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Presentation to the House Health Finance and Policy Committee

Respiratory Disease

- COVID-19 is a respiratory disease.
- The spread of COVID-19 from person to person is mainly through exposure to infectious respiratory droplets (including large and small droplets and particles) which generally occurs when a person is within 6 feet of another.
- Virus from the nose and throat is carried in droplets from the mouth or nose when an infected person speaks, coughs, sings or sneezes. Photo credit: James Gathany, CDC, PHIL

COVID 19: A Serious Disease

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"Corona Virus Hijacks the Body from Head to Toe, Perplexing Doctors" ***The Wall Street Journal*****, 5/7/2020**

- ACE-2 receptors on many tissues
- Loss of taste and/or smell
- Respiratory failure
- Encephalitis
- Cardiac disease and heart attacks
- Kidney disease
- COVID Toes
- Large vessel strokes in people ages 30-40 years old, particularly males
- Kawasaki-like disease in children, a multi-system inflammatory disease with vasculitis

The Protective Benefit When Everyone Wears Masks

- Mask are primarily intended to reduce the emission of virus laden droplets. This is especially relevant for asymptomatic, infected wearers who may not know they are infected.
- Masks also help reduce exposure by the wearer to droplets from an infected person.
- Community benefit for SARS-CoV-2 control is due to the combination of these effects.

CDC Evidence Brief on Face Coverings

Over 25 new studies done in 2020 conclude the effectiveness of masking.

COVID-19: Considerations for Wearing Masks | CDC

- Experimental and epidemiological data support community masking to reduce spread
- Encourages adoption of universal masking policies in combination with interventions like social distancing, hand hygiene, and adequate ventilation

Research Highlights on Effectiveness of Face Coverings

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Setting	Exposure of Interest	Effect
USS Theodore Roosevelt aircraft carrier	face coverings during an outbreak	service members who wore face coverings had lower infection rate than those who did not (55.8% versus 80.8%)
Hair salons in Missouri	two masked hair stylists infected with COVID-19 exposed 139 clients, all masked	none of the 139 clients developed symptoms with 67 testing negative for SARS-CoV-2
Boston health care settings	institution of universal surgical masking with provision in hospitals	significantly lower rate of SARS-CoV-2 positivity among health care workers after masking
Arizona during summer surge	mask mandates, limiting large crowds, social distancing	transmission rates were up by 151% prior to these measures and then stabilized and decreased by 75% with continued application

Setting	Exposure of Interest	Effect
Kansas counties during summer surge	state mask mandate with option for counties to opt-out in Kansas	COVID-19 incidence decreased in 24 counties with mask mandates after July 3, but continued to increase in 81 counties without mask mandates
Tennessee counties	mask requirements	areas with mask requirements had a slower growth rate in hospitalizations for COVID-19 (without controlling for cases) than those without mask requirements
States in the U.S.	mask mandates in 15 states and Washington, DC over summer	reduction in COVID-19 transmission rates in states mandating face mask use in public compared to those without mandates
Germany	regional mandates for mandatory mask wearing in public transport and shops	face masks reduced the number of new COVID-19 infections 45% (between 15% and 75%) over a period of 20 days after the mandates

Source: Gandhi M, Marr LC. Uniting Infectious Disease and Physical Science Principles on the Importance of Face Masks for COVID-19. Med (N Y). 2021 Jan 15;2(1):29-32. doi: 10.1016/j.medj.2020.12.008. Epub 2020 Dec 16. PMID: 33521753; PMCID: PMC7833696.

Face Covering as a Community Mitigation Measure

- Multiple studies conducted a variety of different ways have shown universal face masking is correlated with reduced COVID-19 incidence in multiple countries around the world, and in multiple states in the United States
- One study published this week looked at U.S. states categorized as “early” (pre-June 12), “late”, and “never” mask requirement adopters; when controlling for age, poverty, and race the researchers found strong protective effect (i.e. fewer COVID-19 cases) for “early” vs. “never” adopters, and a smaller protective effect for “late” vs. “never” adopters

Dr. Chris Hogan

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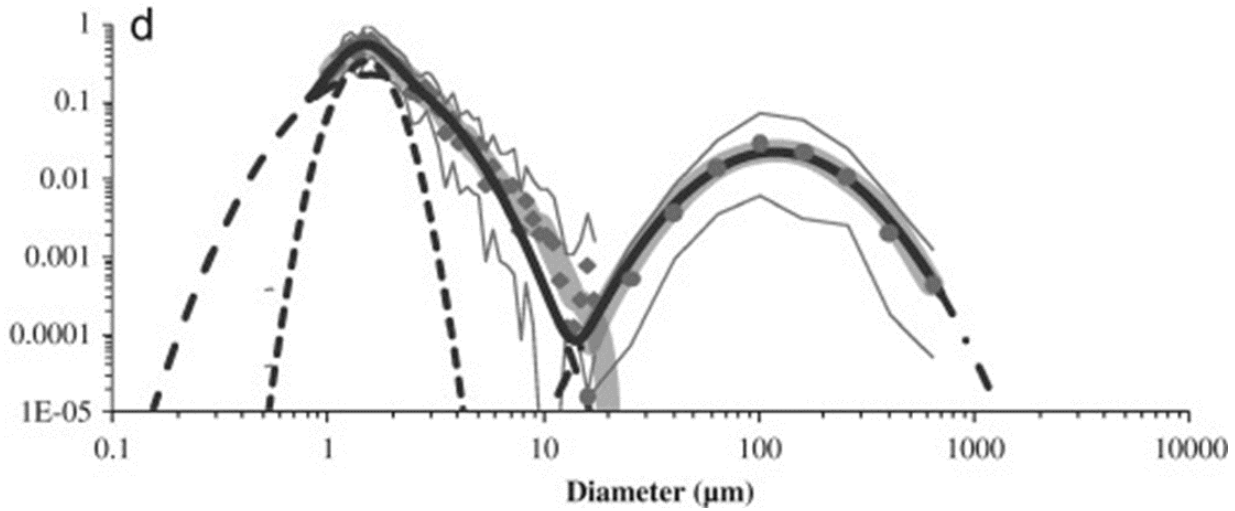
Chris Hogan, PhD
Professor
Department of Mechanical Engineering
University of Minnesota
Editor-in-Chief, Journal of Aerosol Science

