The “Spanish” Flu in Danbury, Bethel, & Beyond

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(Runs for ~22 minutes in PowerPoint slide show mode, with animation on 3 slides.)
(See paper at: https://www.savethechildren.org/us/about-us/resource-library/influenza-library)
Camp Funston, Kansas, March 1918: Sadly, the comparatively benign 1st wave was not at all predictive of what was to come.
As in 1889, the flu in 1918 rode the rails to circle the globe, but now it also benefited from over-crowded troop ships to amplify the virus & deliver it to distant ports.

The SS Leviathan left New Jersey on September 29 with ~ 11,000 troops & crew. Flu broke out soon after, & by the time it docked in France a week later, ~ 2,000 men were sick, & ~ 90 had died.
Communities around the world experienced 1, 2, or 3 successive pandemic waves / outbreaks (some at unusual times of year)

The 2nd wave was the killer that swept around the world. Causes of death included:

- Primary viral pneumonia & Acute Respiratory Distress Syndrome (ARDS), &
- Secondary bacterial pneumonia
And, as the Second Wave Swept Around the World:

Called the “Spanish Influenza” because of extensive press coverage of it in Spain. The King got it & neutral Spain had no press censorship.
Sequestration protected Australia & American Samoa from the 2nd wave, while Western Samoa lost 24% of its population.

Mortality varied over 30-fold across countries.

Income differences contributed to this variation.

Published Pandemic Mortality Estimates for Selected Countries


(1918: 24% of 2019 global population.  www.birdflubook.org/resources/NIALL105.pdf)

USA: 675,000
Canada: 50,000
Guatemala: 49,000
Brazil: 180,000
Chile: 35,000

British Isles: 249,000
Spain: 257,000
Egypt: 139,000
Nigeria: 455,000
Kenya: 150,000
South Africa: 300,000

Russia/USSR: 450,000
Afghan.: 320,000
China: 4 - 9.5 million
Bangl./ India/Pak.: 18.5 million
Philippines: 94,000
Indonesia: 1.5 million
Japan: 388,000

Australia: 15,000, in 1919

Global Total: 50 – 100 million

India

“Throughout the Indian subcontinent, there was only death. Trains left one station with the living. They arrived with the dead and dying, the corpses removed as the trains pulled into station. ........

“The most devastated region was the Punjab. One physician reported that hospitals were so “choked that it was impossible to remove the dead quickly enough to make room for the dying. The streets and lanes of the city were littered with dead and dying people ........... “Nearly every household was lamenting a death and everywhere terror reigned. ........

“The supply of firewood was quickly exhausted, making cremation impossible, and the rivers became clogged with corpses.”

Weekly Death rates in Bombay, Madras, and Calcutta, June-December, 1918.

(See: Laura Spinney. How the Spanish flu of 1918 changed India: https://caravanmagazine.in/history/spanish-flu-1918-changed-india)

(John Barry. The Great Influenza.)
Impact of the 1918 Influenza Pandemic in Coastal Kenya *

“We found that crude mortality rates and healthcare utilization increased six- and three-fold, respectively, in 1918, and estimated a pandemic mortality rate of 25.3 deaths/1000 people/year. Impact to society and the health care system was dramatic as evidenced by correspondence. In conclusion, the 1918 pandemic profoundly affected Coastal Kenya.”

Figure 4. Crude all-cause mortality rates of Coast Province Kenya, 1912–1925. Years 1917, 1918, 1919 and 1921 data for Lamu and Tana River districts missing.

1918 in Senegal

“The world influenza pandemic of 1918-19 pounced upon the French colony of Senegal with a ferocity of biblical proportions in the first week of September of 1918.

“By the time the last case was noted in December in the remote cercle or province of Kedougou, ....... , influenza had reached every village, had probably infected over half of the estimated population of one and a quarter million, and had left a total of roughly 47,000 dead.”

1918 in Singapore


“Influenza was reported to be highly infectious and easily spread by breathing, coughing and spitting, and carried by letters and parcels, with an incubation period from a few hours to 3 days.

“The government and physicians thus advised infected persons to isolate themselves, to seek treatment early, and to avoid crowded places.

“Floors of public premises were disinfected daily. In addition, visits to hospitalized patients were restricted and prohibited.

“Schools were also closed for a week at the peak of the second wave.”
In 1918, Masks Were Popular in Many Areas, & Required in Some

Schoolgirls wear masks to protect against the flu in Tokyo

Seattle, Nov. 1918: No mask, no ride.
9. Massachusetts was the first state to suffer huge numbers of civilian deaths. This is a hospital in Lawrence.

