

COVID-19 Conversations



Nancy Messonnier, MD

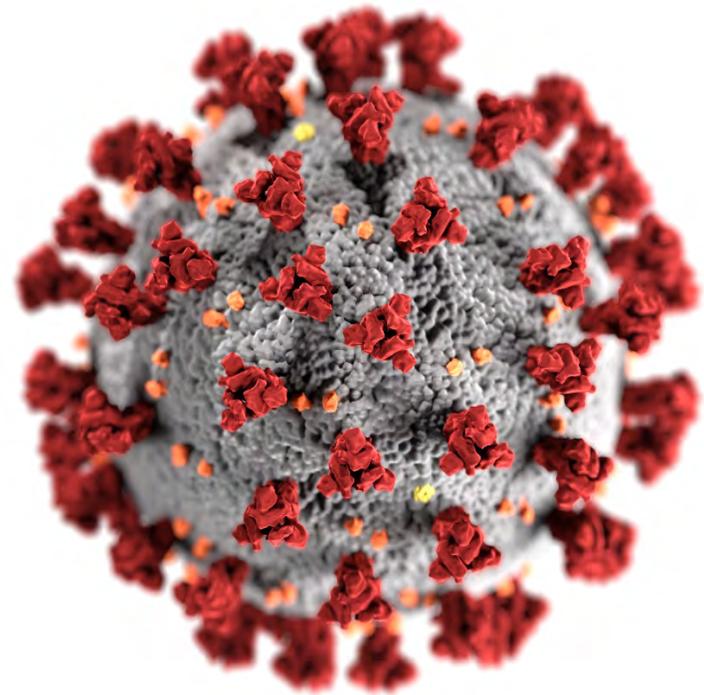
Director, National Center for
Immunization and Respiratory
Diseases, Centers for Disease Control
and Prevention

COVID19Conversations.org | [#COVID19Conversations](https://twitter.com/COVID19Conversations)



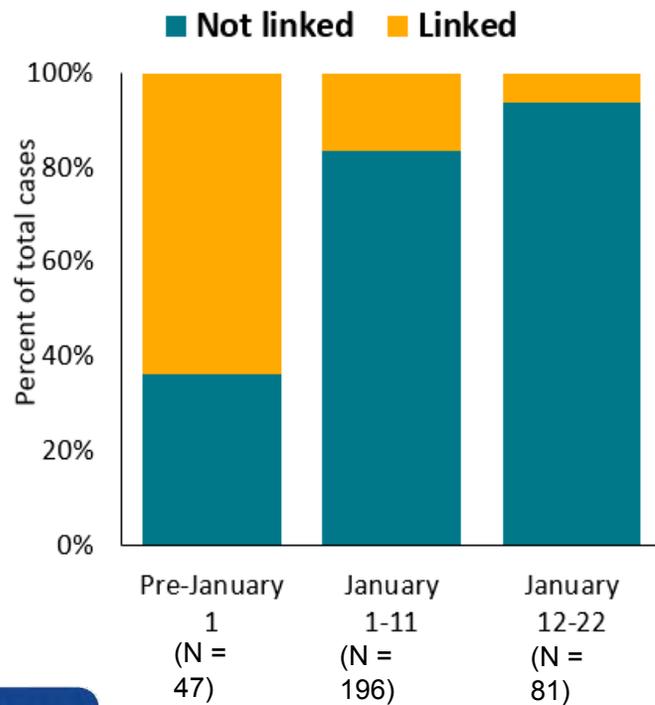
The Science of Social Distancing

Dr. Nancy Messonnier, Director
CDC's National Center for Immunization and Respiratory Diseases



For more information: www.cdc.gov/COVID19

Linkage of Early COVID-19 Cases* to Huanan Seafood Wholesale Market – Wuhan, China



<https://www.healthpolicy-watch.org/>



Adapted from Li 2020, *N Engl J Med*; DOI: 10.1056/NEJMoa2001316.

* Total N=324 persons with complete exposure histories among 425 total cases

**Early
Distribution
of Cases:
China as of
20-Jan-2020**



CNN Source: National Health Commission of the PRC. Data correct as of January 26, 08:30 P.M. ET
Graphic: Natalie Leung and Henrik Pettersson, CNN



Widespread rapid dissemination in our hyper-connected world creates real-time challenges to prediction analyses