Inhalable SARS-CoV-2

The virus causing COVID-19, SARS-CoV-2, is ~100 nm, but it is incorporated into larger particles droplets (usually 500 nm and larger) and is transmittable by asymptomatic individuals

- Aerosols: Smaller particles (<10 μm), can contain infectious virus, infection through inhalation and aerosols are larger during exhalation (they evaporate afterwards)
- Droplets: Larger, can also contain infectious virus, infection through inhalation and deposition (fomites)



Johnson et al, Journal of Aerosol Science , 2011

Masks- Collection of Aerosols and Droplets

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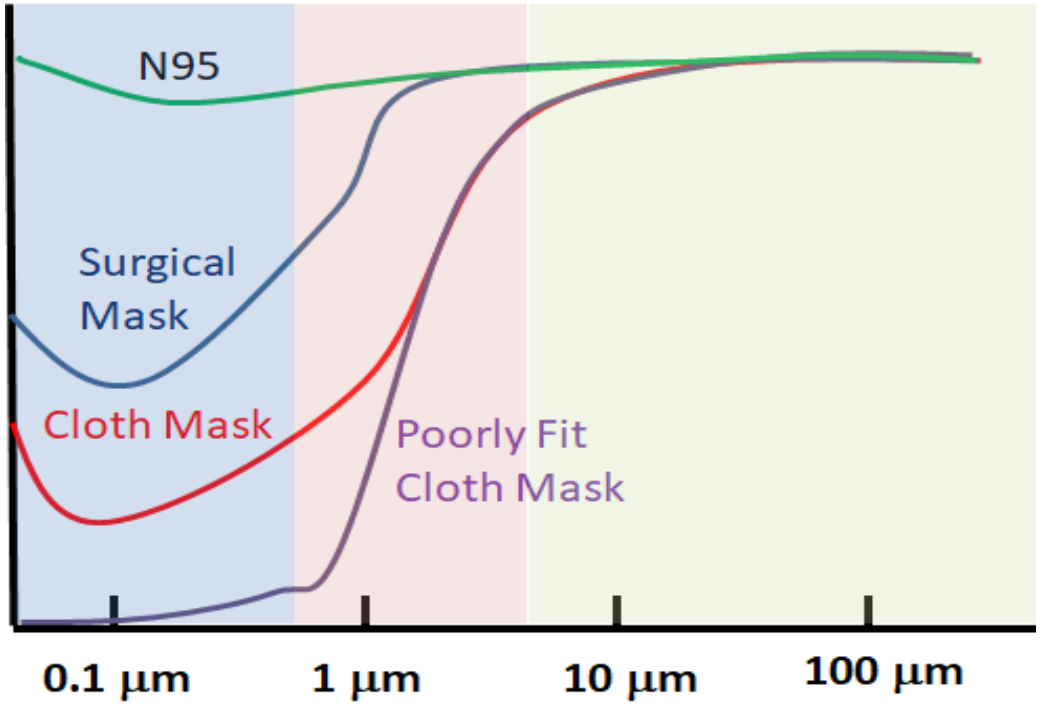
- Masks collect different sized particles by different mechanisms
- Larger droplets and particles “impact” or are intercepted by fibers
- Smaller aerosols diffuse to fibers
- In the middle (~300 nm), collection efficiency is at its minimum

Unlikely to contain viable virus (too small)

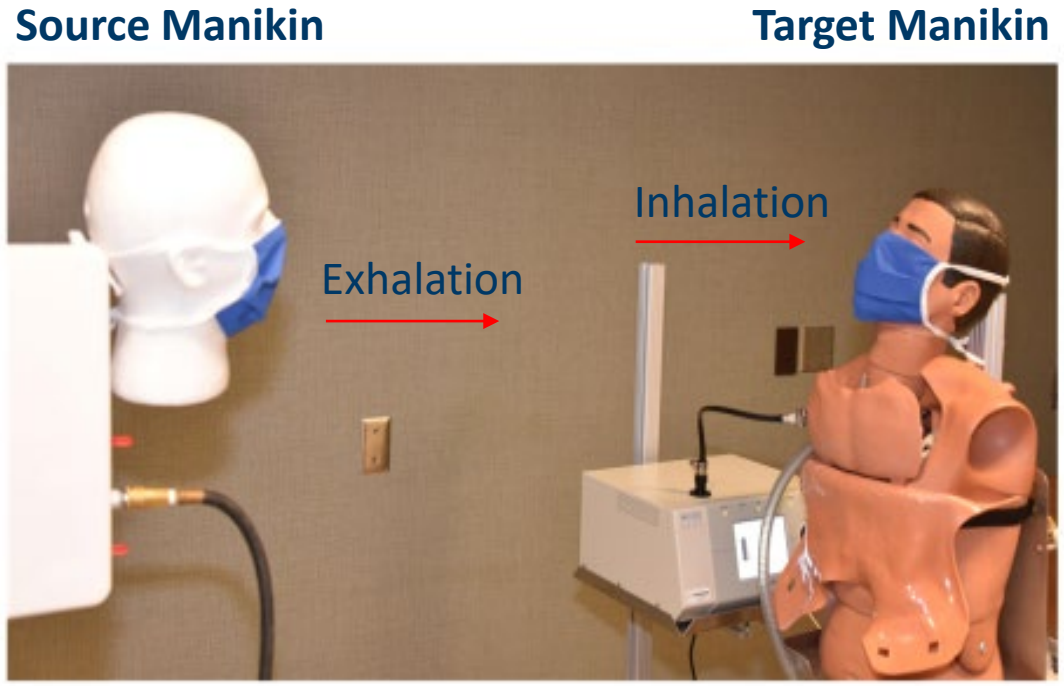
Inhalable, can contain viable virus, aerosols after evaporation