(John Barry. *The Great Influenza.*)
Movement of the Second Wave Across the US

Source: America’s Forgotten Pandemic - The Influenza of 1918 - 1989
Younger age distribution of flu & pneumonia deaths is a characteristic of pandemics. (Also had shift to younger deaths in 1957, 1968, & 2009)

U.S. life expectancy dropped by 12 years
Impact Beyond Flu-Related Mortality: In 1918, Worker Absenteeism Led to Social & Economic Disruption

The Danbury News (Connecticut), Wednesday, October 9, 1918
In 1918, Some of the Guidance to the Public (& Even Some of the Advertising) Reflected a Good Understanding of the Modes of Transmission

INFLUENZA
Spread by Droplets sprayed from Nose and Throat

Cover each COUGH and SNEEZE with handkerchief.
Spread by contact.
AVOID CROWDS.
If possible, WALK TO WORK.
Do not spit on floor or sidewalk.
Do not use common drinking cups and common towels.
Avoid excessive fatigue.
If taken ill, go to bed and send for a doctor.
The above applies also to colds, bronchitis, pneumonia, and tuberculosis.
A good understanding of modes of transmission led to non-pharmaceutical interventions but guidance in the US was inconsistent & communities made very different decisions.
200,000 crowd to see the biggest parade in the city’s history, 2 weeks after the first civilian cases, & the day after 200 were admitted to hospital!

“By mid-October Philadelphia was reeling. ..... the city had to secure five supplementary morgues. ..... Many families, especially in the slums, had no adult well enough to prepare food & in some cases had no food at all because the breadwinner was sick or dead.” Alfred Crosby
“In Philadelphia the number of dead quickly overwhelmed the city’s ability to handle bodies. It was forced to bury people, without coffins, in mass graves and soon began using steam shovels to dig the graves.”

(John Barry, *The Great Influenza*)
3 studies have examined relationships between NPI implementation & mortality in US cities. This is St. Louis, from Sep. 14 to Dec. 28.

The Situation in Saint Louis During the Peak of the Second Wave Never Approached that in Philadelphia

In St. Louis, Missouri, the Red Cross Motor Corps transports a flu victim from a house at Etzel & Page Avenues (St. Louis Post Dispatch file photo)
Excess pneumonia & flu mortality over 1913–1917 baseline in Philadelphia & St. Louis, Sep. 8 – Dec. 28, 1918

NPIs implemented Oct. 3, 16 days after 1\textsuperscript{st} case

NPIs implemented on Oct. 7, 2 days after 1\textsuperscript{st} case

“These findings support the hypothesis that rapid implementation of multiple NPIs can significantly reduce influenza transmission, but that viral spread will be renewed upon relaxation of such measures.”
“In most cities all public meetings were banned, all public gathering places – churches, schools, theaters, & saloons – closed. Most churches simply cancelled services, but this one in California met outdoors, a technical violation of the closing order but a response to the congregation’s need for prayer.” John Barry, *The Great Influenza.*
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<td>1. Making influenza a reportable disease</td>
<td>9. Mandatory or Recommended use of masks in public</td>
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<td>2. Isolating sick individuals</td>
<td>10. Closing or discouraging the use of public transit systems</td>
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<td>3. Quarantine of households with sick individuals</td>
<td>11. Restrictions on funerals, parties, and weddings</td>
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<td>4. School closure</td>
<td>12. Restrictions on door-to-door sales</td>
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<td>5. Protective sequestration of children or adults</td>
<td>13. Community-wide curfew measures and business closures</td>
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<td>6. Cancellation of worship services</td>
<td>14. Social distancing strategies for those encountering others</td>
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<td>7. Closure of public gathering places [e.g., saloons, theatres, etc.</td>
<td>15. Public health education measures</td>
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<td>8. Staggered business hours to decrease congestion</td>
<td>16. Declaration of public health emergency</td>
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“Protective Sequestration” in Gunnison, Colorado
1 of only 7 U.S. towns & residential institutions to escape the 2nd wave
(Escape Community Digital Document Archive, Center for the History of Medicine, Univ. of Michigan:
http://chm.med.umich.edu/research/1918-influenza-escape-communities/)

Site: Small mountain town, far from major population centers, but on a major rail line.
Population: 1,329 in town
Flu Cases: 0 in town
FluDeaths: 0 in town

Non-Pharmaceutical Interventions
- Barricades on roads for 4 months;
- Rail travel restricted;
- Quarantine of arrivals & jailing of those in violation;
- Isolation of suspected cases;
- Schools & all institutions closed;
- No public gatherings, per state law
14. All New York City workers wore masks. Note the absence of traffic on the street and pedestrians on the sidewalk. The same silent streets were seen everywhere. In Philadelphia a doctor said, “The life of the city had almost stopped.”

