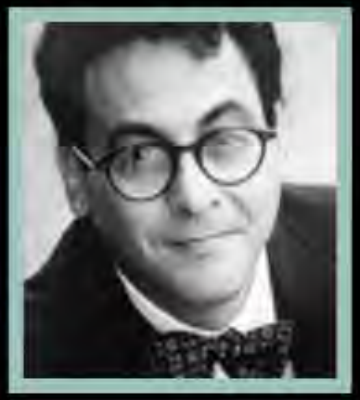
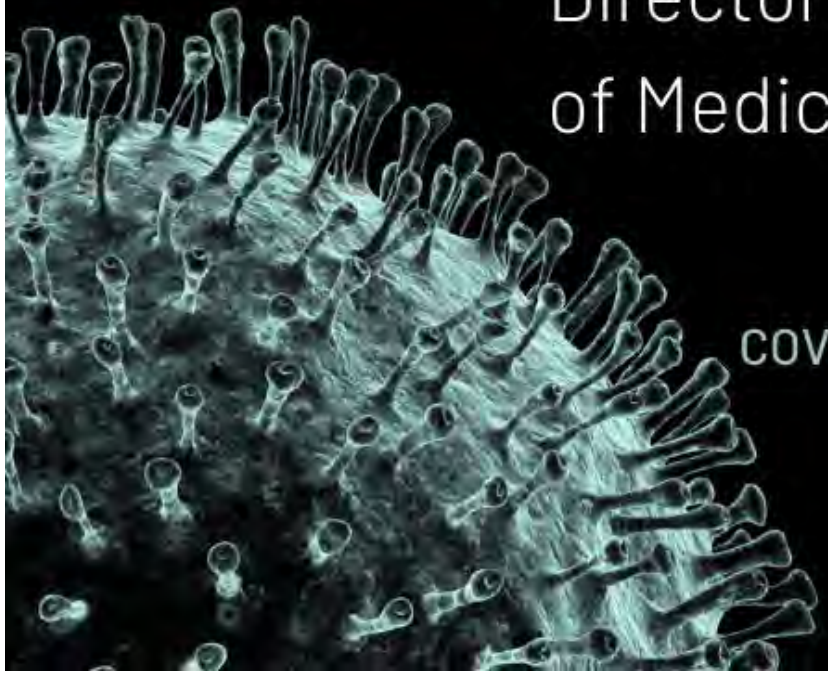
COVID-19 Conversations



Howard Markel, MD, PhD

George E. Wantz Distinguished Professor of the History of Medicine & Director of the Center for the History of Medicine, University of Michigan



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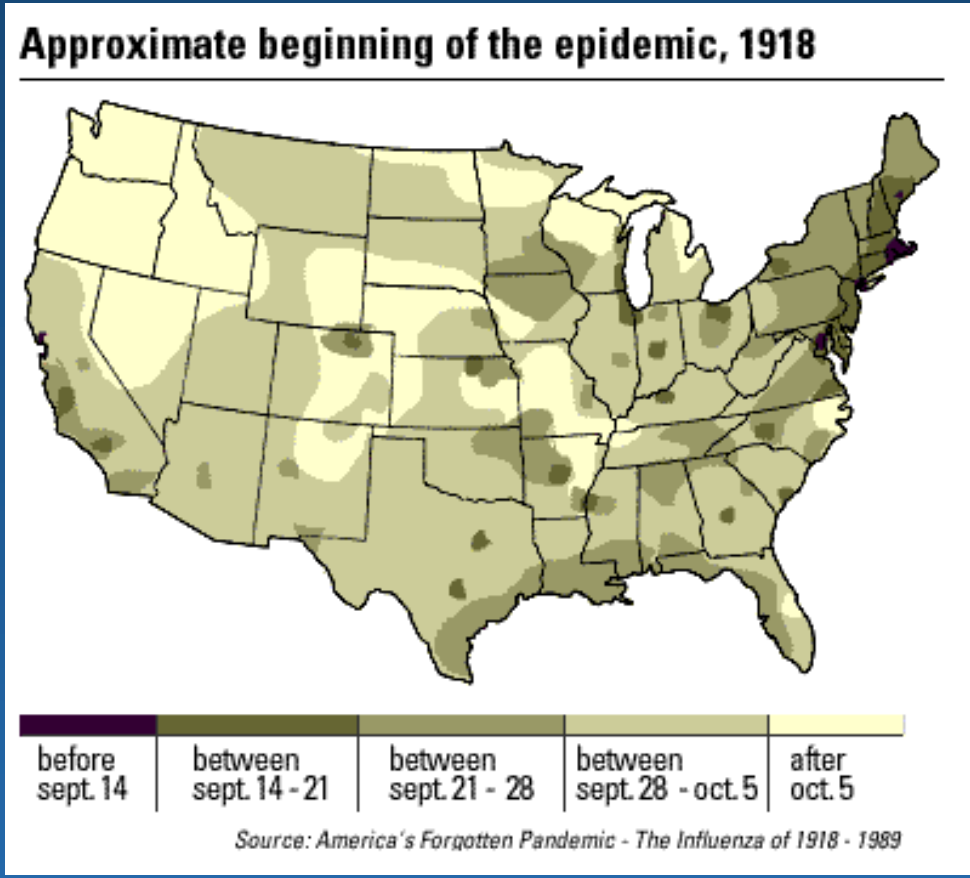
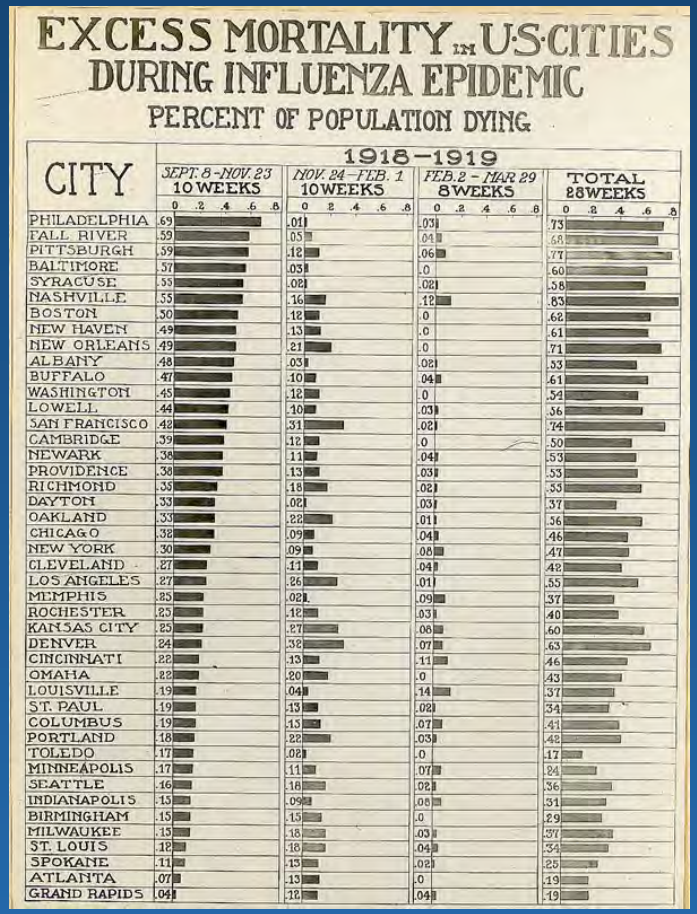
The Origin of the Quarantine