Droplet sizes during exhalation, before drying, can contain viable virus



Mask Wearing- Testing

- Study conducted by the Mayo Division of Engineering
- Physical effect on aerosol exposure
- 3 minute exposure times
- Wide variety of disposable and fabric masks
- Source- exhaling 2 micrometer particles
- Target- inhaling with a particle detector attached for measurements
- 1-6 ft distances



Study led by Mayo Clinic Division of Engineering

Mask Wearing- Effect

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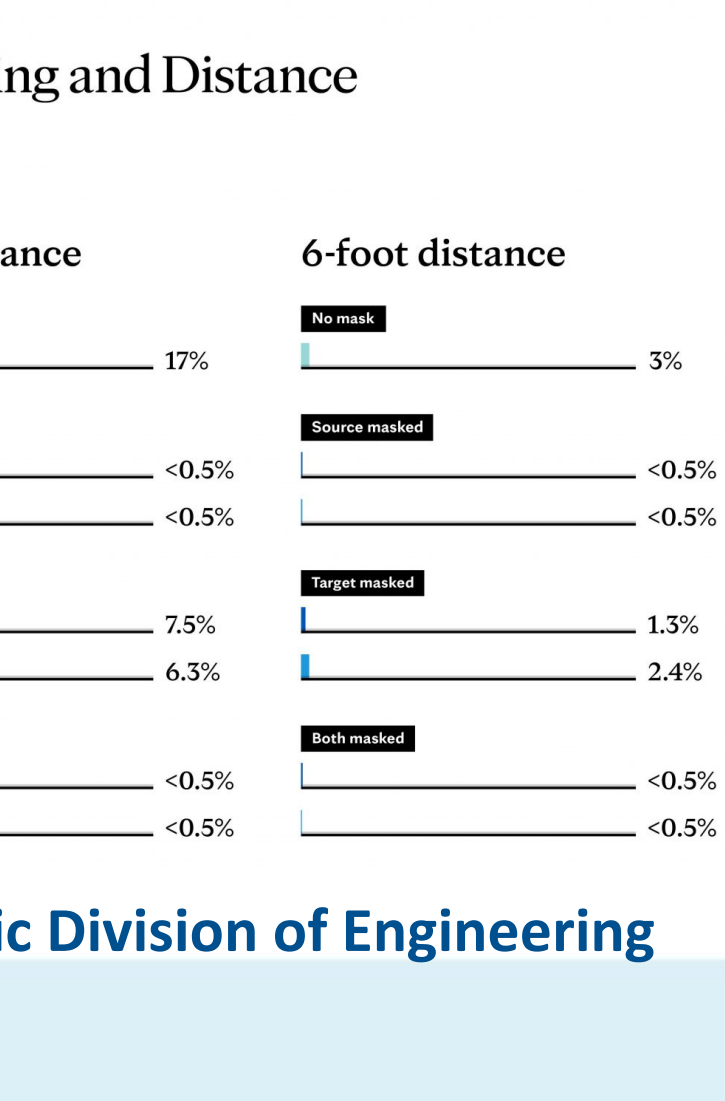

