the impact of a novel flu virus?

How to stop an epidemic:

- Vaccine
- Antimicrobials
  - Prophylactic (preventative)
  - Treatment (reduce illness and limit spread)
- Disease containment measures

Vaccine

- Flu is constantly changing-can't predict the pandemic strain, can't stockpile
- Limited manufacturing capacity
- Antiquated (slow) production technology
- Once produced, the efficacy of a vaccine is uncertain

Antivirals

- Limited supply and production capacity
  - Widespread prophylaxis is not practical
- Resistance may develop
- Dosage and duration of treatment vary from strain to strain
- Time to treatment is critical

Potential Disease Containment Measures

- Isolate the sick
- Identify (through contact tracing) and quarantine those exposed
- Geographic quarantine (cordon sanitaire)
- Travel restrictions
- Social distancing
  - "snow days", school closings, canceling gatherings,, avoiding crowds, telecommuting
- Infection control
  - Respiratory etiquette, hand washing, use of protective masks, gowns and gloves

Features that Make Flu Hard to Contain

- Very short time incubation period (2 days)
  - no time to trace contacts or implement quarantine
- Presymptomatic and asymptomatic spread
  - Isolation only partially effective
  - Can't identify all the spreaders
- Short time between generations (2-3 days)
  - Spreads rapidly, no time to implement geographic controls (1→1M: 60 days)

Is It Realistic To Expect That *Public Health* Interventions Will Thwart The Impact Of A Novel Flu Virus?

No

- It can't be stopped
- At best, *may* be slowed- even this is unproven
- The economic and societal costs of many containment efforts may far exceed the potential benefit.

Is it realistic to expect that *Medical* interventions will thwart the impact of a novel flu virus?

- **If** there were unlimited surge capacity in the healthcare system, all flu patients would be treated to normal standards and other healthcare would go on unaffected. However,…..

Current Status of U.S. Hospitals

- 30% of U.S. hospitals losing money; of those that are profitable, operating margins average 1.9%
- 45 million uninsured; $25 billion/year uncompensated care
- Shortage of 100,000 RNs (8% of workforce)
- 48% of EDs at or over capacity
- 46% of EDs spent time on diversion due to lack of ICU beds, general beds, staff, and ED overcrowding

Source: AHA 2003

Federal Role in Pandemic Response

"Any community that fails to prepare with the idea that somehow, in the end, the federal government will be able to rescue them will be tragically wrong."

- **Michael Leavitt, U.S. Secretary of Health and Human Services at Maryland State Meeting 2/24/06**

Most Likely Ethical And Practical Dilemmas That Communities Will Face

- Allocation of scarce supplies of vaccine and antivirals
- Rationing of scarce life saving medical resources (e.g. ventilators)
- Ensuring similar levels of healthcare in hospitals throughout a community
- Limiting access to other healthcare
- Enforcing isolation and quarantine