

State Epidemiology: Lessons Learned and Future Applications

Dr. Caitlin Pedati

11/05/21

The brown river usually flows lazily through the middle of town. But today it is a torrent, carrying human bodies. Some, still alive, are gasping for air, thrashing the water. Approaching the river to enjoy lunch on its banks, two doctors, horrified by what they see, begin to haul people out of the water. There are no signs of violence, but the victims' eyes are glazed, their weak pulses racing. The doctors cannot keep up with the flow of bodies. They save a few and watch helplessly as the others drift beyond them.

Suddenly, one of the doctors lowers an old man to the ground and starts to run. "What are you doing?" yells the other doctor. "For God's sake, help me save these people!"

Without stopping, she yells back over her shoulder. "I'm going upstream to find out why they're falling in."

From **"Inside the Outbreaks: The Elite Medical Detectives of the Epidemic Intelligence Service"**

By Mark Pendergrast. New York: Houghton Mifflin Harcourt

Public Health and Medical Examiners/Death Investigators

- Essential partner in public health
- Surveillance system in vital records
- Inform understanding of impact/burden of conditions
- Alert to unusual patterns
- Can offer insight that helps protect others

Objectives

- Overview of Public Health COVID-19 Response
- Current Trends and Focus
- Future priorities

Finding Outbreaks

- Calls from local public health/clinicians/MEs/providers/partners/public
- Routine reporting surveillance systems (active and passive)
- State-to-state communication (formal and informal)
- Health Alert Network messages (other states and federal, CDC, FDA, HHS, FEMA)

Monitoring resources:

- NEJM, JAMA, EID, etc.
- Professional societies (AAP daily brief, etc.)
- ProMED
- CIDRAP
- Medscape
- Becker's
- General media alerts

Published Date: 2019-12-30 23:59:00

Subject: PRO/AH/EDR> Undiagnosed pneumonia - China (HU): RFI

Archive Number: 20191230.6864153

UNDIAGNOSED PNEUMONIA - CHINA (HUBEI): REQUEST FOR INFORMATION

A ProMED-mail post

<http://www.promedmail.org>

ProMED-mail is a program of the
International Society for Infectious Diseases

<http://www.isid.org>

[1]

Date: 30 Dec 2019

Source: Finance Sina [machine translation]

<https://finance.sina.cn/2019-12-31/detail-iihnzakh1074832.d.html?from=wap>

Public Health Response

- “Are we in danger?”
- “Why are people getting sick?”
- “Can you help?”

Public Health Reponse

- Identification/surveillance
- Implementing new/evolving information and anticipating future changes/needs
- Building new systems to accommodate new technology/information
- Allocation of limited resources
- Balance with other public health work/activities
- Protect wellbeing and safety of public health workforce
- Sharing data (real-time) and answering questions
- Constant communication among stakeholders: response staff, State Hygienic Laboratory, agency staff, legal support, other state agencies, local public health, clinicians (infection control), other states, federal partners (bidirectional), businesses, educators, legislators, media, general public

What is an Outbreak?

- An increase in the observed/reported number of cases of a disease or health problem compared with the expected number for a given **place** or among a specific group of **people** over a particular period of **time**

Epidemic = Outbreak = Cluster

Investigating an Outbreak

1. Determine the existence of the epidemic
2. Confirm the diagnosis
3. Define a case and count cases
4. Orient the data in terms of time, place, and person
5. Determine who is at risk of becoming ill
6. Develop and test the hypothesis
7. Compare the hypothesis with the established facts
8. Plan a more systematic study
9. Prepare a written report
10. Execute control and prevention measures

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Defining & Counting Cases

Council of State & Territorial Epidemiologists



Introduction

The Council of State and Territorial Epidemiologists (CSTE) works to advance public health policy and epidemiologic capacity. CSTE is an organization of member states and territories representing public health epidemiology, known as the "Council". In addition, CSTE has a separate role as the professional home for applied public health epidemiologists representing multiple levels of public health practice with more than 2000 individual members. CSTE provides technical advice and assistance to partner organizations and to federal public health agencies such as Centers for Disease Control and Prevention (CDC). CSTE members have surveillance and epidemiology expertise in a broad range of areas including infectious diseases, environmental health, chronic diseases, occupational health, injury, maternal and child health, and more. CSTE supports effective public health surveillance and sound epidemiologic practice through training, capacity development, and peer consultation.

Mission

- Promote effective use of epidemiologic data to guide public health practice and improve health
- Support effective public health surveillance and epidemiologic practice through training, capacity development, and peer consultation
- Develop standards for practice
- Advocate for resources and scientifically based policy

Vision

Using the power of epidemiology to improve the public's health.

Council of State & Territorial Epidemiologists



21-ID-01

Committee: Infectious Disease

Title: Update to the standardized surveillance case definition and national notification for 2019 novel coronavirus disease (COVID-19)

https://cdn.ymaws.com/www.cste.org/resource/resmgr/21-ID-01_COVID-19_updated_Au.pdf

There are two different types of tests – **diagnostic tests** and **antibody tests**.



Diagnostic tests can show if you have an active Covid-19 infection and need to take steps to quarantine or isolate yourself from others. **Molecular** and **antigen tests** are types of diagnostic tests that can detect if you have an active COVID-19 infection. Samples for diagnostic tests are typically collected with a nasal or throat swab, or saliva collected by spitting into a tube.



Antibody tests look for antibodies in your immune system produced in response to SARS-CoV-2, the virus that causes COVID-19. **Antibody tests should not be used to diagnose an active COVID-19 infection.** Antibodies can take several days or weeks to develop after you have an infection and may stay in your blood for several weeks or more after recovery. Samples for antibody tests are typically blood from a finger stick, or blood drawn by your doctor or other medical personnel.

Public Health Reporting

- Legal requirement
- Monitor for emergence of new issues
- Be able to communicate a community's health issues
- Implement control and prevention measures
- Track cases
- Understand trends

Reportable Communicable Diseases and Infectious Conditions

To report diseases immediately, use the 24/7 disease reporting telephone hotline: 1-800-362-2736

Outbreak Reporting

IMMEDIATELY report to the department outbreaks of any kind, diseases that occur in unusual numbers or circumstances, unusual syndromes, or uncommon diseases. Outbreaks may be infectious, environmental or occupational in origin and include food-borne outbreaks or illness secondary to chemical exposure (e.g., pesticides, anhydrous ammonia).

Bioterrorism Reporting

IMMEDIATELY report diseases, syndromes, poisonings and conditions of any kind suspected or caused by a biological, chemical, or radiological agent or toxin when there is reasonable suspicion that the disease, syndrome, poisoning or condition may be the result of a deliberate act such as terrorism. Examples of these include (but are not limited to) anthrax, mustard gas, sarin gas, ricin, tularemia and smallpox.