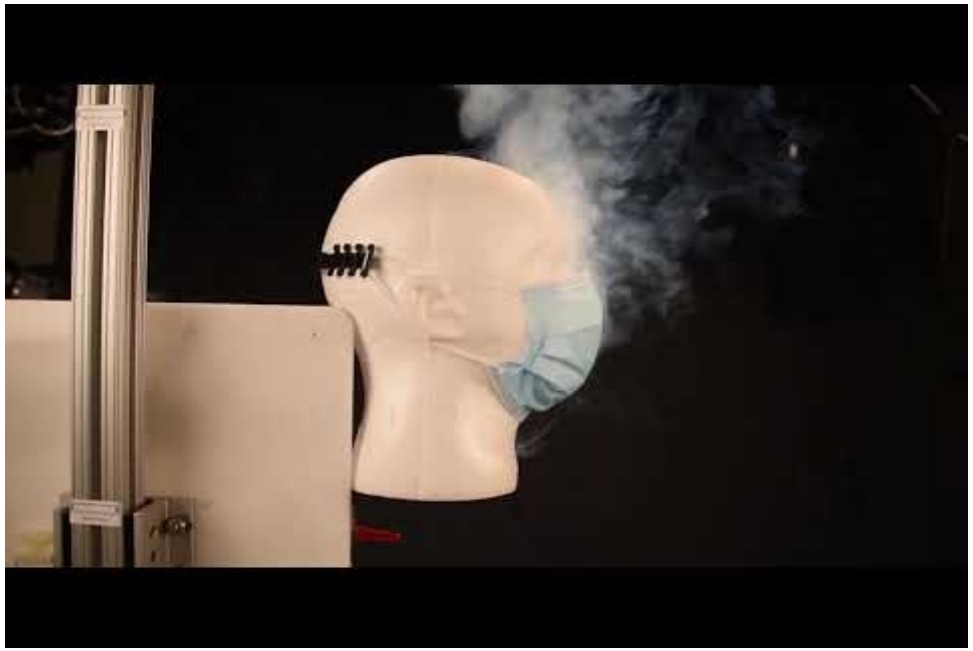

Collector and a Diffuser

Study led by Mayo Clinic Division of Engineering

Face Covering Best Practices

A face covering should fit snugly over the nose and mouth.

Face coverings are not a substitute for social distancing.

Face Covering Best Practices

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- Use breathable fabric that is tightly woven
- Use at least two or three layers
- May use a mask with inner filter pockets
- Avoid masks with valves

Different Kinds of Face Coverings

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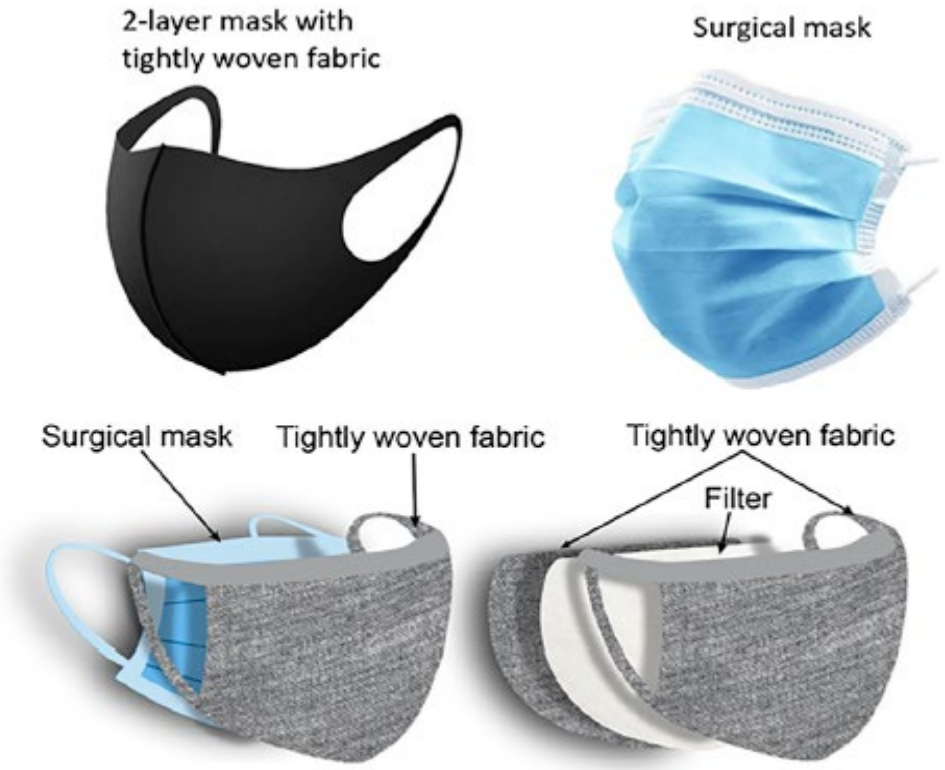

Figure 1. Recommended Masks for Public
Top: basic; bottom: maximal protection.

Source: Gandhi M, Marr LC. Uniting Infectious Disease and Physical Science Principles on the Importance of Face Masks for COVID-19. Med (N Y). 2021 Jan 15;2(1):29-32. doi: 10.1016/j.medj.2020.12.008. Epub 2020 Dec 16. PMID: 33521753; PMCID: PMC7833696.

Dr. Anne Griffiths

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Anne Griffiths, MD

Pediatric Pulmonologist,
Children's Minnesota Director,
Primary Ciliary Dyskinesia Center,
Children's Minnesota Children's Respiratory & Critical Care Specialists

MN Face Covering Requirements

The Stay Safe MN Approach

- Listen - to the best advice of the public health experts serving our state.
- Balance - the spread of COVID-19, the economy, and the personal well-being of all Minnesotans.
- Protect – our hospital capacity.
- Cautiously loosen restrictions – to support communities, families, and small businesses.

Stay Safe Guiding Principles

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Protect public and worker health - limit morbidity and mortality due to COVID-19

Protect hospital capacity

Give every business in Minnesota an opportunity to build our economy in a way that is safe, and builds consumer confidence

Integrate equity into the reopen design and the COVID-19 response - recognize that the negative health impacts have fallen disproportionally on communities of color

Face Covering Requirement: Key Mitigation Strategy

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Executive Order 20-81 – Effective July 25, 2020

- People in Minnesota are required to wear a face covering in all indoor businesses and public indoor spaces, unless alone
- Workers are required to wear a face covering when working outdoors in situations where social distancing cannot be maintained

Exemptions from Face Coverings

- Children under age 5. Ages 2-5 may wear them if they are able.
- People who have medical or other health conditions, disabilities or mental health, developmental, or behavioral needs that make it difficult to tolerate wearing a face covering
- People at their workplace when wearing a face covering would create a safety hazard or workplace safety guidelines. Face shields may be used as an alternative.