In response to the "Black Plague" pandemic of 1347- 1348, Venice founded the first quarantine island, Lazaretto Vecchio, Santa Maria di Nazareth Island. In 1485, in response to a successive wave of plague, Venice adopted the rule requiring that all vessels coming from infected ports be detained for 40 days, (*Quaranta giorno*).

The U.S. Experience in 1918-19:

From Sept 1, 1918-April 5, 1919, in the U.S., there were > 10,000,000 cases and 500,000 flu deaths; worldwide, there were hundreds of millions of cases and >50 million flu deaths worldwide.





Seven Escape Communities and the Concept of Protective Sequestration

Gunnison, Colorado
Yerba Buena, San Francisco, CA
Princeton University, Princeton, NJ
Trudeau Tuberculosis Sanitarium, Saranac, NY
Bryn Mawr College, PA
Western School for the Blind, Pittsburgh PA
Fletcher, VT

Emerging Infectious Diseases, Volume 12, Number 12–December 2006: 1961-1964.

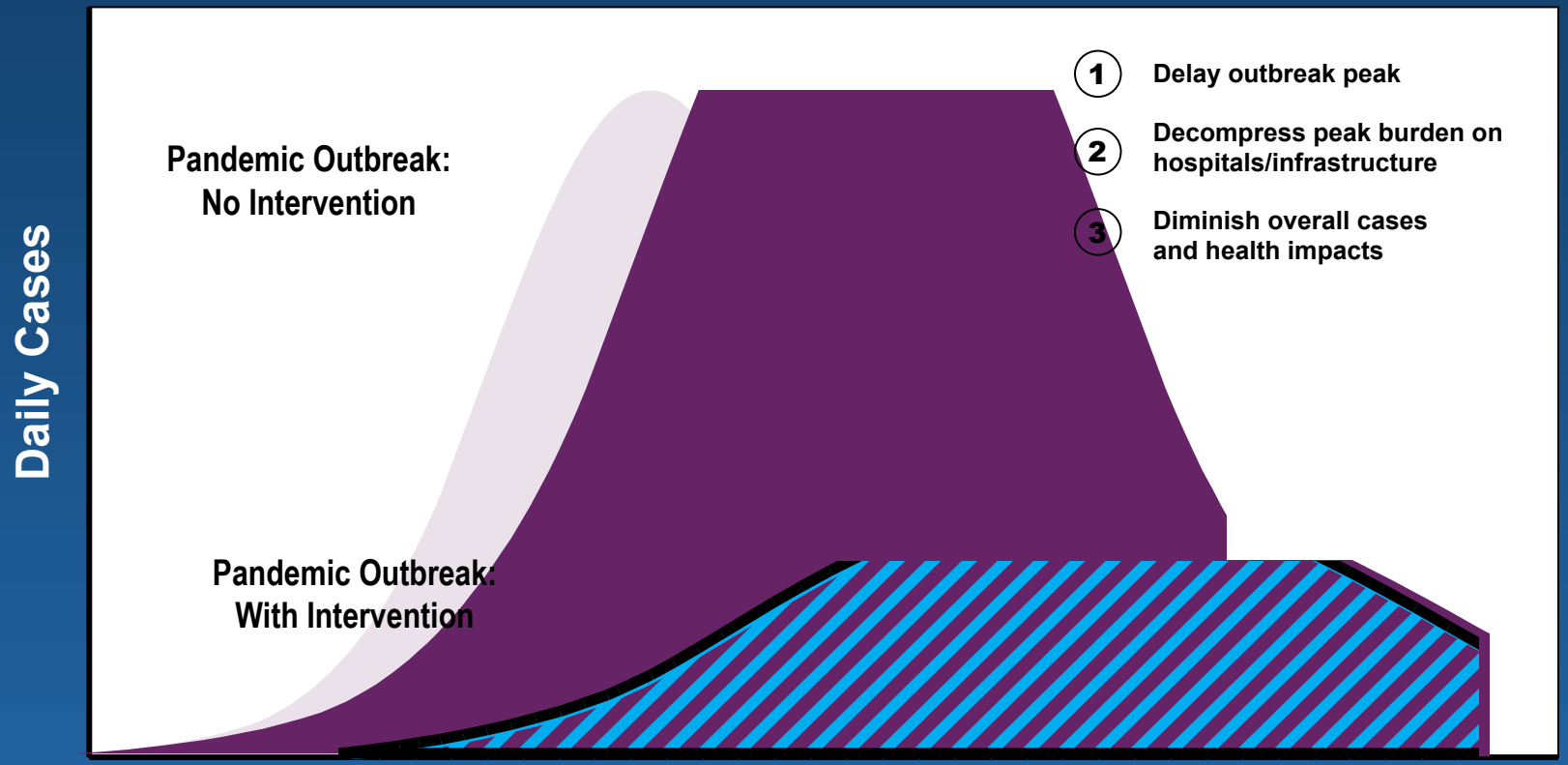
Complete UM/DTRA Escape Communities Report
http://www.med.umich.edu/medschool/chm/influenza/