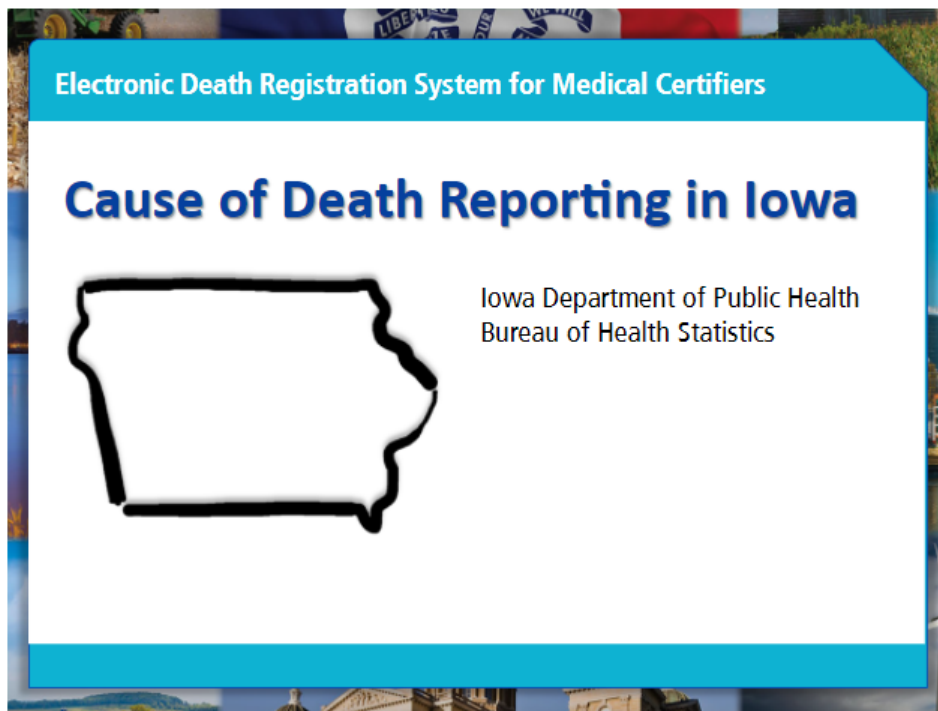
Reportable Diseases

Report cases of the diseases listed in the following table to the department within the time frame specified in the When to Report column and by the reporting method in the How to Report column.

IVES Training

EDRS: Medical Certifier Cause of Death Reporting in Iowa

[RESOURCES](#) [EMAIL IVES HELPDESK](#)




Public Health Reporting – Vital Statistics

National Center for Health Statistics

CDC > NCHS > COVID-19 Data from NCHS



 COVID-19 Data from
NCHS

COVID-19 Death Data and Resources

COVID-19 Mortality
Overview

Daily Updates of Totals by
Week and State

Weekly Updates by Select
Demographic and
Geographic
Characteristics

COVID-19 Death Data and Resources

NCHS is responding to [Coronavirus Disease 2019 \(COVID-19\)](#) with new resources to help monitor and report deaths from COVID-19.

Below please find our latest provisional death counts, guidance for filling out death certificates for deaths due to COVID-19, and other important alerts and information.



[Understanding the Numbers](#)

Learn how provisional counts are produced and how they differ from other sources.



[Understanding Death Certificate Data](#)

Learn more about cause-of-death data and improving the quality of information on death certificates.

Post-Mortem Specimen Guidance

The screenshot shows the CDC COVID-19 website. The top navigation bar includes 'COVID-19' and links for 'Your Health', 'Vaccines', 'Cases & Data', 'Work & School', 'Healthcare Workers' (selected), 'Health Depts', 'Science', and 'More'. On the left sidebar, under 'Healthcare Workers', there are links for 'Testing', 'Clinical Care', 'Infection Control' (selected), and 'Post Vaccine Considerations for Workplaces'. The main content area is titled 'Collection and Submission of Postmortem Specimens from Deceased Persons with Confirmed or Suspected COVID-19' with a subtitle 'Postmortem Guidance'. It indicates the page was 'Updated Dec. 2, 2020' and has a 'Print' link. A light blue box contains the text: 'CDC recommendations for SARS-CoV-2 infection may be adapted by state, tribal, local, and territorial health departments to respond to rapidly changing local circumstances.'

- Considerations regarding postmortem rapid antigen testing
- Updates to collection of postmortem fixed tissue specimens
- Added requirements for precautionary signs posted on the autopsy door and written biosafety policies and procedures present in autopsy facilities
- Additional language and new extended measures have been added to PPE guidance during PPE shortage, specifically optimizing strategy for N95 respirators and gowns and considerations for other non-NIOSH-approved Filtering Facepiece Respirators (FFR)
- EPA-approved disinfectant choice has been updated with emerging data about SARS-CoV-2 virus survival time on different surfaces.
- Engineering Controls sections updated with other recommended facility design (sink location and drainage requirement) to prevent pathogen transmission.
- Added importance of the selected eye protection and respirator not interfering with the correct fit and function of the other.

Public Health Reporting – Vital Statistics

Vital Statistics Reporting Guidance

Report No. 3 • April 2020



Guidance for Certifying Deaths Due to Coronavirus Disease 2019 (COVID–19)

Introduction

In December 2019, an outbreak of a respiratory disease associated with a novel coronavirus was reported in the city of Wuhan in the Hubei province of the People's Republic of China (1). The virus has spread worldwide and on March 11, 2020, the World Health Organization declared Coronavirus Disease 2019 (COVID–19) a pandemic (2). The first case of COVID–19 in the United States was reported in January 2020 (3) and the first death in February 2020 (4), both in Washington State. Since then, the number of reported cases in the United States has increased and is expected to continue to rise (5).

Cause-of-Death Reporting

When reporting cause of death on a death certificate, use any information available, such as medical history, medical records, laboratory tests, an autopsy report, or other sources of relevant information. Similar to many other diagnoses, a cause-of-death statement is an informed medical opinion that should be based on sound medical judgment drawn from clinical training and experience, as well as knowledge of current disease states and local trends (6).

Part I

Public Health Reporting – Vital Statistics

COVID-19 Alert No. 9

April 15, 2021

Reminder: COVID-19 Certification Guidance and Frequently Asked Questions (FAQ) Page on the NVSS COVID-19 Website

In April 2020, the National Center for Health Statistics (NCHS) released *Guidance for Certifying Deaths Due to Coronavirus Disease 2019 (COVID-19)* available at <https://www.cdc.gov/nchs/data/nvss/vsrg/vsrg03-508.pdf>. NCHS also provided answers to FAQs from certifiers about how to report deaths due to COVID-19 on death certificates, among other related topics, which can be accessed at <https://www.cdc.gov/nchs/covid19/faq.htm>. The page has four main sections: How NCHS Collects and Reports Data on Deaths Due to COVID-19, Surveillance of Deaths Due to COVID-19, Coding Deaths Due to COVID-19, and Certifying Deaths Due to COVID-19.