Considerations for Face Shields

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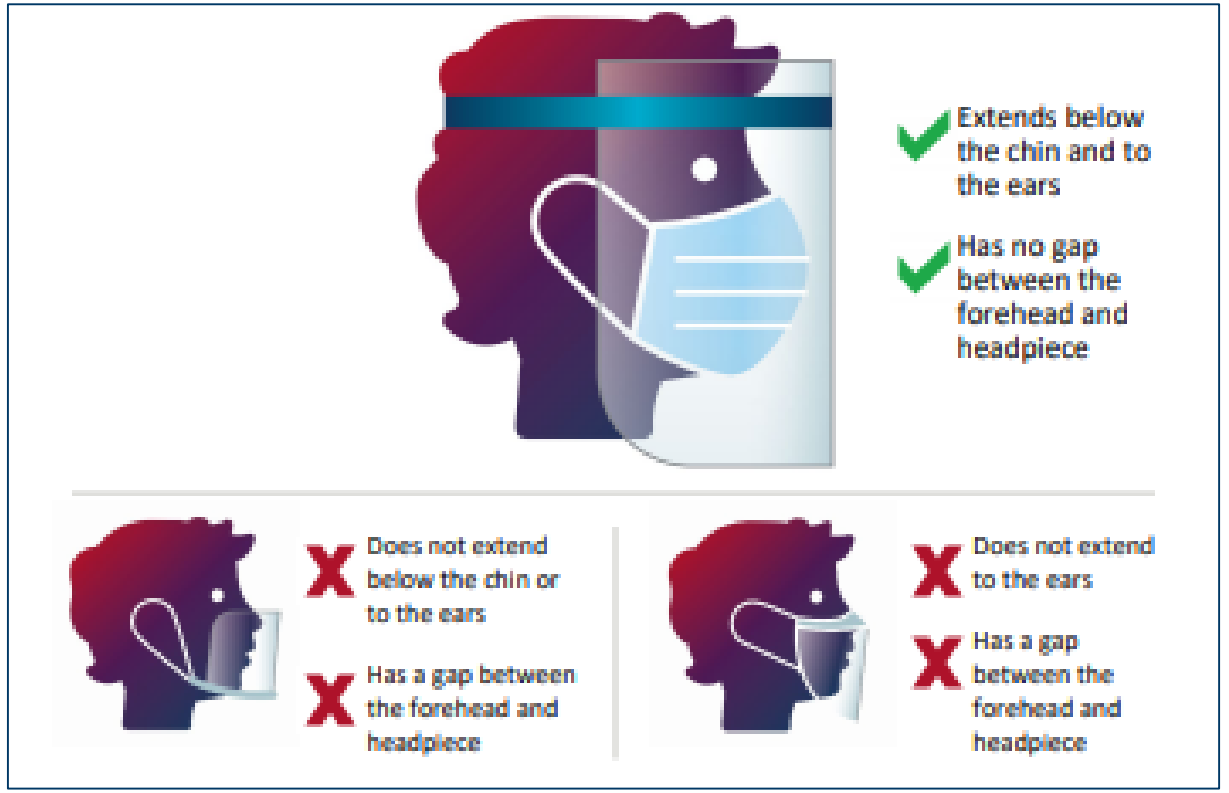
[Considerations for Face Shields: https://www.health.state.mn.us/diseases/coronavirus/faceshields.pdf](https://www.health.state.mn.us/diseases/coronavirus/faceshields.pdf)

- Face shields should only be used in combination with a mask or when a mask cannot be worn.
- Reusable face shields should be cleaned and disinfected after each use.
- For optimal protection, the shield should extend below the chin and to the ears, and there should be no exposed gap between the forehead and the shield's headpiece.