(John Barry, The Great Influenza)
Danbury (1918 population ~ 22,500) & Bethel (1918 pop. ~ 3,300), in western Connecticut (60 miles northeast of New York City) were hit by the deadly 2nd wave in October.
Danbury press accounts include frequent reference throughout October to the
- family clustering of cases &
- the shortage of nurses,
- throughout Connecticut, &
- the implications of these challenges for care of the ill.

In Danbury, this contributed to a situation “perhaps the most desperate of its kind that had ever developed in this city.” (Danbury Evening News, Nov. 9)
“The Siege of Illness”

- Wednesday, Oct. 2nd: 4 cases reported in Danbury to date.
- Friday, Oct. 4th: Danbury “Schools Closed As Precaution.”
- Saturday, Oct. 5th: Theatres closed.
- Thursday, Oct. 10th: Danbury Fair closed & public dances prohibited.
- Thursday, Oct. 17th: Bethel call for volunteers to help care for the ill.
- Friday, Nov. 8th: Bethel cabinet maker making caskets because “it is difficult to secure caskets of any kind.”
“A Great Need of Nurses”

- Saturday, Sep. 28th: Danbury Hospital Superintendent urgently seeking nurses in Danbury to send to Camp Devens, Massachusetts, in response to their appeal.

- Saturday, Oct. 5th: Connecticut state-wide appeal to “use every means to keep nurses in this state.”

NURSES

Graduate and Non-Graduate.

“You are needed in Connecticut to help overcome the influenza epidemic.

Don’t leave your home state folks to die while you seek a pot of gold at the end of the rainbow somewhere else.

The State Department of Health will place you where you can serve best, guarantees your pay.

Graduate nurses $28 a week and expenses; trained nurses, assistants $15 a week and upward with expenses.

Report at once by telegraph or telephone to the State Department of Health of Connecticut for assignment.”

Class of 1917, Danbury Hospital Training School for Nurses, Sep. 5, 1917. (Images of America: Danbury)

Danbury Evening News, Tuesday, Oct. 8
“Health Authorities Differ”

“Two directly conflicting opinions in regard to the advisability of closing schools and theatres and other places of public gatherings have been given during the last forty-eight hours by federal and state health officials………..

“The most effective way to stop the spread of the Spanish influenza is to close churches, schools, theatres and public institutions in every community where the epidemic has developed in the opinion of Surgeon General Blue of the public health service. ……………

“In its current campaign to check the epidemic of Spanish influenza, the state department of health does not advocate the closing of either schools or theatres.” ……..

“When schools are closed, children are apt to play together at all hours of the day,” ………..

Danbury Evening News, Sat., Oct. 5th

“Better Off in School”: School Medical Inspection as a Public Health Strategy During the 1918–1919 Influenza Pandemic in the United States

Public Health Reports / 2010 Supplement 3 / Volume 125

SYNOPSIS

During the 1918–1919 influenza pandemic in the United States, most cities responded by implementing community mitigation strategies, such as school closure. However, three cities—New York City, Chicago, and New Haven, Connecticut—diverged from the dominant pattern by keeping their public schools open while the pandemic raged. This article situates the experiences of these three cities in the broader context of the Progressive era, when officials and experts put great faith in expanding public programs in health and education. It adds an important dimension to the historical understanding of the 1918–1919 influenza pandemic and offers lessons for public health practitioners and policymakers today who might face difficult decisions about how to respond to the 2009 H1N1 influenza pandemic.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2862335/pdf/phr125s30063.pdf

https://www.floridaemory.com/exhibits/wwi/postwar/
HEALTH NOTICE.

“The holding of any public dance within the limits of the Town or City of Danbury is hereby prohibited, in accordance with the orders of the State Health Commissioner.

No more gatherings of this nature can be held until the order of the commissioner is revoked.

Any attempt at violation of this order will be dealt with promptly and effectively, through the police department.