Certifiers should only report conditions that they determine *caused or contributed* to death. If the certifier determines COVID-19 is a cause of death, then they should report it on the death certificate. If the certifier determines COVID-19 did *not* cause or contribute to death, then they should *not* report it on the death certificate.

Certifying Deaths Due to COVID-19 Vaccines on Death Certificates

Like all other causes of death, if the certifier determines that a condition is a cause of death, then they should report it on the death certificate. Like any vaccine, if a certifier determines that a COVID-19 vaccine *caused or contributed* to death, then they should report it on the death certificate, along with any complications it caused to specify how the vaccine caused death. For example, if the certifier determines a COVID-19 vaccine was the underlying cause of death, then “adverse effects of COVID-19 vaccine” or other similar language should be reported on the lowest line used in Part I with the specific adverse effects on the lines above in a logical sequence. An example of a cause-of-death statement could be “anaphylaxis” on line a. and “allergic reaction to COVID-19 vaccine” on line b.

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Current Trends & Focus

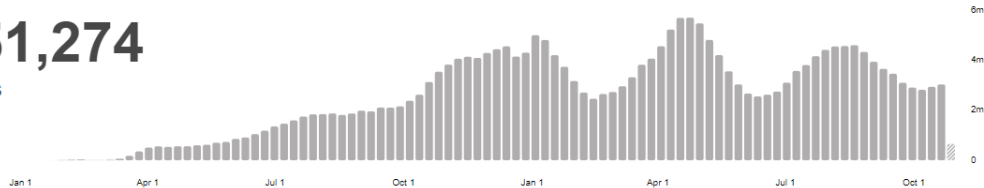


WHO Coronavirus (COVID-19) Dashboard

Global Situation

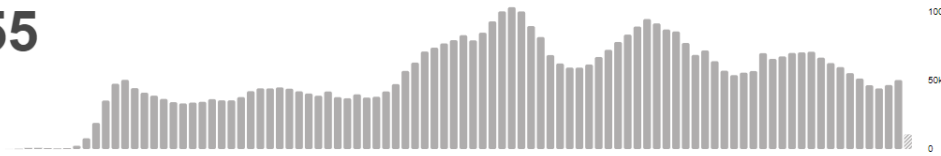
246,951,274

confirmed cases



5,004,855

deaths



Source: World Health Organization

Situation by WHO Region

Americas 93,711,700 confirmed

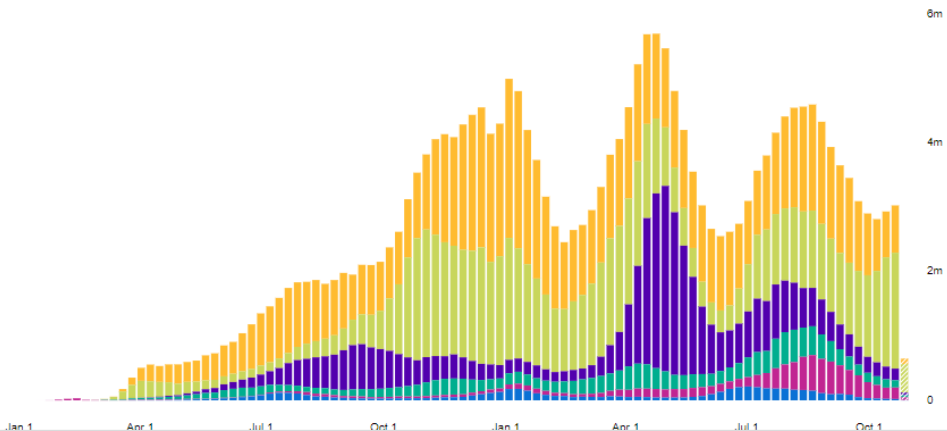
Europe 77,231,883 confirmed

South-East Asia 44,005,474 confirmed

Eastern Mediterranean 16,382,071 confirmed

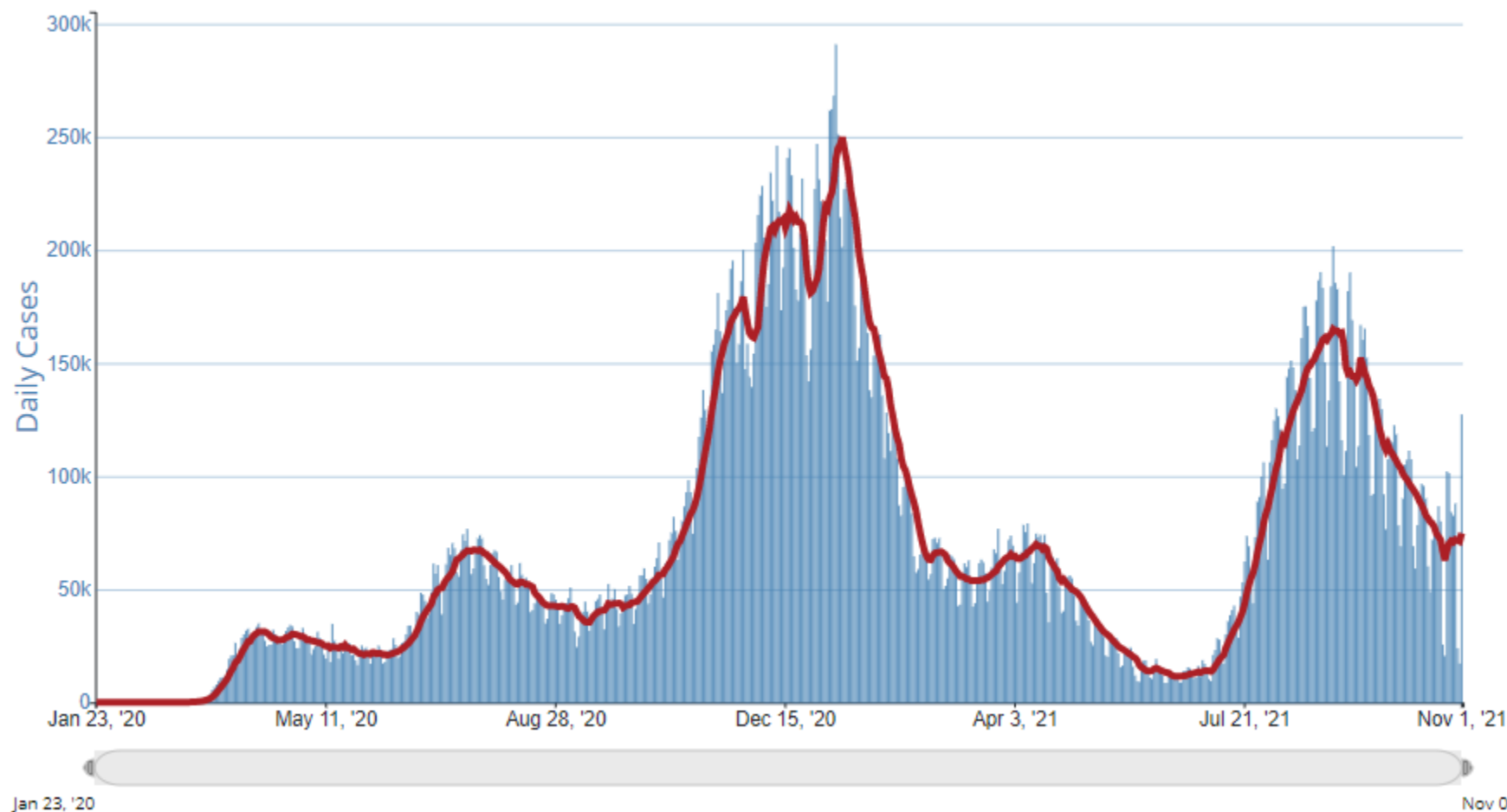
Western Pacific 9,465,219 confirmed

Africa 6,154,163 confirmed

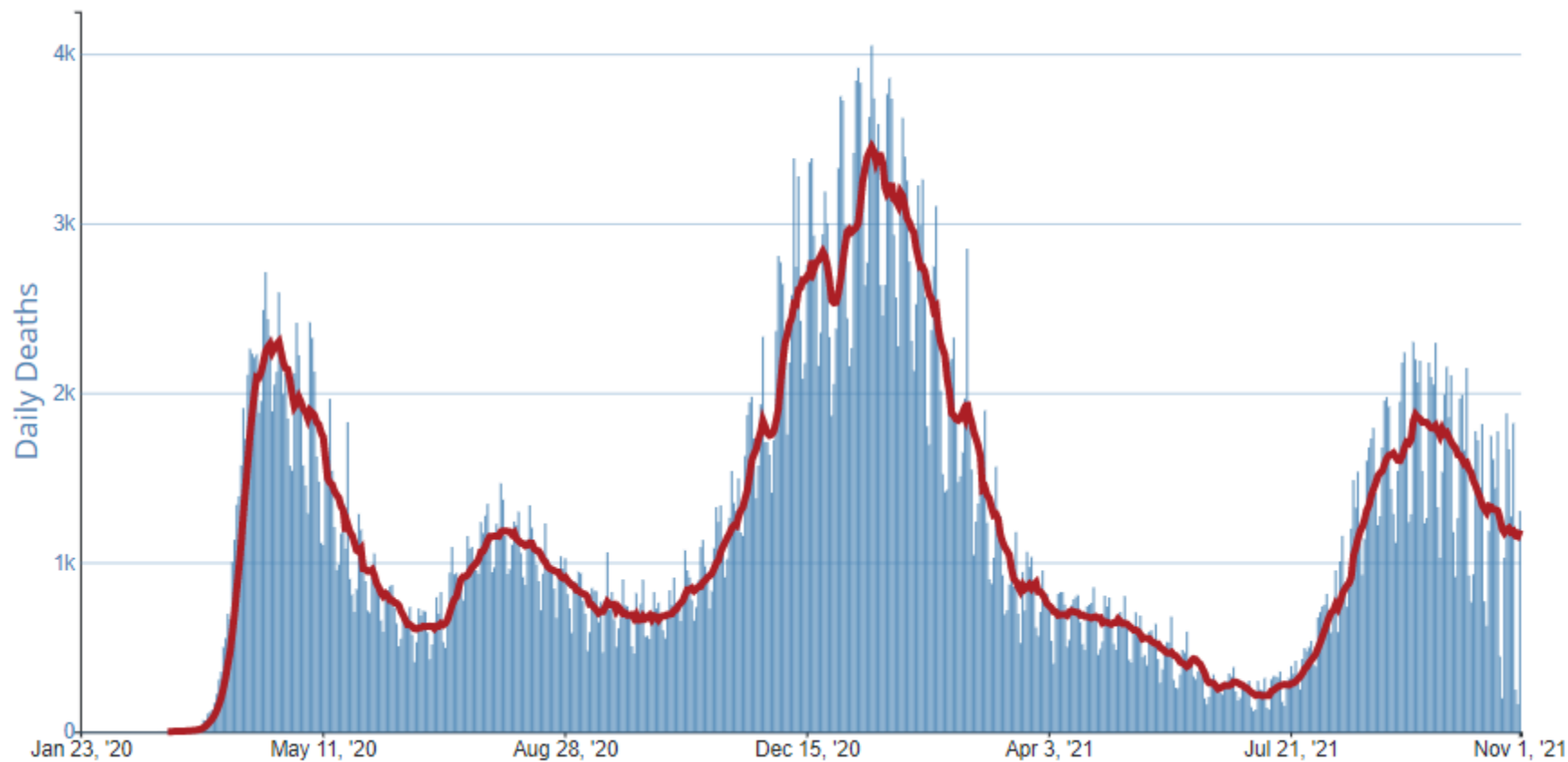


Source: World Health Organization

Daily Trends in Number of COVID-19 Cases in The United States Reported to CDC



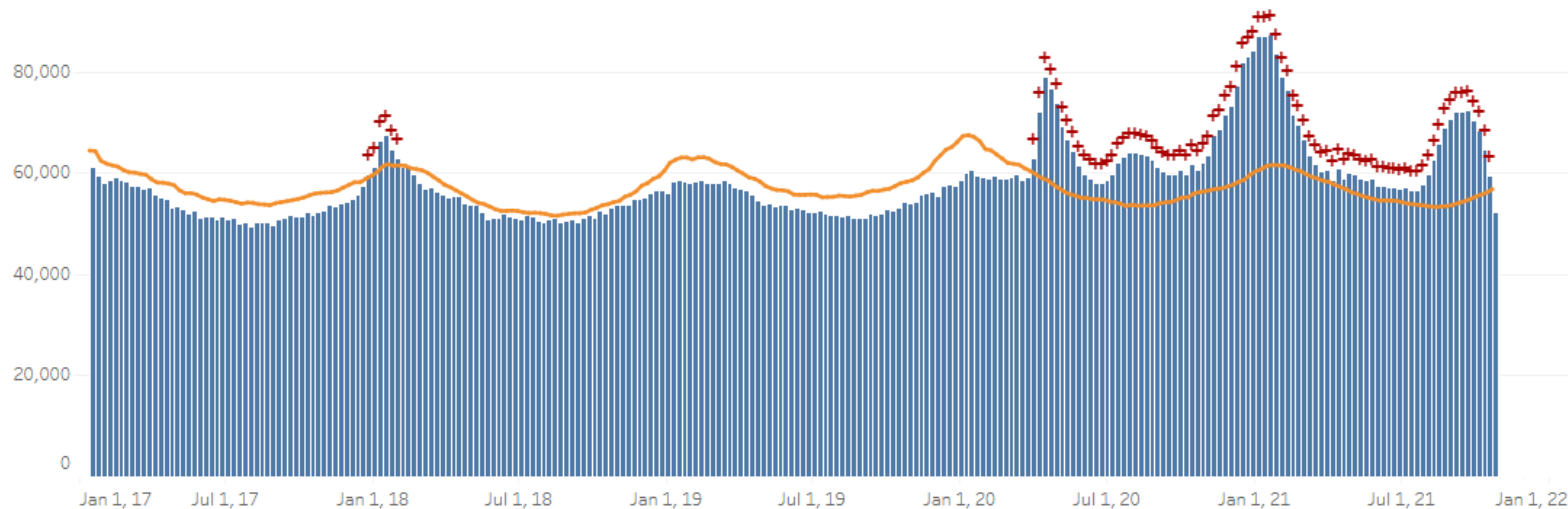
Daily Trends in Number of COVID-19 Deaths in The United States Reported to CDC