State by State: Mask Mandate

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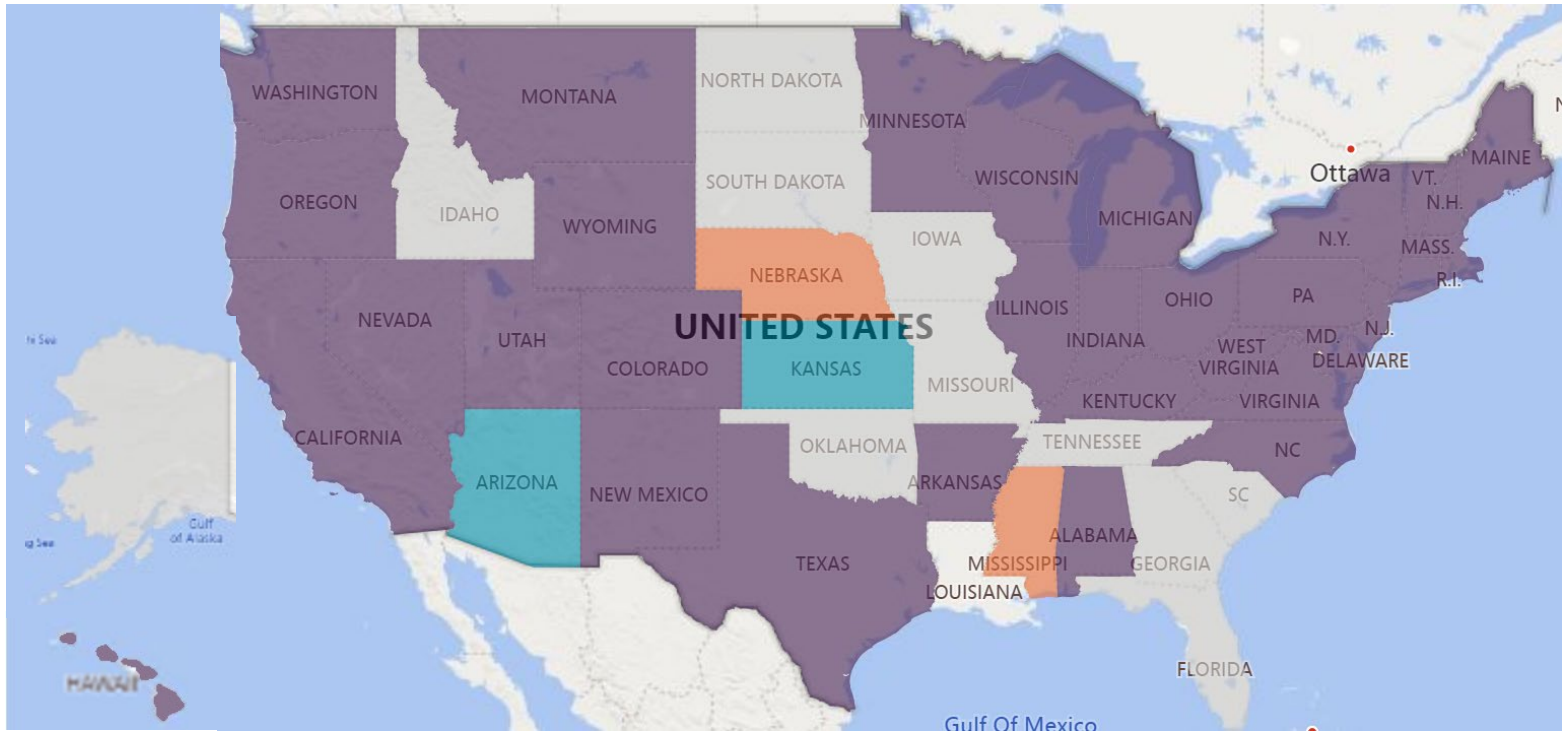

- Regulated
- Not Regulated
- County Specific
- Certain Settings

Minnesotans Wear Face Coverings

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June 1, 2020

47%

January 15, 2021

77%

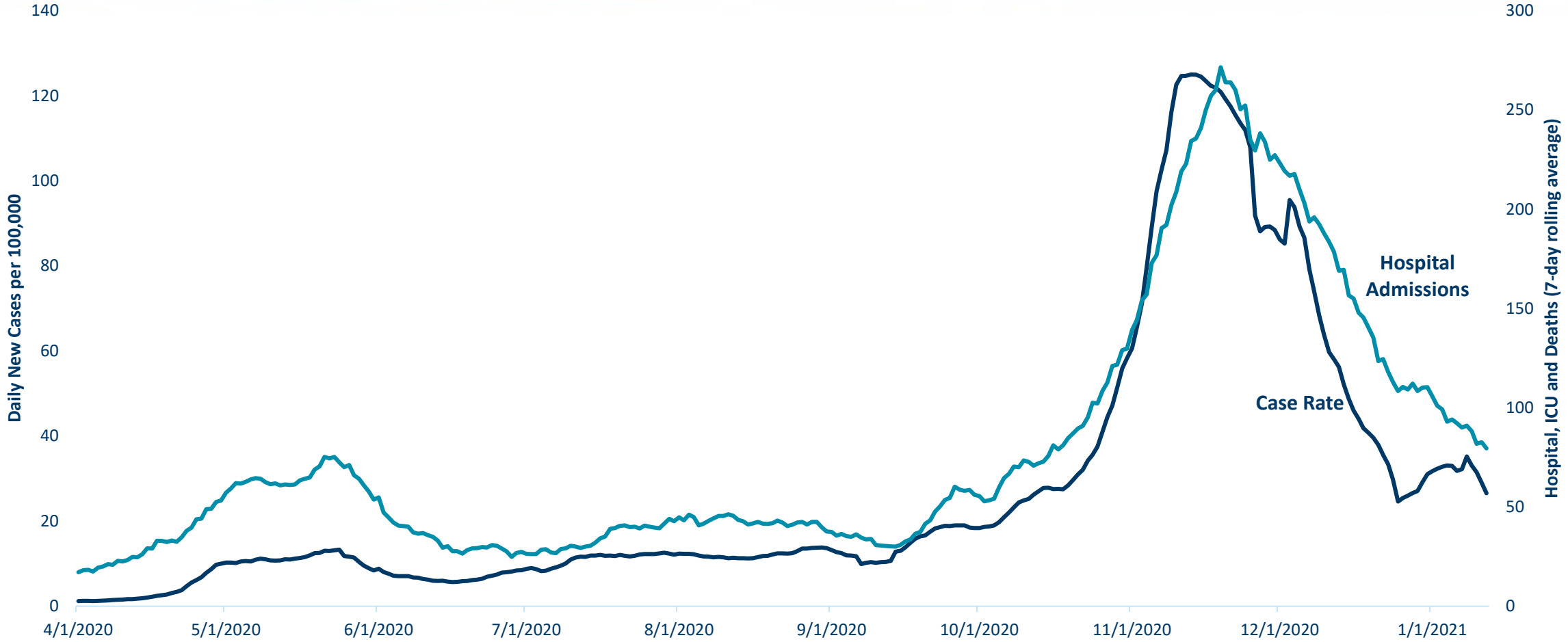
39% Increase

Source: COVID-19 (healthdata.org)