Modeling Likelihood of Infection Outside Mainland China

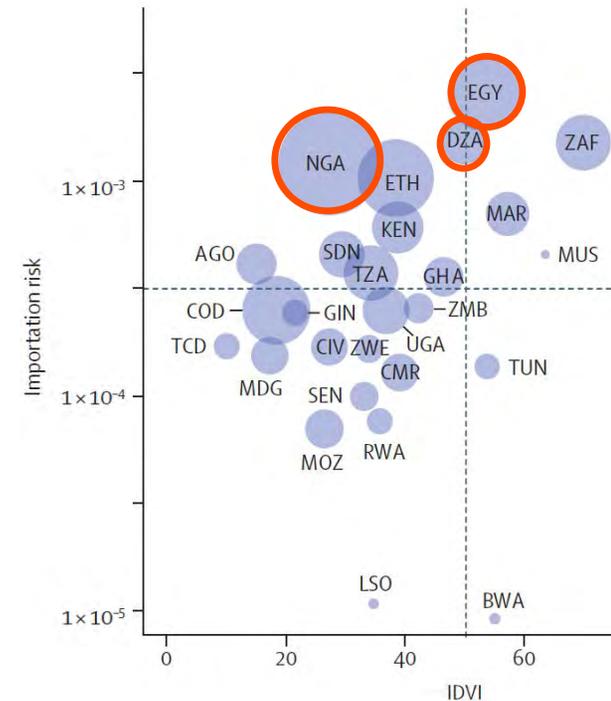
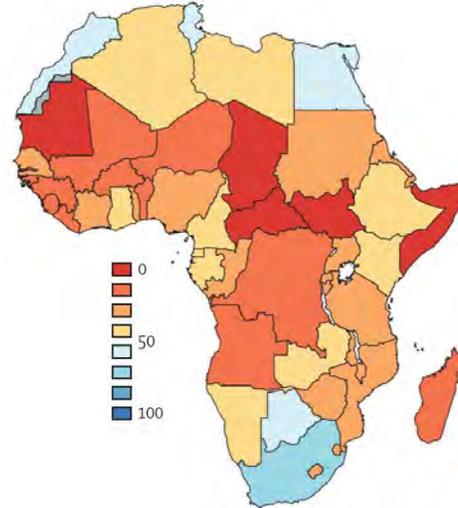
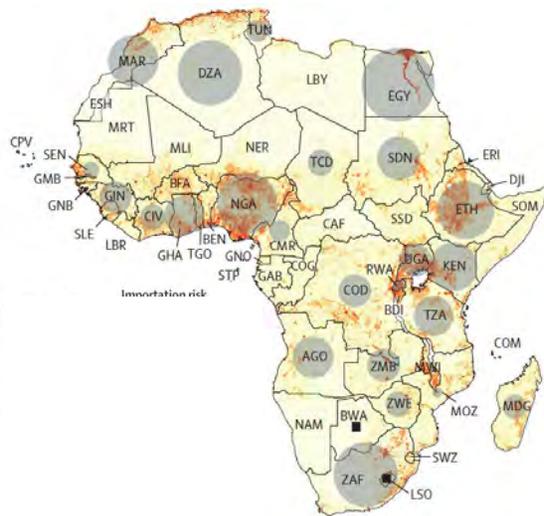
Air travel volume inbound
From China provinces



Infectious disease
vulnerability index (IDVI)



Contextualized risk



Gilbert 2020, *Lancet*; [https://doi.org/10.1016/S0140-6736\(20\)30411-6](https://doi.org/10.1016/S0140-6736(20)30411-6)

SARS-CoV-2 in Human Samples and Transmission

- **Respiratory secretions – main mode of transmission**
 - Infection is spread through respiratory droplets in the air and that land on surfaces
 - Transmission from persons who are pre-symptomatic or who may have asymptomatic infection is possible but the contribution of these infections to overall numbers of illness is not fully known at this time.
- **Stool – unlikely at this time**
 - Readily detectable by RT-PCR but only one report of replication-competent virus cultured
- **Perinatal – no transmission yet observed**
 - Not detected by RT-PCR in amniotic fluid, cord blood, neonatal throat swab, breast milk