Excess Deaths

- + indicates observed count above threshold
- Predicted number of deaths from all causes
- upper bound threshold for excess deaths

Weekly number of deaths (from all causes)



Iowa COVID-19 Summary

Testing Data

Positive Tests
by Day



Apr 1, 21 Vaccine Available for All

Hospitalization Data

COVID-19 Hospitalized Patients
by Day



Apr 1, 21 Vaccine Available for All

Death Data

Total Deaths
by Day



Apr 1, 21 Vaccine Available for All

6,816

Positive Tests last 7 days²



483

Covid-19 Patients in Hospitals

104

Deaths occurred
between 08/29/2021 - 10/30/2021*

530,607

Total Positive Tests



111

Covid-19 Patients in ICU

7,069

Total Deaths



8.2%

Positive Tests (Past 14 Days)



75

Covid-19 Patients admitted last 24H

3,771,944

Total Doses Administered¹

68.0%

18+ Fully Vaccinated¹

70.5%

12+ with at least one dose¹

Those not fully vaccinated account for...

82.0%

Covid-19 Patients in ICU⁴

74.8%

Patients Hospitalized because of Covid-19⁴

Long Term Care Data

23

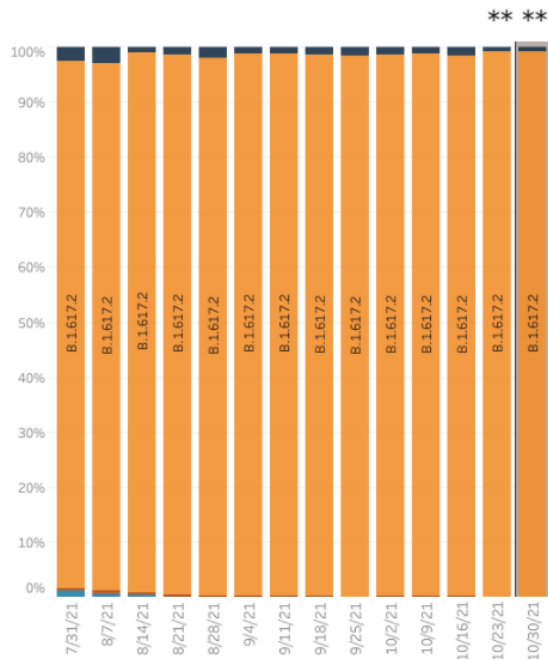
Long Term Care Outbreaks



IDPH
IOWA Department
of PUBLIC HEALTH

Variant Proportions

United States: 7/25/2021 – 10/30/2021



United States: 10/24/2021 – 10/30/2021 NOWCAST

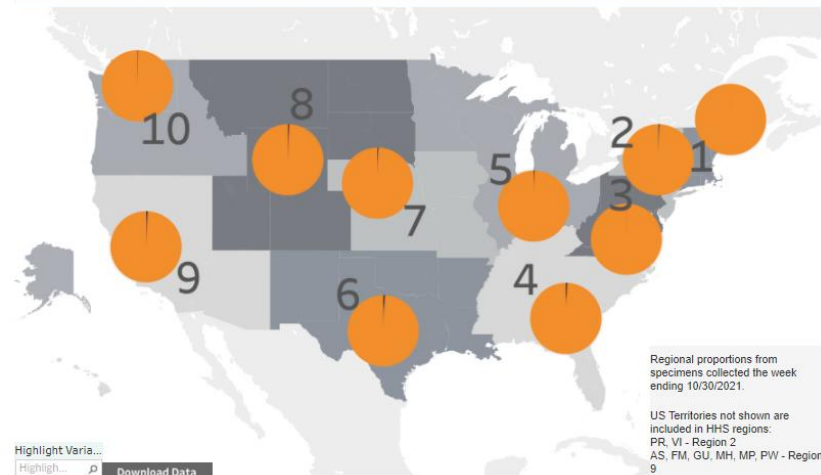
USA				
WHO label	Lineage #	US Class	%Total	95%PI
Alpha	B.1.1.7	VBM	0.0%	0.0-0.0%
Delta	B.1.617.2	VOC	99.2%	98.9-99.4%
	AY.1	VOC	0.1%	0.0-0.1%
	AY.2	VOC	0.0%	0.0-0.0%
Other	Other*		0.7%	0.5-1.0%

* Enumerated lineages are US VOC and lineages circulating above 1% nationally in at least one week period. "Other" represents the aggregation of lineages which are circulating <1% nationally during all weeks displayed.

** These data include Nowcast estimates, which are modeled projections that may differ from weighted estimates generated at later dates

Q.1-Q.8 are aggregated with B.1.1.7. AY.3-AY.41 and their sublineages are aggregated with B.1.617.2.