Nonpharmaceutical Influenza Mitigation Strategies, US Communities, 1918–1920 Pandemic

Howard Markel,* Alexandra M. Stern,*
J. Alexander Navarro,* Joseph R. Michalsen,*
Arnold S. Monto,† and Cleto DiGiovanni Jr‡

We studied nonpharmaceutical interventions used to mitigate the second, and most deadly, wave of the 1918–1920 influenza pandemic in the United States. We conclude that several small communities implemented potentially successful attempts at preventing the introduction of influenza.

Goals of Community Mitigation



43 U.S. cities in 1918-19:

Populations range from 104,000-5.6 million; >23 million people or 22% of entire U.S. population, (1920 U.S. Census)

ORIGINAL CONTRIBUTION

Nonpharmaceutical Interventions Implemented by US Cities During the 1918-1919 Influenza Pandemic

Howard Markel, MD, PhD
Harvey B. Lipman, PhD
J. Alexander Navarro, PhD
Alexandra Sloan, AB
Joseph R. Michalsen, BS
Alexandra Minna Stern, PhD
Martin S. Cetron, MD

Context A critical question in pandemic influenza planning is the role nonpharmaceutical interventions might play in delaying the temporal effects of a pandemic, reducing the overall and peak attack rate, and reducing the number of cumulative deaths. Such measures could potentially provide valuable time for pandemic-strain vaccine and antiviral medication production and distribution. Optimally, appropriate implementation of nonpharmaceutical interventions would decrease the burden on health care services and critical infrastructure.

Objectives To examine the implementation of nonpharmaceutical interventions for epidemic mitigation in 43 cities in the continental United States from September 8, 1918, through February 22, 1919, and to determine whether city-to-city variation in mortality was associated with the timing, duration, and combination of nonpharmaceutical interventions; altered population susceptibility associated with prior pandemic waves; age and sex distribution; and population size and density.

Design and Setting Historical archival research, and statistical and epidemiological analyses. Nonpharmaceutical interventions were grouped into 3 major categories: school closure; cancellation of public gatherings; and isolation and quarantine.

Main Outcome Measures Weekly excess death rate (EDR); time from the activation of nonpharmaceutical interventions to the first peak EDR; the first peak weekly EDR; and cumulative EDR during the entire 24-week study period.

Results There were 115 340 excess pneumonia and influenza deaths (EDR, 500/100 000 population) in the 43 cities during the 24 weeks analyzed. Every city adopted at least 1 of the 3 major categories of nonpharmaceutical interventions. School closure and public gathering bans activated concurrently represented the most common combination implemented in 34 cities (79%); this combination had a median duration of 4 weeks (range, 1-10 weeks) and was significantly associated with reductions in weekly EDR. The cities that implemented nonpharmaceutical interventions earlier had greater delays in reaching peak mortality (Spearman $r=-0.74$, $P<.001$), lower peak mortality rates (Spearman $r=0.31$, $P=.02$), and lower total mortality (Spearman $r=0.37$, $P=.008$). There was a statistically significant association between increased duration of nonpharmaceutical interventions and a reduced total mortality burden (Spearman $r=-0.39$, $P=.005$).

Conclusions These findings demonstrate a strong association between early, sustained, and layered application of nonpharmaceutical interventions and mitigating the consequences of the 1918-1919 influenza pandemic in the United States. In planning for future severe influenza pandemics, nonpharmaceutical interventions should be considered for inclusion as companion measures to developing effective vaccines and medications for prophylaxis and treatment.

JAMA. 2007;298(6):644-654 www.jama.com

THE INFLUENZA PANDEMIC OF 1918-1919 was the most deadly contagious calamity in human history. Approximately 40 million individuals died worldwide, including 550 000 individuals in the United States.[1-4] The historical record demonstrates that when faced with a devastating pandemic, many nations, communities, and individuals adopt what they perceive to be effective social distancing measures or nonpharmaceutical interventions including isolation of those who are ill, quarantine of those suspected of having contact with those who are ill, school and selected business closure, and public gathering cancellations.[5,6] One compelling question emerges: can lessons from the 1918-1919 pandemic be applied to contemporary pandemic planning efforts to maximize public health benefit while minimizing the disruptive social consequences of the pandemic as well as those accompanying public health response measures?[7-10]