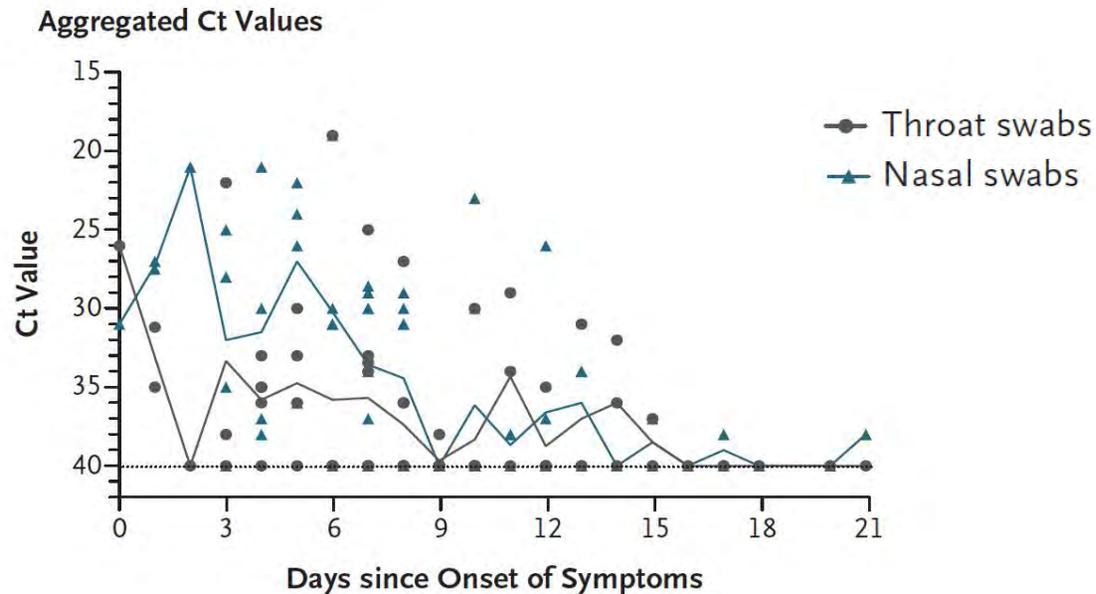
Zou 2020, *N Engl J Med*; DOI: 10.1056/NEJMc2001737. Pan 2020, *Lancet Infect Dis*; [https://doi.org/10.1016/S1473-3099\(20\)30113-4](https://doi.org/10.1016/S1473-3099(20)30113-4).

Zhang 2020; *China CDC Weekly*; <http://weekly.chinacdc.cn/en/article/id/ffa97a96-db2a-4715-9dfb-ef662660e89d>. Chen 2020; *Lancet*; [https://doi.org/10.1016/S0140-6736\(20\)30360-3](https://doi.org/10.1016/S0140-6736(20)30360-3)

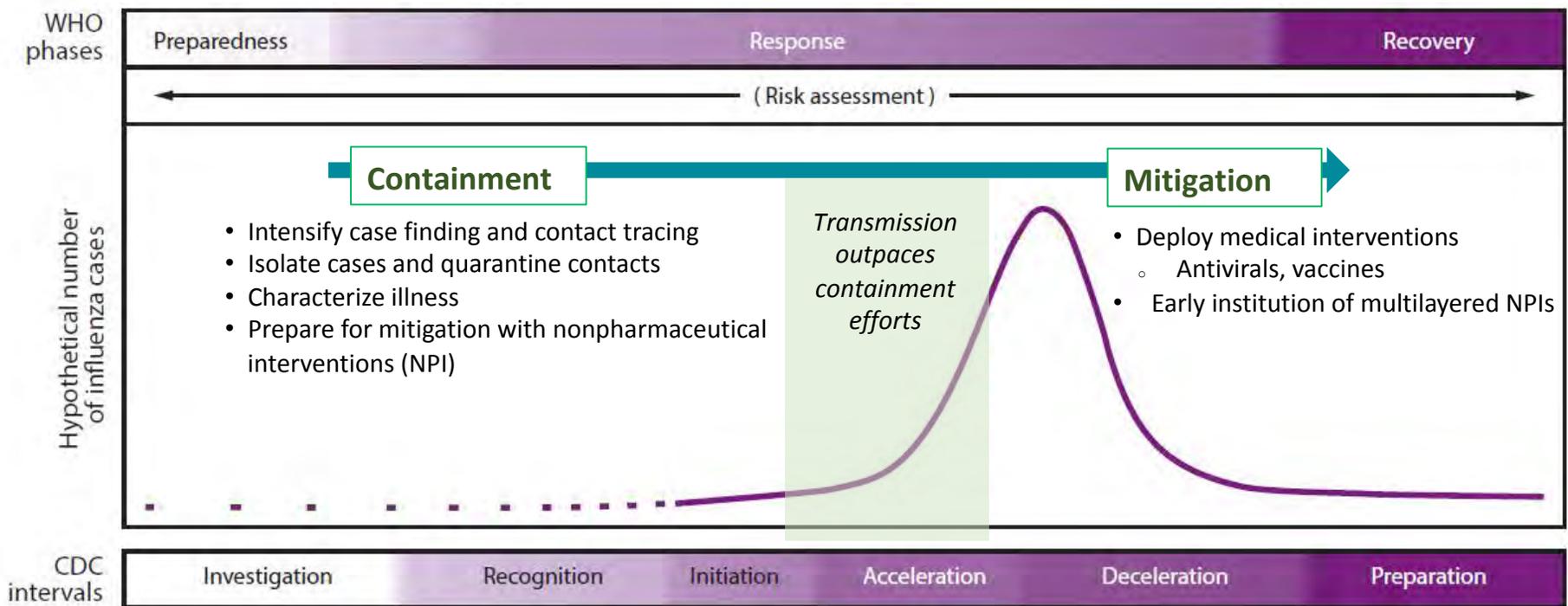
Zhu 2020 *Transl Pediatr*; <http://dx.doi.org/10.21037/tp.2020.02.06>