United States: 10/24/2021 – 10/30/2021 NOWCAST



HHS Protect Inpatient Bed Dashboard

State/Territory

Please select from the list

722,949

Inpatient Beds

5,608 Hospitals Reporting

547,995

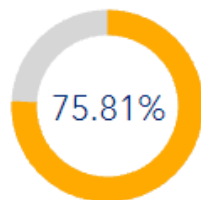
Inpatient Beds in Use

5,606 Hospitals Reporting

48,071

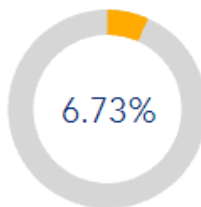
Inpatient Beds in Use for COVID-19

5,485 Hospitals Reporting



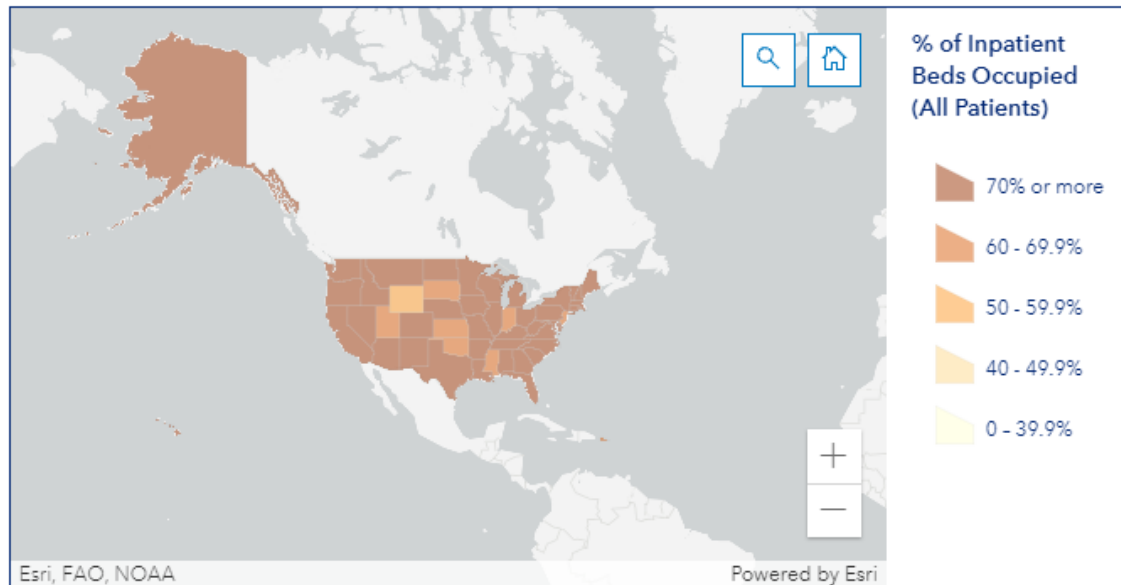
of Inpatient Beds in Use

5,606 Hospitals Reporting



of Inpatient Beds in Use for COVID-19

5,484 Hospitals Reporting



Esri, FAO, NOAA

Powered by Esri

Inpatient Bed Utilization

Inpatient Bed Utilization for COVID-19

Hospital Inpatient Population

Last Updated 11/3/2021

HHS Protect ICU Bed Dashboard

State/Territory

Please select from the list

82,228

Staffed ICU Beds

5,608 Hospitals Reporting

61,960

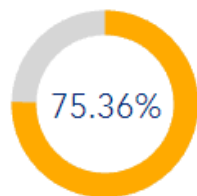
ICU Beds in Use

5,606 Hospitals Reporting

11,932

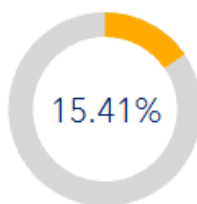
ICU Beds in Use for COVID-19

5,605 Hospitals Reporting



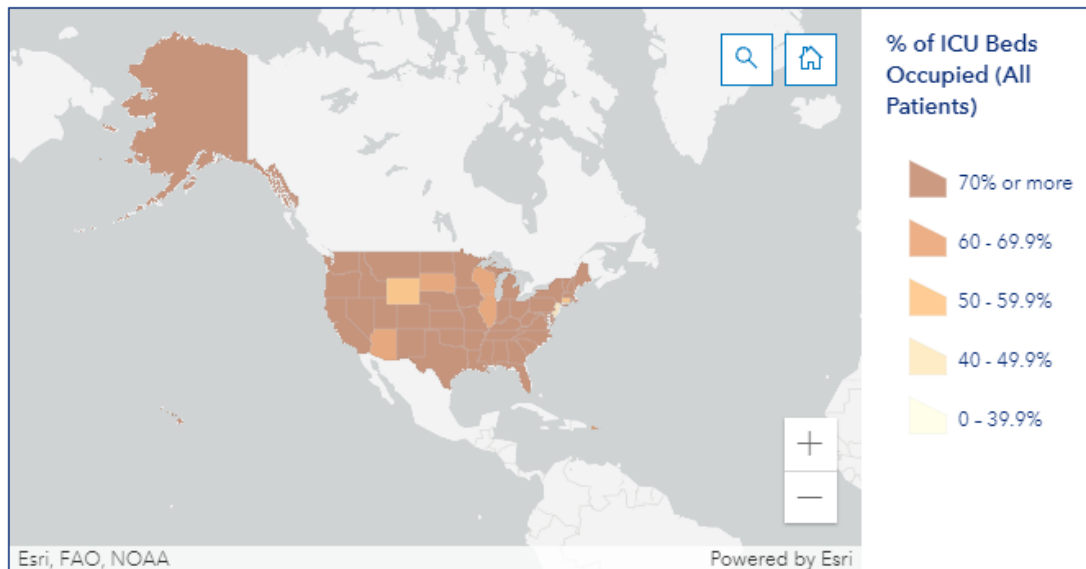
of ICU Beds in Use

5,606 Hospitals Reporting



of ICU Beds in Use for COVID-19

5,483 Hospitals Reporting



ICU Bed Utilization

ICU Bed Utilization for COVID-19

Staffed ICU Beds in use for COVID-19

Last Updated 11/3/2021

Therapeutics

COVID-19 Monoclonal Antibody Therapeutics Information for Providers

Recently, bamlanivimab, casirivimab/imdevimab, and bamlanivimab/etesevimab were granted emergency use authorization for the treatment of mild to moderate COVID-19. Until the national supply of these monoclonal antibodies (mAbs) is sufficient, the Iowa Department of Public Health and the United States government will help facilitate allocation across Iowa.

Find a COVID-19 Monoclonal Antibody Provider

[HHS mAb Site Locator](#) [NICA mAb Site Locator](#)