Most pandemic influenza policy makers agree that even the most rigorous nonpharmaceutical interventions are unlikely either to prevent a pandemic or change a population's underlying biological susceptibility to the pandemic virus. However, a growing

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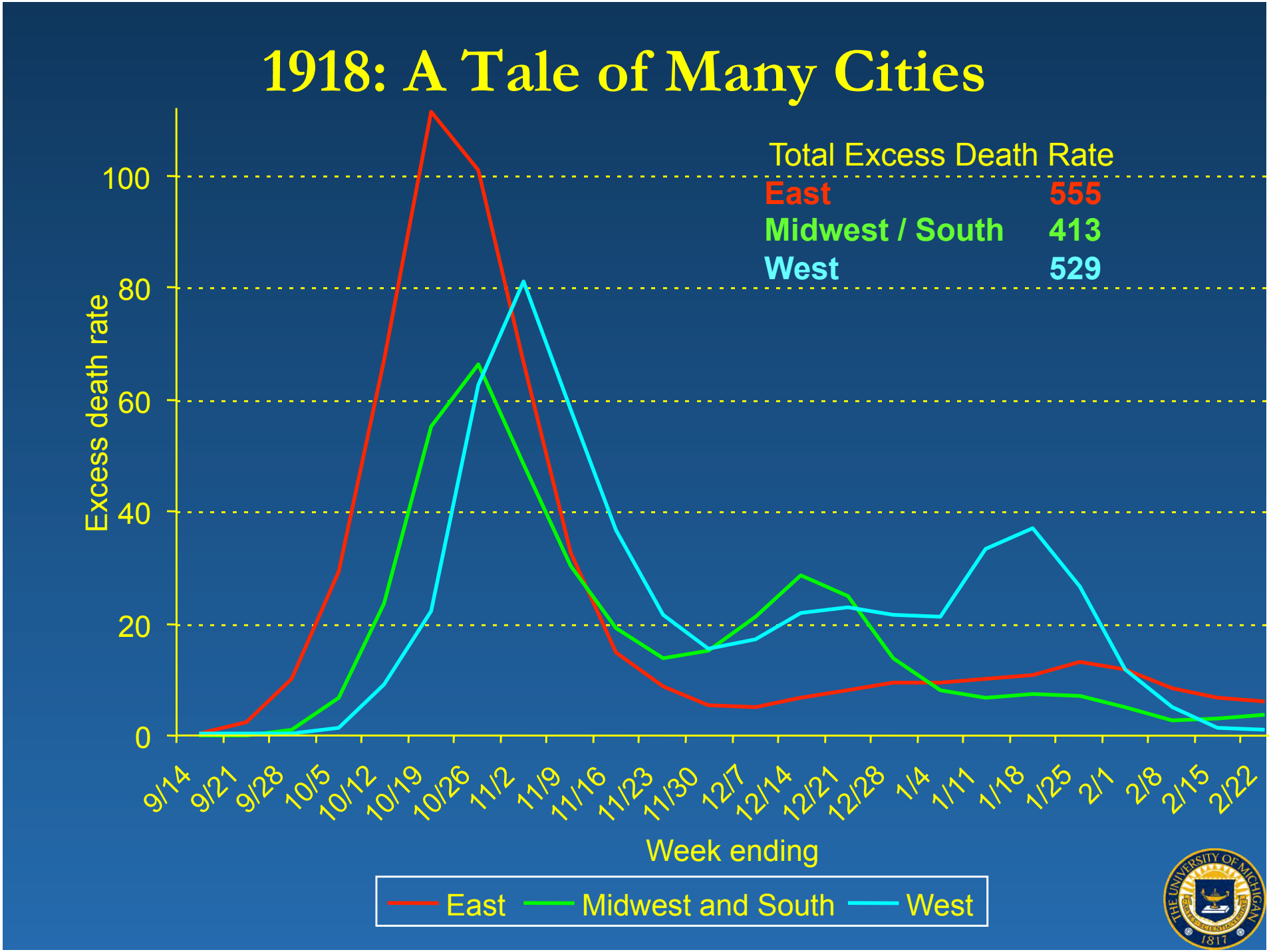
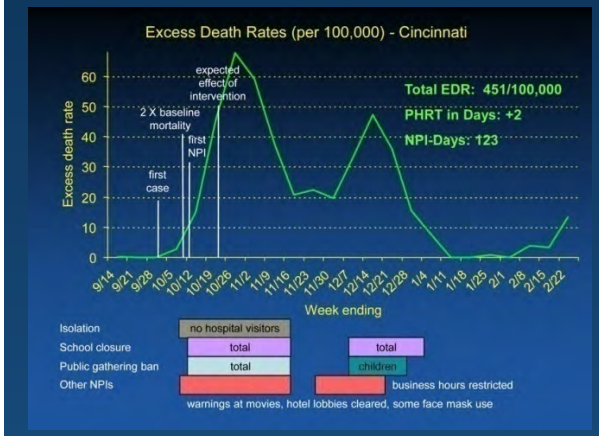
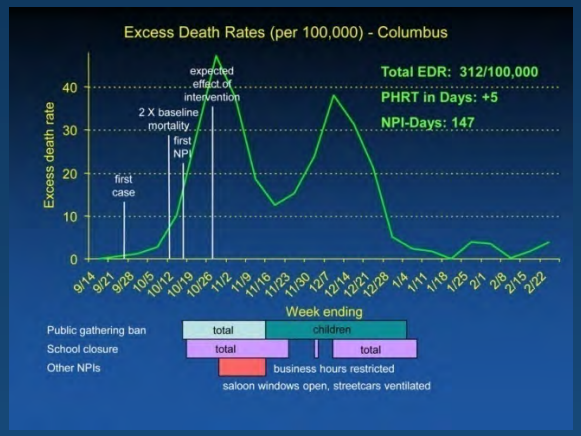
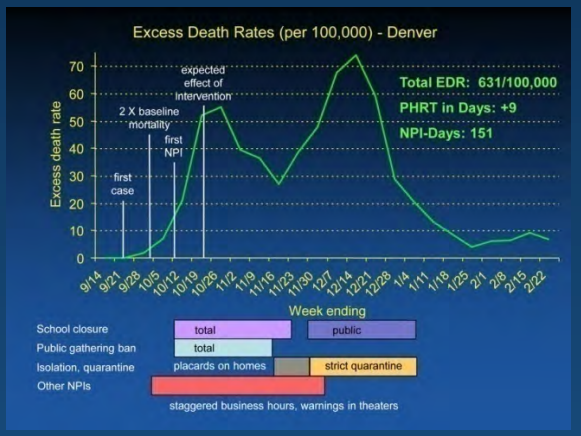
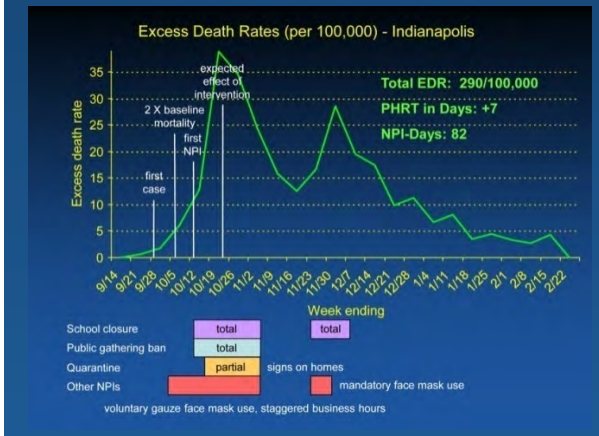
1918: A Tale of Many Cities