COVID-19 By the Numbers: Minnesota

Source: MDH COVID-19 Case Data, current as of 1/19/21

COVID-19 By the Numbers: Minnesota



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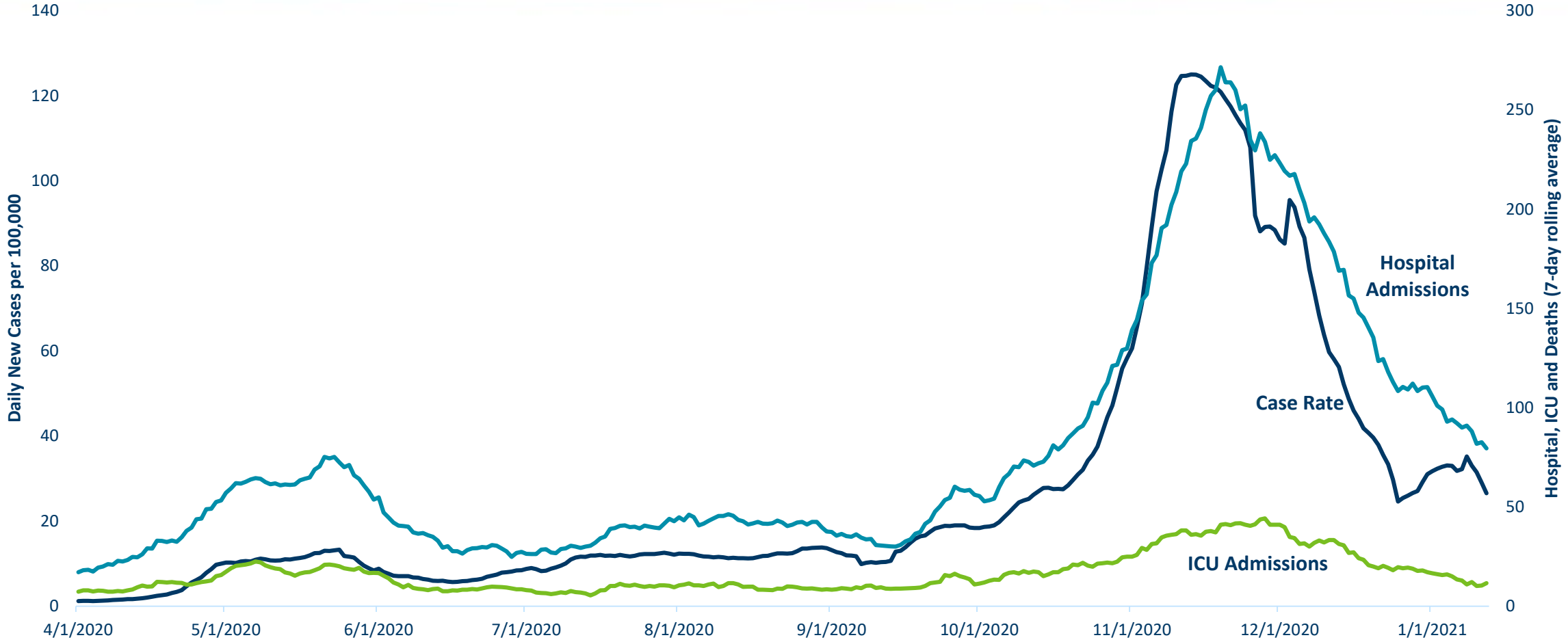
COVID-19 By the Numbers: Minnesota



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COVID-19 By the Numbers: Minnesota

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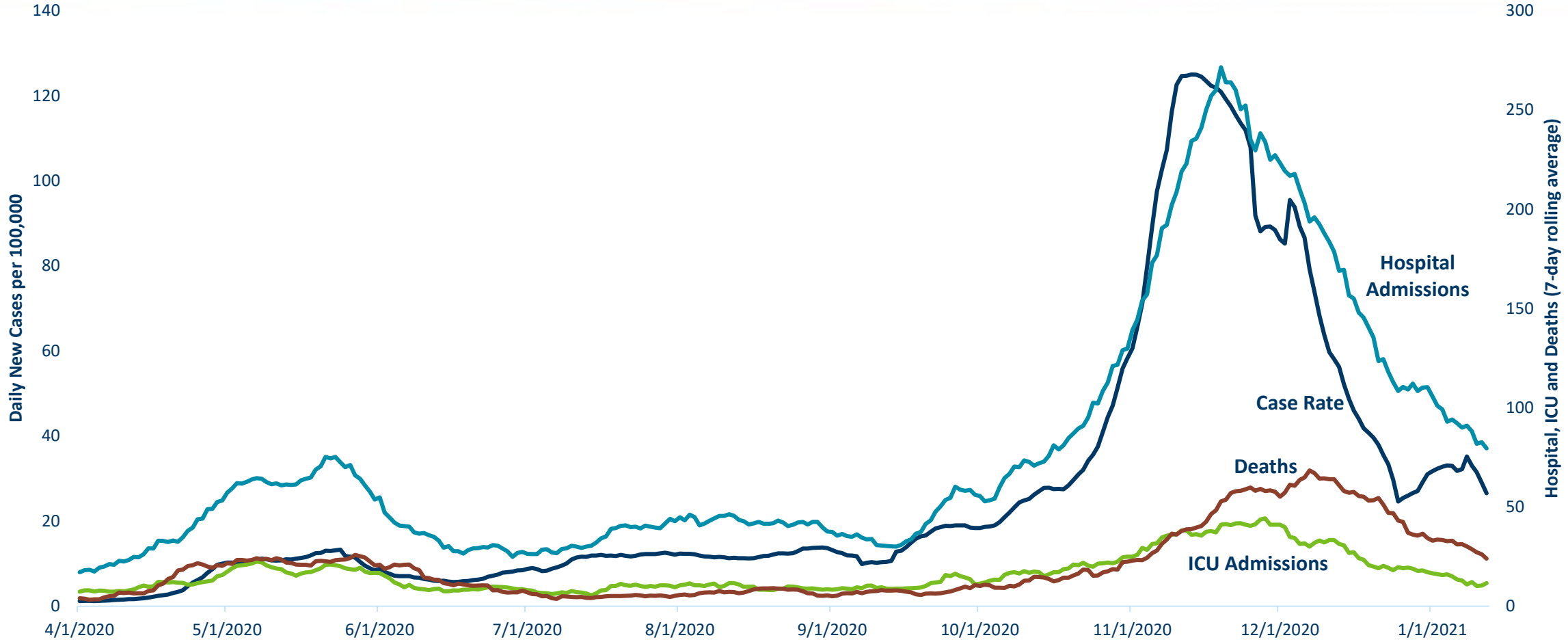