Viral Shedding Greatest At Time Symptoms Start

- SARS-CoV-2 viral loads in 17 symptomatic patients
- No data regarding duration of replication-competent virus shedding (e.g., culture)



Zou 2020, *N Engl J Med*; DOI: 10.1056/NEJMc2001737



Adapted from: Holloway 2014, [MMWR Recomm Rep;63\(No. RR-6\)](#). Qualls 2017, [MMWR Recomm Rep; 66\(No. RR-1\)](#). Jernigan 2020, [MMWR Early Release: February 25, 2020](#).

Nonpharmaceutical Interventions (NPIs) = “Social Distancing”



At Home



At School



At Work



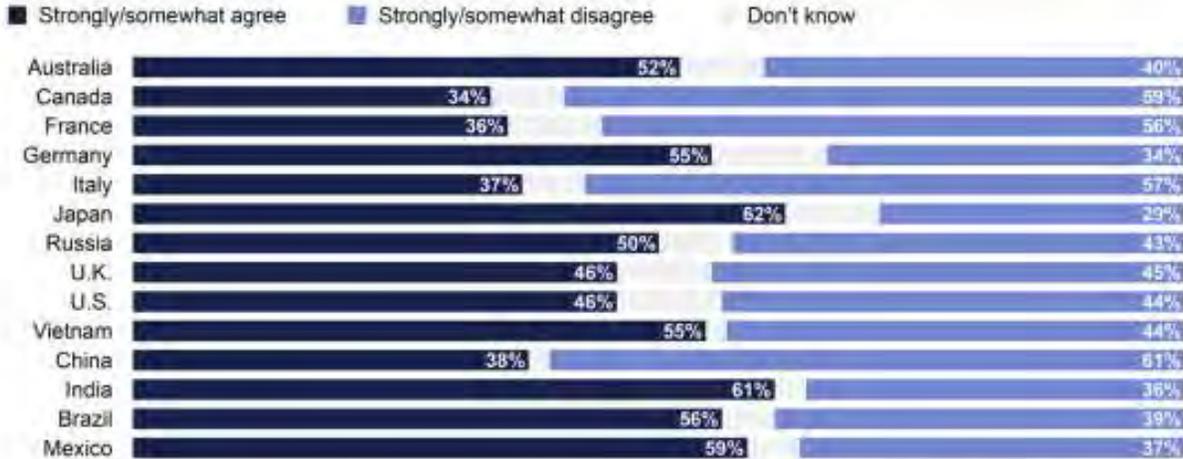
At a Gathering

<https://www.cdc.gov/nonpharmaceutical-interventions/index.html>



Worldwide Sentiment That Travel Restrictions and Self-isolation May Not Stop COVID-19

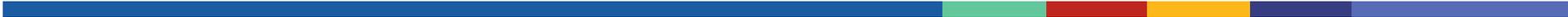
Restrictions on travel and self-isolation won't stop spread of COVID-19 virus



CS, NET adults polled in 14 countries between Mar 19-21, 2020



Source: <https://www.ipsos.com/sites/default/files/ct/news/documents/2020-03/coronavirus-wave-5-pr-ipsos.pdf>



Nonpharmaceutical Interventions (NPIs): “Personal Action”

COVID 19 CORONAVIRUS DISEASE
CORONAVIRUS DISEASE 2019 (COVID-19)

You can help prevent the spread of respiratory illnesses with these actions:

- Avoid close contact with people who are sick.
- Avoid touching your eyes, nose & mouth.
- Wash hands often with soap & water for at least 20 seconds.