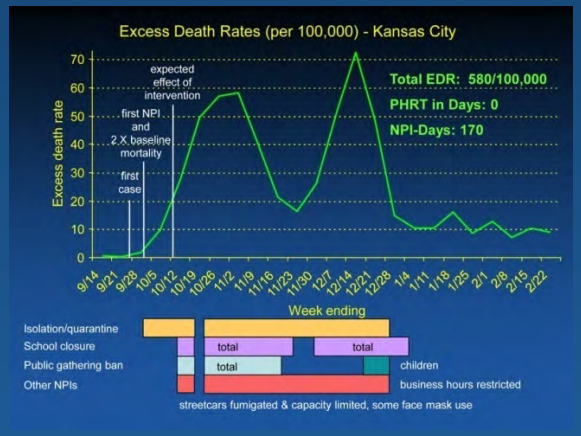


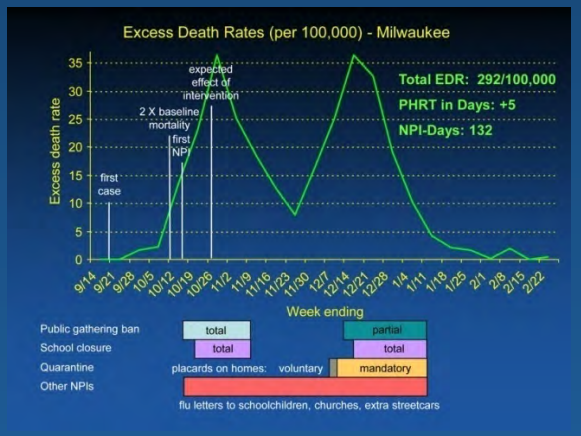


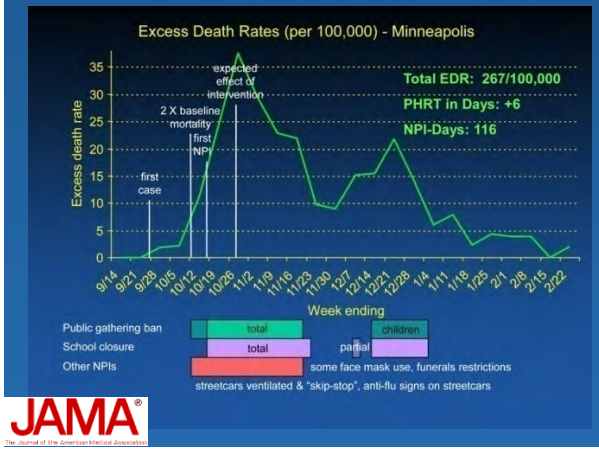


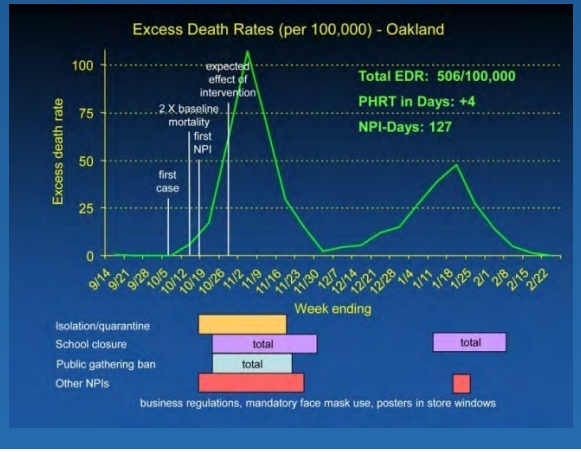


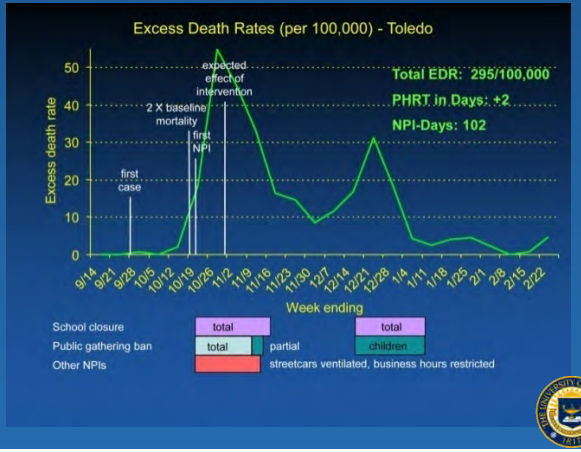












JAMA
The Journal of the American Medical Association

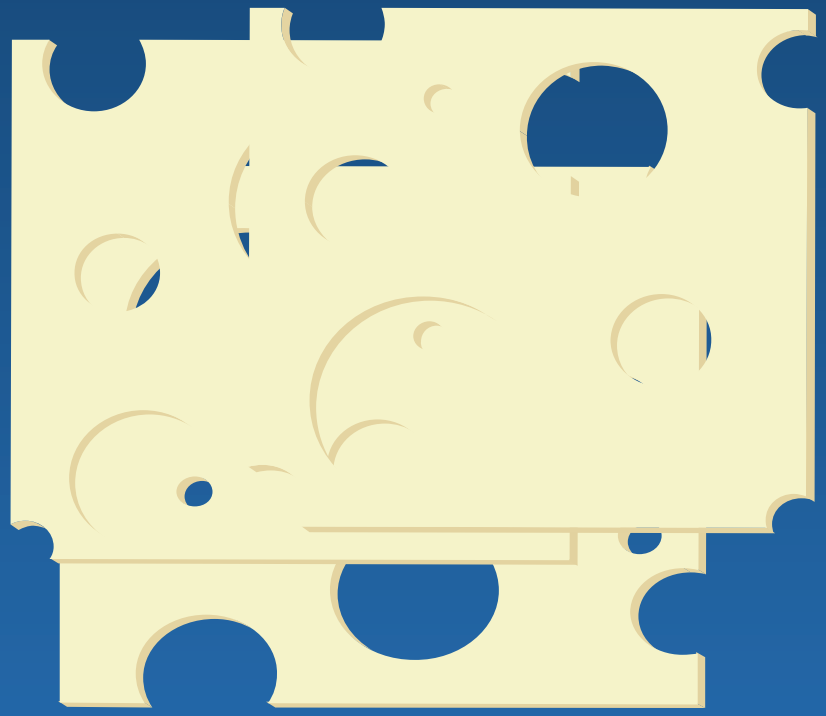
The Dual-Peaked Cities