Request COVID-19 Monoclonal Antibodies

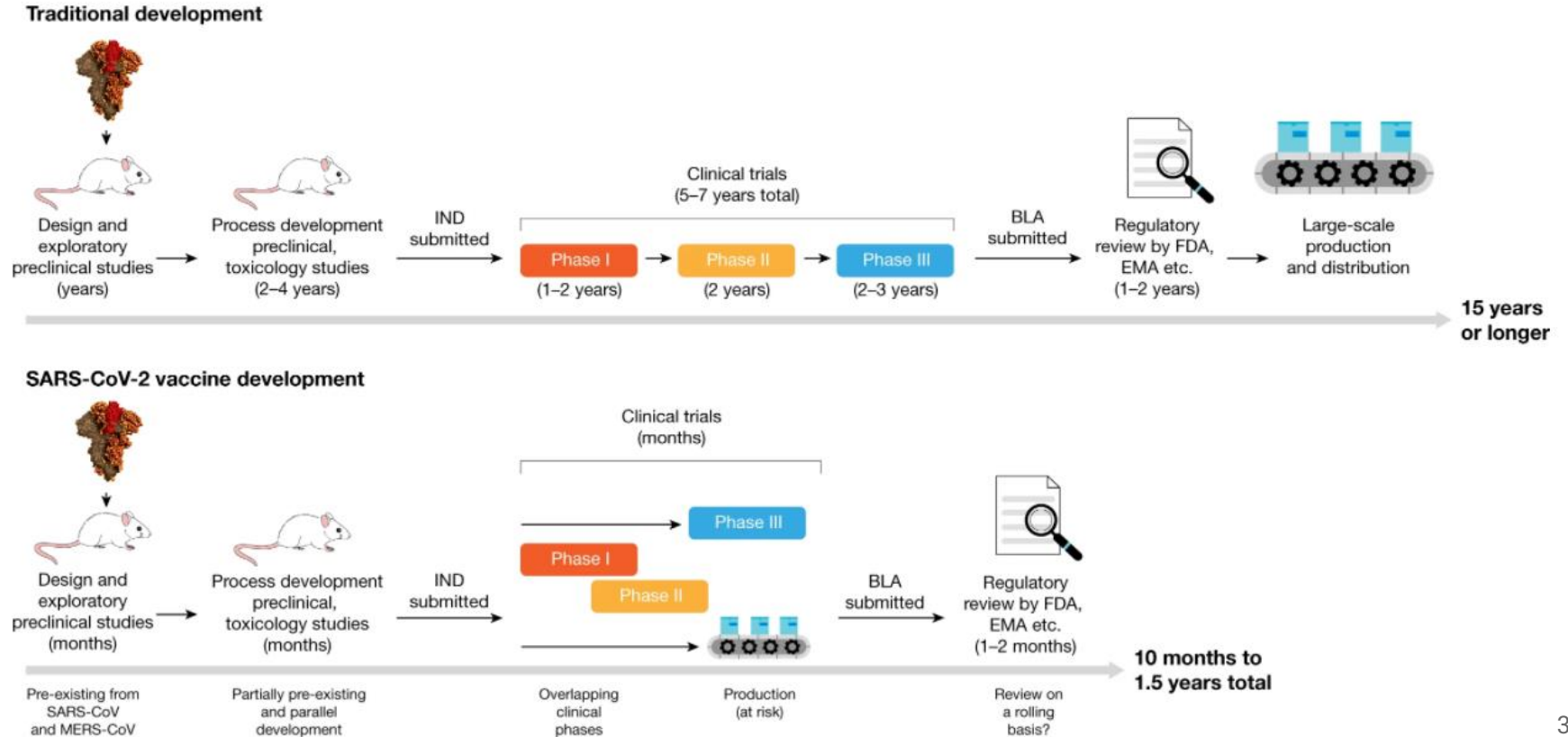
On March 24, 2021, the United States government and Eli Lilly and Company [discontinued distribution of bamlanivimab alone](#) due to resistance to variant strains. Bamlanivimab/etesevimab and casirivimab/imdevimab remain available at no cost to providers. Providers can submit a request to receive monoclonal antibodies [here](#). By submitting a request, sites are required to:

- Provide AmerisourceBergen with board of pharmacy license or physician letter of authorization
- Attest to their designated class of trade and that they will administer authorized product according to the EUA
- Provide utilization data via Teletracking or NHSN

Vaccine

Fig. 1: Traditional and accelerated vaccine-development pipelines.

From: SARS-CoV-2 vaccines in development



Vaccine

Critical intervention (ultimate tool for prevention and control)

Scientific development (coordination of efforts, using available tech/tools)

Planning for distribution and communications

Appropriately changing recommendations as new information is obtained

Vaccine Communication

- VAERS
 - Immune-mediated thrombotic events
 - Myopericarditis
- Fertility questions
- Trusted resources
- Timeline of development and approvals
- Changes/updates (boosters & pediatric availability)
- Ultimate control measure

Vaccine Efficacy

Vaccine efficacy or vaccine effectiveness

Vaccine efficacy and vaccine effectiveness measure the proportionate reduction in cases among vaccinated persons. Vaccine efficacy is used when a study is carried out under ideal conditions, for example, during a clinical trial. Vaccine effectiveness is used when a study is carried out under typical field (that is, less than perfectly controlled) conditions.

Vaccine efficacy/effectiveness (VE) is measured by calculating the risk of disease among vaccinated and unvaccinated persons and determining the percentage reduction in risk of disease among vaccinated persons relative to unvaccinated persons. The greater the percentage reduction of illness in the vaccinated group, the greater the vaccine efficacy/effectiveness. The basic formula is written as:

$$\frac{\text{Risk among unvaccinated group} - \text{risk among vaccinated group}}{\text{Risk among unvaccinated group}}$$

OR: $1 - \text{risk ratio}$

In the first formula, the numerator (risk among unvaccinated – risk among vaccinated) is sometimes called the risk difference or excess risk.

Vaccine efficacy/effectiveness is interpreted as the proportionate reduction in disease among the vaccinated group. So a VE of 90% indicates a 90% reduction in disease occurrence among the vaccinated group, or a 90% reduction from the number of cases you would expect if they have not been vaccinated.

Comparative Effectiveness of Moderna, Pfizer–BioNTech, and Janssen (Johnson & Johnson) Vaccines in Preventing COVID–19 Hospitalizations Among Adults Without Immunocompromising Conditions — United States, March–August 2021

Weekly / September 24, 2021 / 70(38);1337–1343

On September 17, 2021, this report was posted online as an MMWR Early Release.

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[View suggested citation](#)

Summary

What is already known about this topic?

Two 2-dose mRNA COVID-19 vaccines (from Pfizer–BioNTech and Moderna) and a 1-dose viral vector vaccine (from Janssen [Johnson & Johnson]) are currently used in the United States.

What is added by this report?

Among U.S. adults without immunocompromising conditions, vaccine effectiveness against COVID-19 hospitalization during March 11–August 15, 2021, was higher for the Moderna vaccine (93%) than the Pfizer–BioNTech vaccine (88%) and the Janssen vaccine (71%).

What are the implications for public health practice?

Although these real-world data suggest some variation in levels of protection by vaccine, all FDA-approved or authorized COVID-19 vaccines provide substantial protection against COVID-19 hospitalization.