www.cdc.gov/COVID19

Your hands carry germs you can't see

Wash your hands

www.cdc.gov/handwashing

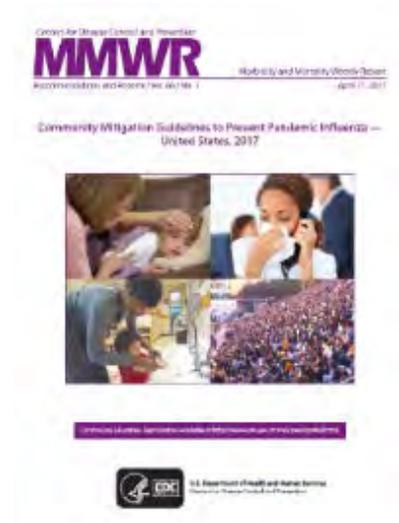
1/14/20 - February 11, 2020 12:00PM



www.cdc.gov/handwashing

Schools, Pandemics, and School Closures

- School reopening often heralds increased influenza activity
 - Host factors: age-specific susceptibility, viral shedding, behaviors
 - Environmental factors: very high social density in an age-assorted setting
- Timing of influenza-related school closures relative to influenza spread*
 - Reactive: after flu is widespread
 - Pre-emptive: before disease becomes widespread within school
- Only pre-emptive coordinated closures are considered an NPI*
 - Evidence on effectiveness: historic, modeling, & observational studies*¹



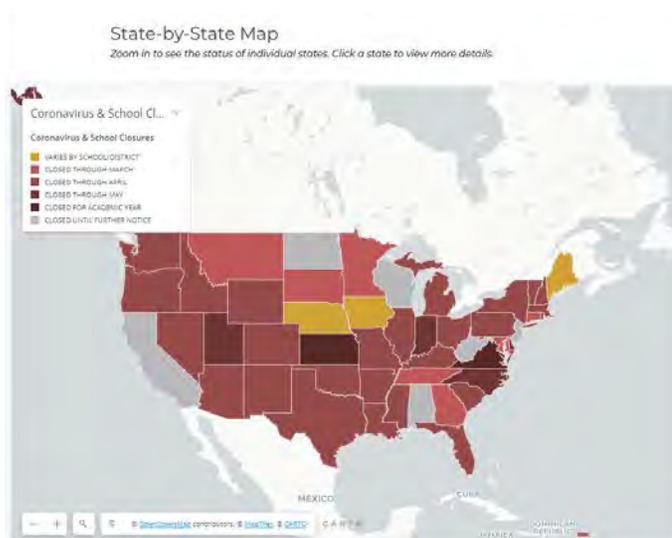
*Per 2017 Community Mitigation Guidelines: <https://www.cdc.gov/mmwr/volumes/66/rr/pdfs/rr6601.pdf>.

¹See additional information in Technical Report 2, Appendix 5,

NPI Body of Evidence Summary Table: <https://stacks.cdc.gov/view/cdc/44314>



State Board of Education OKs distance learning for remainder of 2019-20 because of COVID-19



MD Students May Be Home Longer Amid COVID-19 outbreak, School Systems Prepare



About Us Jobs Board
Essential education reporting in NEW YORK



The 'new reality' of coronavirus: Here's what NYC's first day of remote learning looked like

By Alex Zimmerman, Christina Vega, Renée Amis 2 days ago



Adami Peña's son Lucas completes a mindfulness exercise.



Epidemiological and Modeling Studies Support Social Distancing in Workplaces

Ahmed et al. *BMC Public Health* (2018) 18:518
<https://doi.org/10.1186/s12889-018-5446-1>

BMC Public Health

RESEARCH ARTICLE

Open Access

Effectiveness of workplace social distancing measures in reducing influenza transmission: a systematic review

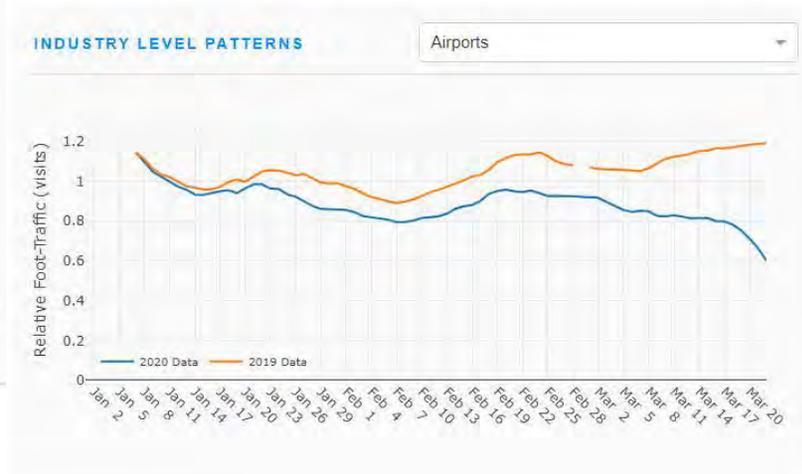
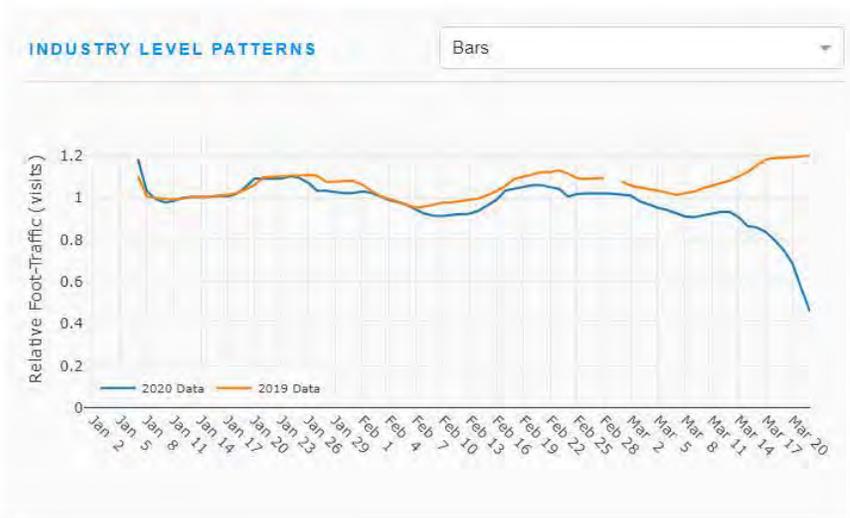