- In dual-peaked cities, (n=23) NPI activation was followed by a reduction of deaths and, typically, when NPI were deactivated, death rates increased, highlighting the transient protective nature of such measures and the need for a sustained response.

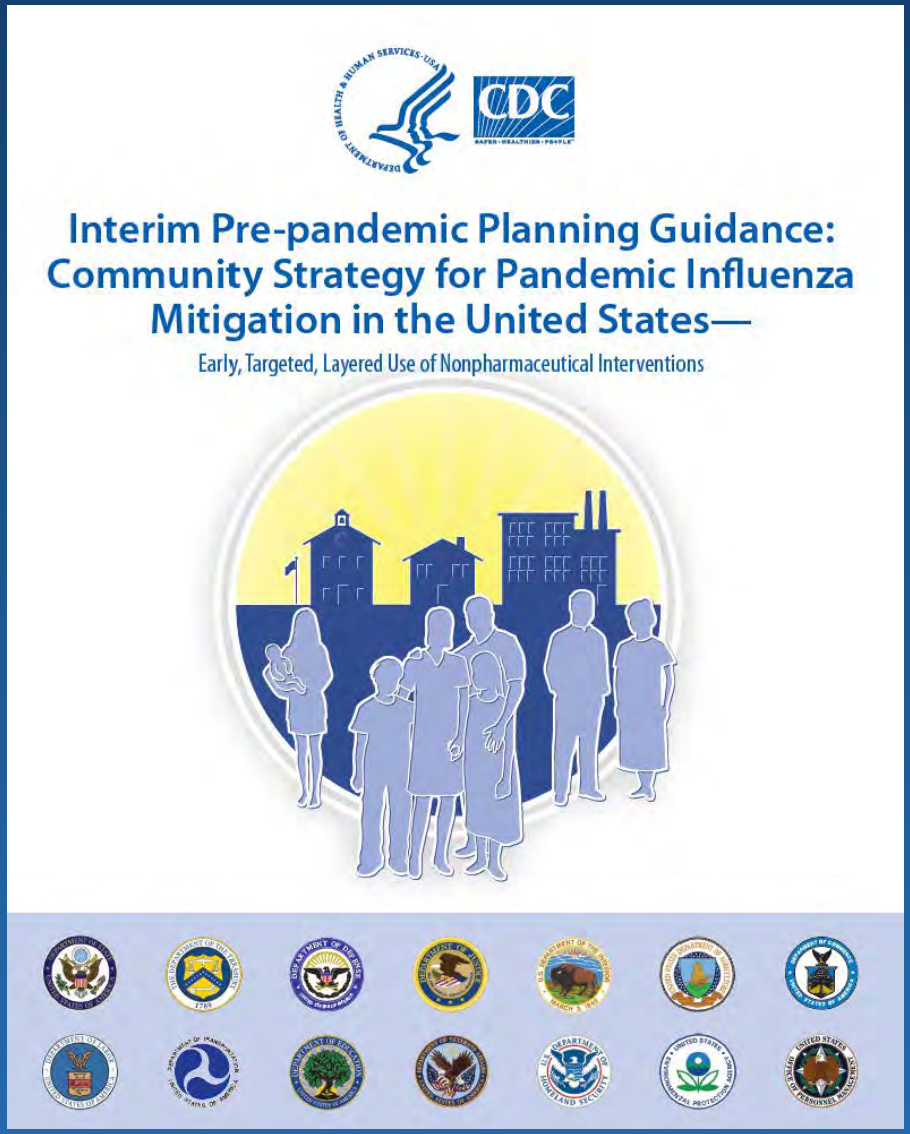
- The specificity and temporal associations between excess mortality and the triggers of NPI activation and deactivation suggests a causal relationship.