BOARD OF HEALTH.
Danbury, Conn., October 10.”
A “Most Desperate” Situation

Friday, Oct. 25th: "Physicians and nurses are still working almost to the limit of their endurance and the hospitals are practically filled with patients.

All effort is being made to divert influenza and pneumonia patients from the Danbury hospital to the emergency hospital, so far as possible.

It was stated this afternoon, however, that the emergency hospital, opened in the Children’s Home on Town Hill avenue two days ago, will probably be filled by tonight. ..............................

Bad as the situation is here, it is good compared with that in several other places in Connecticut." (Danbury Evening News)
**Prevention & Home Care**

- Danbury press accounts reflect a good understanding of flu transmission.
- Many of the NPIs now being used around the world, were tried in Connecticut in 1918.
- But with conflicting guidance from federal & state authorities, different communities implemented different NPIs.
- Danbury papers printed key information on reducing the risk of infection & on home care, some of which was good by current standards, & some not.
- The feasibility of home care was challenged by the family clustering of cases & shortage of nurses, leading to a call for volunteers, & need for hospital admission for basic care.
Month of Death
Among the 492 Deaths from All Causes in Danbury, in 1918: ~145 excess deaths Sep. - Dec. = 42% excess all-cause mortality in 1918.*

Age at Death Among Deaths from All Causes in Danbury, April – August, & October, 1918:
61% of deaths in October were in 10 – 49 year olds, compared to 21% from April through August.*

1918 Danbury population ~ 22,500.
Charts based on information from the Danbury Evening News, January 13, 1919.
Some cities managed a decent public health response 15 years before the virus was first isolated from a human (at Mill Hill, London, in 1933, after an infected ferret sneezed into the face of a researcher).

Purpose-bred ferrets at Mill Hill. Date unknown (c.1924–1926). Source: National Archives, FD 1/1284. 
https://www.researchgate.net/figure/Purpose-bred-ferrets-at-Mill-Hill-Date-unknown-c1924-1926-Source-National-Archives_fig6_263290792
Wave-2 Virus Reconstructed from Lung Tissue of 1 Alaskan Native & 2 Soldiers

Phenotypic characterization in tissue culture & animals

Reverse genetics

Gene reconstruction

Gene sequencing

Tissue specimens

“Here we present sequence and phylogenetic analyses of the complete genome of the 1918 influenza virus, and propose that the 1918 virus was not a reassortant virus, but more likely an entirely avian-like virus that adapted to humans.”


Johan Hultin excavating the Brevig Mission burial site in Alaska, where 72 of its 80 inhabitants were lost to the 2nd wave, Nov. 15 - 20, 1918.

(The Wave-2 virus now lives in Atlanta)
“I had a little bird
Its name was Enza
I opened the window
And in-flew-Enza”

(The kids knew it came from the birds 87 years before Taubenberger did!)
Origins of deadly pandemic debated

The “Spanish flu” outbreak of 1918-20 killed perhaps 50 million people worldwide. Here are three possible origins:


ALDERSHOT, U.K. ÉTAPLES, FRANCE
World War I’s trenches were first seen as the source of the disease.

SHANXI PROVINCE, CHINA
A respiratory disease outbreak in 1917 may have been the first stirrings of the flu.

KANSAS, U.S.
At Camp Funston, 48 soldiers died in March 1918, just ahead of the outbreak.

JOHN TOMANIO, RYAN MORRIS, KELSEY NOWAKOWSKI, NG STAFF
SOURCES: WAR IN HISTORY, JOURNAL OF PUBLIC HEALTH POLICY
Origins of the 1918 Pandemic? (one of several hypotheses)

A hypothesis: The conjunction of soldiers, gas, pigs, ducks, geese, & horses in Northern France .... provided the conditions for the emergence of the ..... pandemic... (JS Oxford, et. al.)

Huge British army base at Etaples: Site of the winter 1916/1917 outbreak (of H1N1?)
“most of the avian-like genomic segments in the 1918 human virus appear to be of Western Hemisphere and, probably, North American origin …… the virus reassortment event giving rise to the pandemic probably occurred in or around 1915…… antigenic imprinting caused by an individual’s first IAV exposure(s) in infancy to one or the other of the two HA phylogenetic ‘groups’ has emerged as a key explanatory factor that appears to underlie ….. the peak in mortality among young adults” …

https://doi.org/10.1093/emph/eoz001
Recommended Books on 1918

(Same book as *Epidemic & Peace*, published in 1976)
Recommended Papers on 1918