Faruque Ahmed¹, Nicole Zviedrite and Amra Uzicanin

- Effect is more pronounced when workplace social distancing is combined with other NPIs
- Effectiveness declines with delayed triggering of workplace social distancing or lower compliance
- Results are mainly based on modeling; more empirically parametrized models and epidemiological studies needed



General Public is Heading Mass Gathering and Travel Messages



Source: https://www.safegraph.com/dashboard/covid19-commerce-patterns?utm_source=newsletter&utm_medium=email&utm_campaign=covid_dashboard

Mass Gathering in Densely Populated Area Gave Rise to 2009 H1N1 Outbreaks in Mexico

OPEN ACCESS freely available online

PLUS ONE

Inside the Outbreak of the 2009 Influenza A (H1N1)v Virus in Mexico

Hector M. Zepeda-Lopez¹, Lizbeth Perez-Arango², Angel Miller-Garcia³, Aaron Dominguez-Lopez⁴, Beatriz Xicoastec-Cazarez⁵, Eleazar Lara-Ruiz⁶, Jorge A. Ramirez-Hernandez⁷, Edgar Sevilla-Royas⁸, Maria Esther Orozco⁹, Amador Ahuvel-Ortega⁹, Ignacio Villatoro-Ruiz⁹, Ricardo J. Garcia-Cavares⁹, Luis M. Tejada⁹

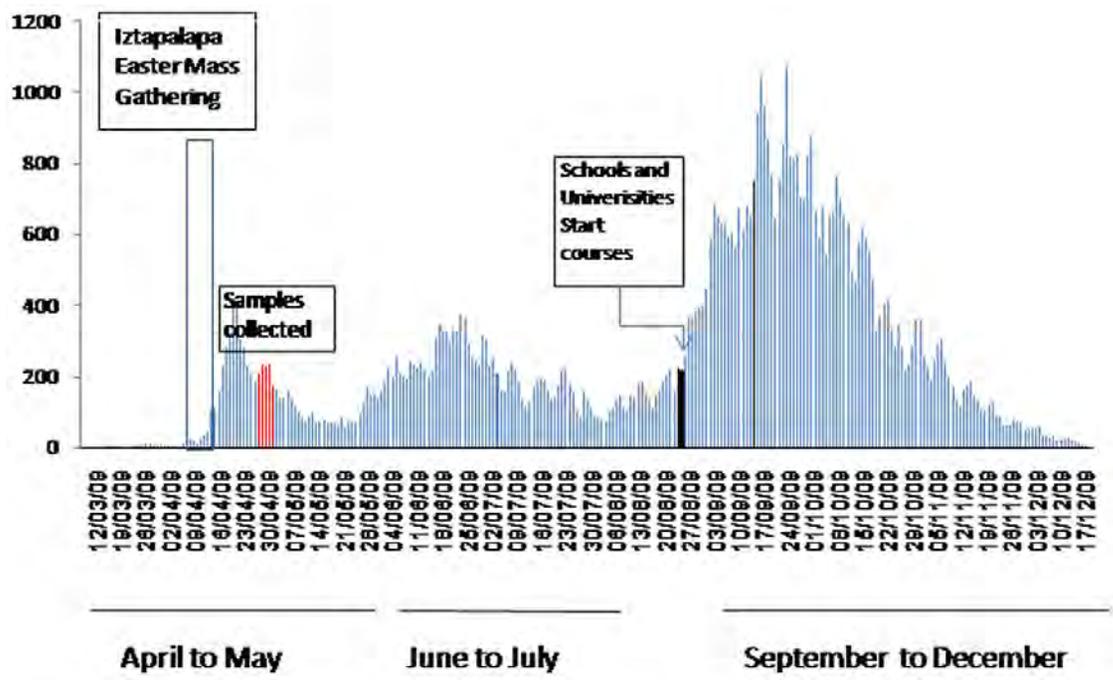
Abstract
 Background: Influenza viruses pose a threat to human health because of their potential to cause global disease. Between mid-March and mid-April a pandemic influenza A virus emerged in Mexico. This report details 202 cases of infection of humans with the 2009 influenza A virus (H1N1)v, which occurred in Mexico City as well as the spread of the virus throughout the entire country.