- None of the 43 cities had a second peak of influenza while the first set of NPIs were still in effect; in essence each of the cities with bimodal patterns served as their own control.

Early, sustained, and layered application of NPI (e.g., Quarantine and Isolation; School Closures; and Social Distancing) played a critical role in mitigating the consequence of the 1918-19 influenza pandemic in the United States.

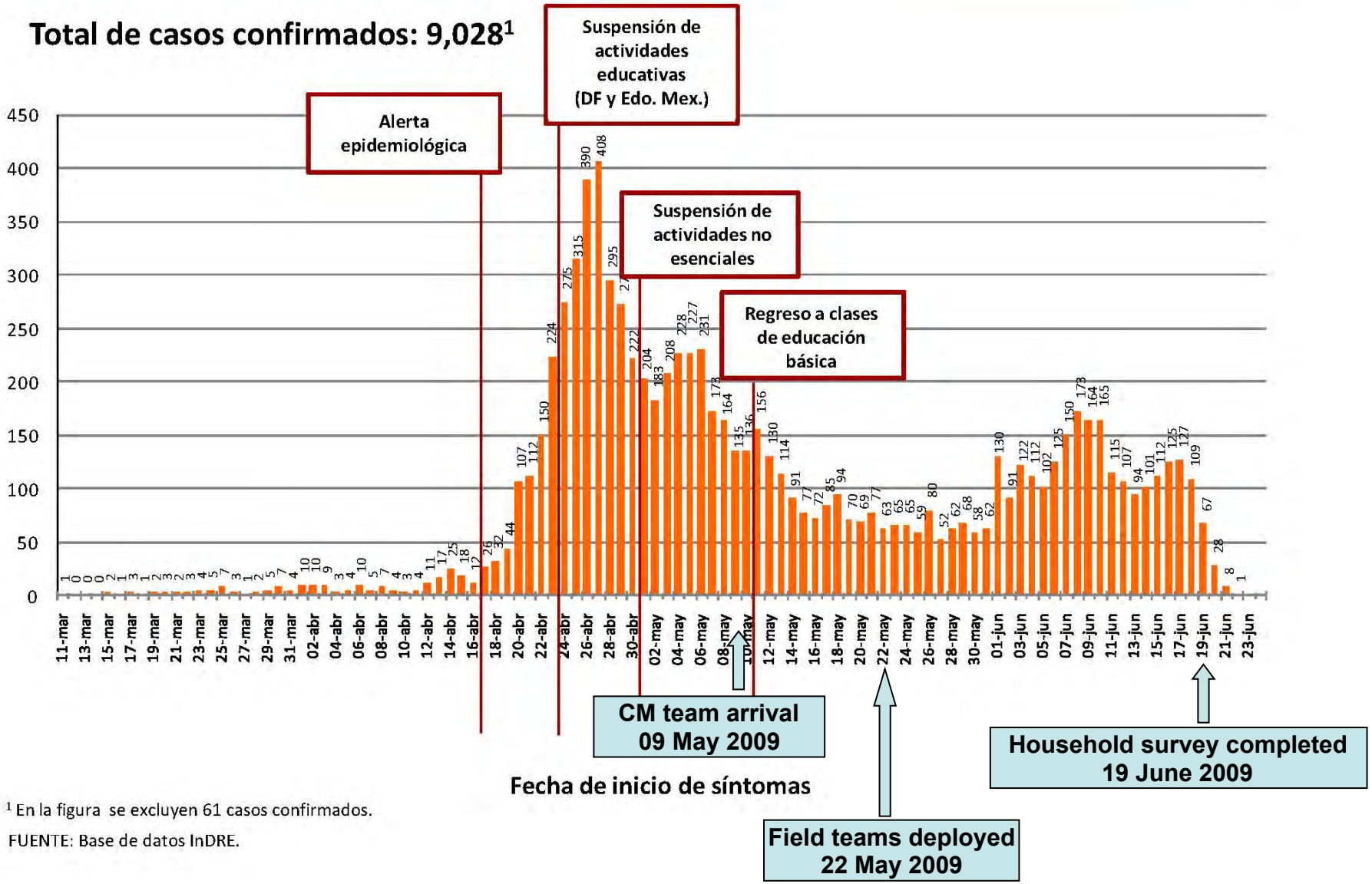


Federal pandemic influenza policy, February 1, 2007-present



Distribución de los casos confirmados de acuerdo a la fecha de inicio de síntomas

SALUD



[1] En la figura se excluyen 61 casos confirmados.

FUENTE: Base de datos InDRE.