Article Metrics

Altmetric:



Citations:

Views:

Views equals page views plus PDF downloads

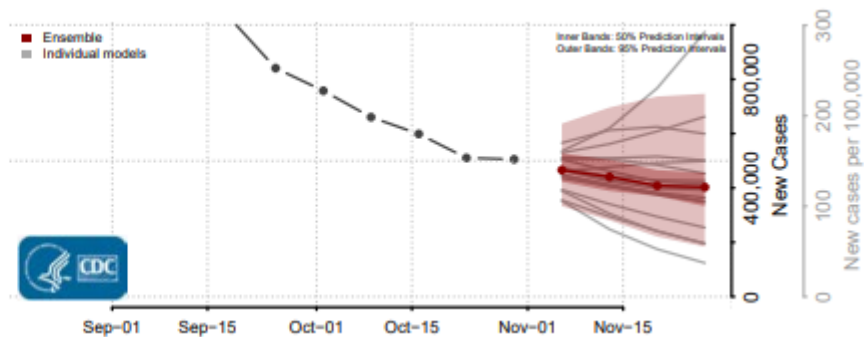
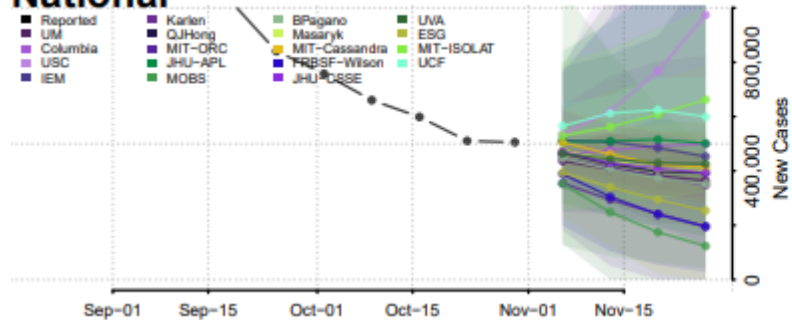
[Metric Details](#)

[Figure](#)

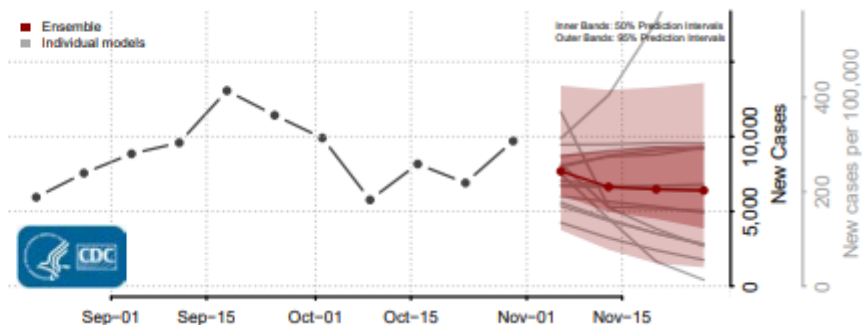
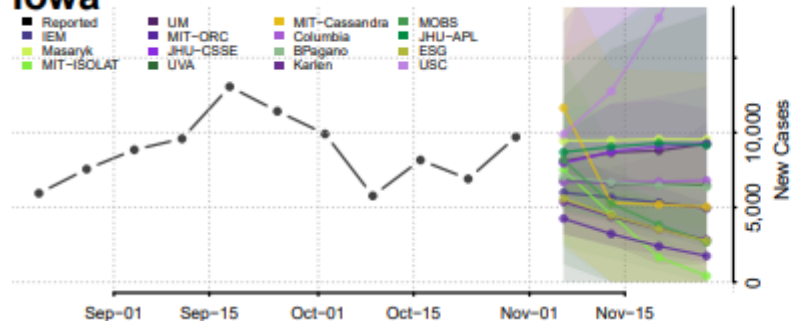
Key Challenges and Ongoing Priorities

- Information sharing
- Data systems
- Limited resources (continue other disease work, responses, etc.)
- Changes in recommendations
- Data modernization
- Improve communication
- Develop strong public health infrastructure (including workforce)
- Strengthen partnership between public health and healthcare

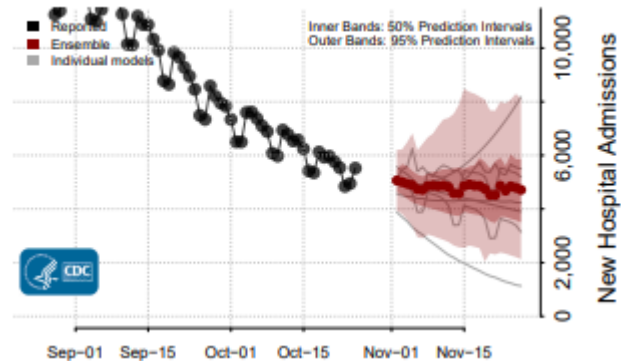
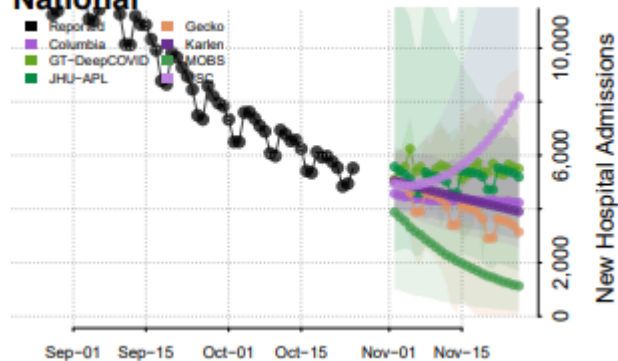
National



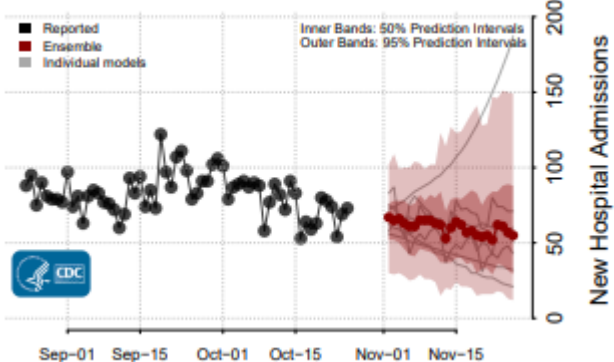
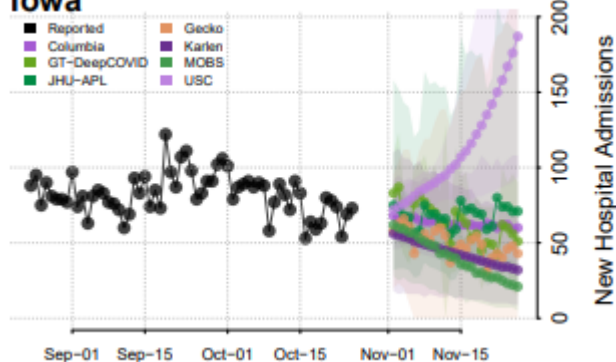
Iowa



National



Iowa





COVID-19 & the Future of Public Health

- Significant and lasting changes from COVID-19 response for everyone
- New demand for information (content and methods of sharing)
- Need continued close collaboration across industries, jurisdictions, etc.
- Must increase efficiency in diagnosing and managing health issues
- Need to maximize community resources for improved health outcomes
- Unique opportunity for lasting investment in public health

Thank you.