Methodology and Findings: From May 1st to May 26th nasopharyngeal swabs, derived from 751 patients, were collected at 227 outpatient clinics and 28 hospitals distributed throughout Mexico City. Analysis of samples using real-time RT-PCR revealed that 202 patients out of the 751 subjects (26.9%) were confirmed to be infected with the virus. Six confirmed cases of human infection with the strain influenza (H1N1)v suffered respiratory symptoms. The greatest number of confirmed cases during the outbreak of the 2009 influenza A (H1N1)v were seen in neighborhoods on the northern side of Mexico City including Iztapalapa, Cuauhtemoc, Iztacalapa, and Tlalcahuac which are the most populated areas in Mexico City. Using these data, together with data reported by the Mexican Secretariat of Health (SE) to date, we plot the course of influenza (H1N1)v activity throughout Mexico.

Conclusion: Our data, which is backed up by SEH data, show that the greatest numbers of the 2009 influenza A (H1N1)v cases were seen in the most populated areas. We speculate on conditions in Mexico which may have spurred this pandemic, the first in 41 years. We accept the hypothesis that high population density and a mass gathering which took on pandemic proportions in the capital spread of the disease which developed in three peaks of activity throughout the country.

Keywords: Influenza A (H1N1)v, Mexico, 2009, pandemic, outbreak, mass gathering, densely populated areas, Mexico City, Iztapalapa, Cuauhtemoc, Iztacalapa, Tlalcahuac

Introduction
 In 2009, human infections with the influenza A (H1N1)v virus became a global health threat throughout the world. Initial cases were seen in the state of La Gloria in the Eastern coastal region of Mexico in the state of Veracruz. Similar cases of influenza A (H1N1)v were reported shortly thereafter in other parts of Mexico including Mexico, Michoacan and San Luis Potosi [1]. The World Health Organization (WHO) reported that the first case of human infection with the 2009 influenza A (H1N1)v virus was in Mexico on June 11th [2]. The Mexican Secretariat of Health (SE) reported that the highest number of influenza (H1N1)v cases were reported in the Federal District (74% of total cases) also known as Mexico City [3]. To date however, the origin of the virus has not been determined. Using phylogenetic analysis, Ballester et al. [4] showed that the new influenza A (H1N1)v has been circulating in swine for at least 10 years before the first human infection. The course of the 2009 influenza A (H1N1)v virus between 22 and 112 days after the outbreak was revealed from a reconstruction of the pandemic virus. A "single introduction" of the virus is considered in North America since 1968 and an H1N1 virus that has been circulating for decades in some populations in Europe and Asia. It has been proposed that transmission in the hemisphere (HA) and internal membrane (NA) proteins could have facilitated human-to-human transmission in the 2009 influenza A (H1N1)v virus over time [5]. However, it has not been reported that pathogen flow patterns with the 2009 influenza A (H1N1)v virus (including the H2N2) but are strongly reflective. Therefore despite the cases replicating outbreaks in the temporary increase [2]. More recently, it has been observed several influenza A virus

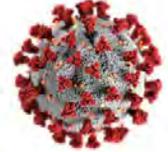


Source: Zepeda-Lopez HM, et al. 2010; PLoS ONE 5(10): e13256.

Social Distancing Works

- Experience is based on influenza pandemics, but data shows that community interventions do work
- Communities are interconnected systems.
- Actions taken in one sector may have a domino effect.
- Critical that community plans account for interconnection when the country begins a staged return to normal activity.

Implementation of Mitigation Strategies for Communities with Local COVID-19 Transmission



Background

When a novel virus with pandemic potential emerges, nonpharmaceutical interventions, which will be called community mitigation strategies in this document, often are the most readily available interventions to help slow transmission of the virus in communities. Community mitigation is a set of actions that persons and communities can take to help slow the spread of respiratory virus infections. Community mitigation is especially important before a vaccine or drug becomes widely available.