A Tale of Many Cities:
School Closures in During 2009 H1N1 Pandemic

A Tale of Many Cities: A Contemporary Historical Study of the Implementation of School Closures during the 2009 pA(H1N1) Influenza Pandemic

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University of Michigan

Katrin S. Kohl
Martin S. Cetron
United States Centers for Disease Control and Prevention

Howard Markel
University of Michigan

Abstract Applying qualitative historical methods, we examined the consideration and implementation of school closures as a nonpharmaceutical intervention (NPI) in thirty US cities during the spring 2009 wave of the pA(H1N1) influenza pandemic. We gathered and performed close textual readings of official federal, state, and municipal government documents; media coverage; and academic publications. Lastly, we conducted oral history interviews with public health and education officials in our selected cities. We found that several local health departments pursued school closure plans independent of CDC guidance, that uncertainty of action and the rapidly evolving understanding of pA(H1N1) contributed to tension and pushback from the public, that the media and public perception played a significant role in the response to school closure decisions, and that there were some notable instances of interdepartmental communication breakdown. We conclude that health departments should continue to develop and fine-tune their action plans while also working to develop better communication methods with the public, and work more closely with education officials to better understand the complexities involved in closing schools. Lastly, state and local governments should work to resolve lingering issues of legal authority for school closures in times of public health crises.

Keywords pA(H1N1) influenza; nonpharmaceutical intervention; school closure; pandemic preparedness

Research for this article was funded by the United States Centers for Disease Control and Prevention, Solicitation Number 2010-N-11968.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Journal of Health Politics, Policy and Law, Vol. 41, No. 3, June 2016
DOI 10.1215/03616878-3523958

Reactive School Closures in Michigan During the 2009 H1N1 Pandemic

MAJOR ARTICLE

The Effect of Reactive School Closure on Community Influenza-Like Illness Counts in the State of Michigan During the 2009 H1N1 Pandemic

Brian M. Davis,[1] Howard Markel,[2] Alex Navarro,[2] Eden Wells,[1] Arnold S. Monto,[1] and Allison E. Aiello[3]

[1]Epidemiology Department, University of Michigan, Ann Arbor; [2]Center for the History of Medicine, University of Michigan, Ann Arbor; and [3]Epidemiology Department, University of North Carolina, Chapel Hill, North Carolina

In sum, 559 Michigan schools were closed as a nonpharmaceutical intervention during the influenza A 2009 (H1N1) pandemic. By linking the proportion of schools closed within a district to state influenza-like illness (ILI) surveillance data, we measured its effect on community levels of ILI. This analysis was centered by the peak week of ILI for each school district, and a negative binomial model compared three levels of school closure: 0%, 1%–50%, and 51%–100% of schools closed from three weeks leading up to ILI peak to four weeks following ILI peak rate. We observed that school closures were reactive, and there was no statistically significant difference between ILI rates over the study period. There was an elevated rate ratio for ILI at 51%–100% closure, and a reduction in the rate ratio at the 1%–50% compared to the 0% closure level. These findings suggest that district level reactive school closures were ineffective.

Keywords. Influenza; influenza-like illness; school closure; nonpharmaceutical interventions.

At the start of the 2009 influenza A (H1N1) pandemic, the Centers for Disease Control and Prevention (CDC) recommended proactive school closures as a nonpharmaceutical intervention (NPI) whenever a confirmed or probable case of 2009 influenza A (H1N1) was identified in a school [1]. On 5 May 2009, the CDC modified its guidelines, emphasizing local decision making and recommending school closures only when high absenteeism interfered with a school's educational mission [2]. Over 3000 schools in the United States closed during the spring and fall waves of the 2009 influenza A (H1N1) pandemic.

We studied retrospective data on 559 school closures in the state of Michigan during the fall wave of the 2009 influenza A (H1N1) pandemic. Most were reactive and occurred late in these school districts' pandemic experience [3]. We hypothesized that late school closures would not result in a significant difference in influenza-like illness (ILI) rates in these communities.

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Clinical Infectious Diseases®

DOI: 10.1093/cid/civ182

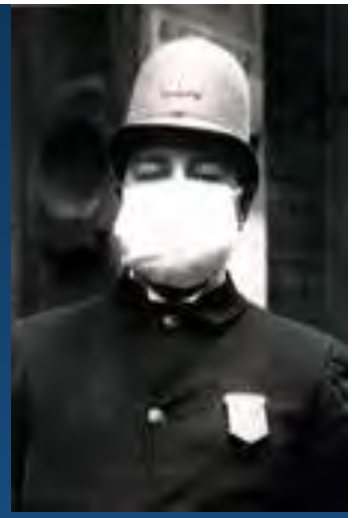
METHODS

We used data from the Michigan Department of Community Health (MDCH) collected during the fall of 2009. The MDCH proactively recorded information on school closures from 559 public traditional, public charter and private K-12 schools during the fall term in response to 2009 influenza A (H1N1). Several schools issued multiple closures during the period, for a total of 567 separate school closure incidents. This study was considered an activity not regulated by the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board (HUM #00091632).

Influenza-like Illness Outcomes

The primary outcome of interest was the weekly ILI count for each school district. In addition to schools closed, MDCH provided a list of all ILI cases reported

Concluding Caveats:



- NPIs do not appear to work well, historically or in computer models, if isolation or social distancing policies are not well-implemented or are implemented too late or for too short a period of time. The triggers, (i.e., when to pull them and when to release them) are unclear and difficult to hit just right.

- The economic, political, and social costs of these measures are high and need to be carefully weighed against severity of circulating virus.

- All social distancing strategies raise a host of practical, ethical and legal dilemmas that often demand adjudication by leaders.

- School closure, in particular, raises important social questions of where children are to stay during a pandemic, how to keep them healthy and nourished, and issues of parental supervision and leave.