The following is a framework for actions which local and state health departments can recommend in their community to both prepare for and mitigate community transmission of COVID-19 in the United States. Selection and implementation of these actions should be guided by the local characteristics of disease transmission, demographics, and public health and healthcare system capacity.

Goals

The goals for using mitigation strategies in communities with local COVID-19 transmission are to slow the transmission of disease and in particular to protect:

- Individuals at increased risk for severe illness, including older adults and persons of any age with underlying health conditions (See Appendix A)
- The healthcare and critical infrastructure workforces

These approaches are used to minimize morbidity and mortality and the social and economic impacts of COVID-19. Individuals, communities, businesses, and health care organizations are all part of a community mitigation strategy. These strategies should be implemented to prepare for and where there is evidence of community transmission. Signals of ongoing community transmission may include detection of confirmed cases of COVID-19 with no epidemiologic link to travelers or known cases, or more than three generations of transmission.

Implementation is based on:

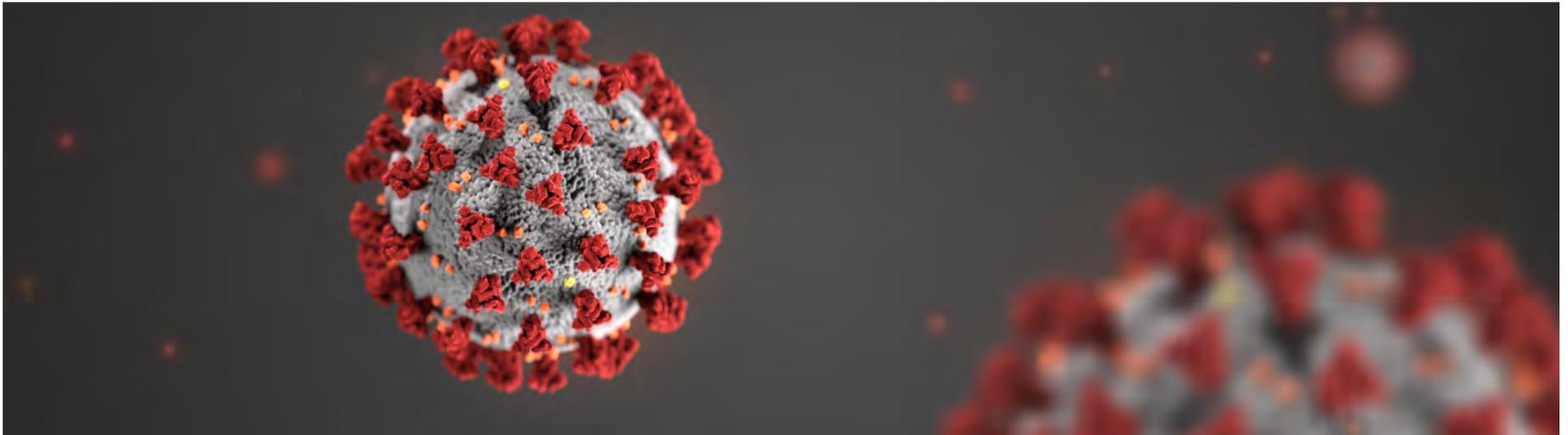
- Emphasizing individual responsibility for implementing recommended personal-level actions
- Empowering businesses, schools, and community organizations to implement recommended actions, particularly in ways that protect persons at increased risk of severe illness
- Focusing on settings that provide critical infrastructure or services to individuals at increased risk of severe illness
- Minimizing disruptions to daily life to the extent possible

Guiding principles

- Each community is unique and appropriate mitigation strategies will vary based on the level of community transmission, characteristics of the community and their populations, and the local capacity to implement strategies (Table 1).
- Consider all aspects of a community that might be impacted, including populations most vulnerable to severe illness and those that may be more impacted socially or economically, and select appropriate actions.
- Mitigation strategies can be scaled up or down depending on the evolving local situation.
- When developing mitigation plans, communities should identify ways to ensure the safety and social well-being of groups that may be especially impacted by mitigation strategies, including individuals at increased risk for severe illness.
- Activation of community emergency plans is critical for the implementation of mitigation strategies. These plans may provide additional authorities and coordination needed for interventions to be implemented (Table 2).
- Activities in Table 2 may be implemented at any time regardless of the level of community transmission based on guidance from local and state health officials
- The level of activities implemented may vary across the settings described in Table 2 (e.g., they may be at a minimal/moderate level for one setting and at a substantial level for another setting in order to meet community response needs).
- Depending on the level of community spread, local and state public health departments may need to implement mitigation strategies for public health functions to identify cases and conduct contact tracing (Table 3). When applied, community mitigation efforts may help facilitate public health activities like contact tracing.

For more information: www.cdc.gov/COVID19





For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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