Source: MDH COVID-19 Case Data, current as of 1/19/21

Minnesota Compared to our Neighbors: Cases

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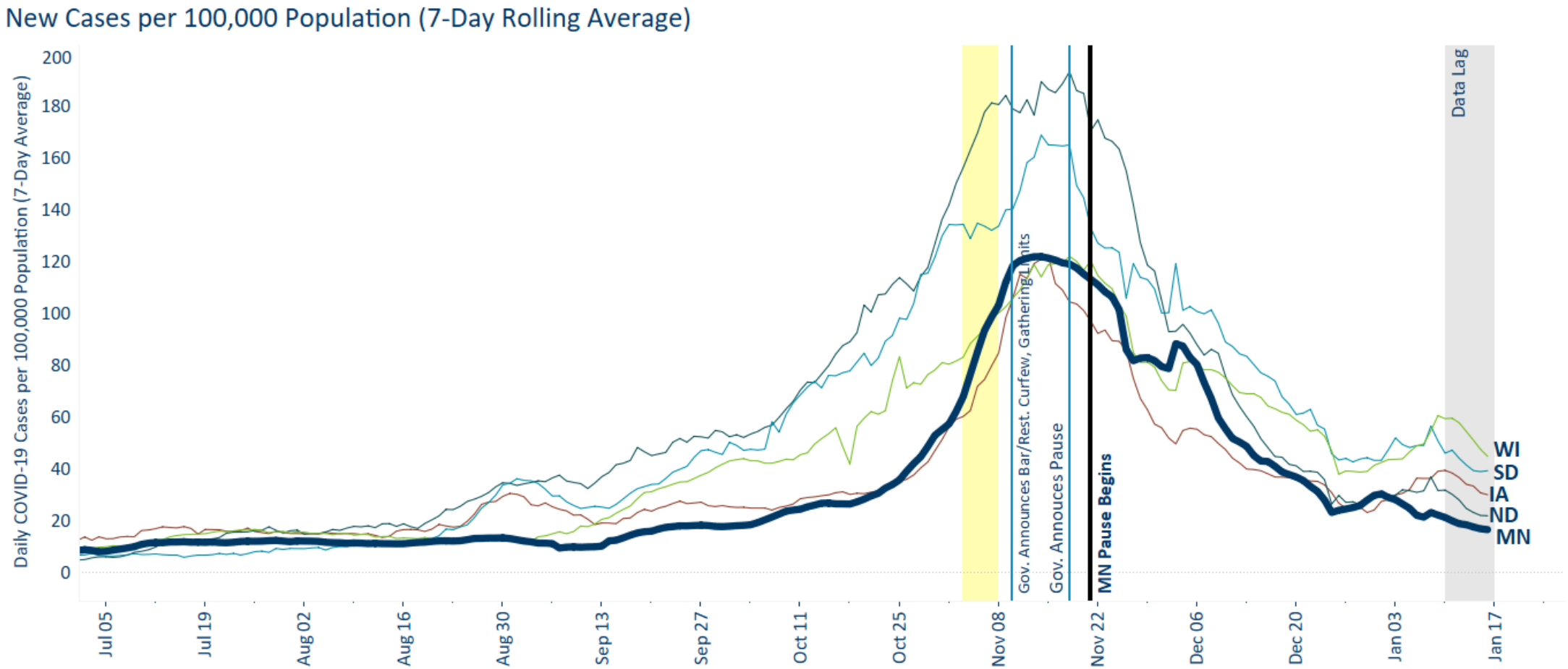

Source: covidtracking.com (report date) and MN daily case data (specimen date). Data is at the patient level. Cases may include non-residents of the state and some states include antigen-positive cases in their estimates (e.g., MN, SD, and WI). State resident population is based on 2018 5-year ACS estimates.

Yellow highlight denotes period of time (11/3-11/8/2020) with 70+ degree weather in most of the State.

Minnesota Compared to our Neighbors: Deaths

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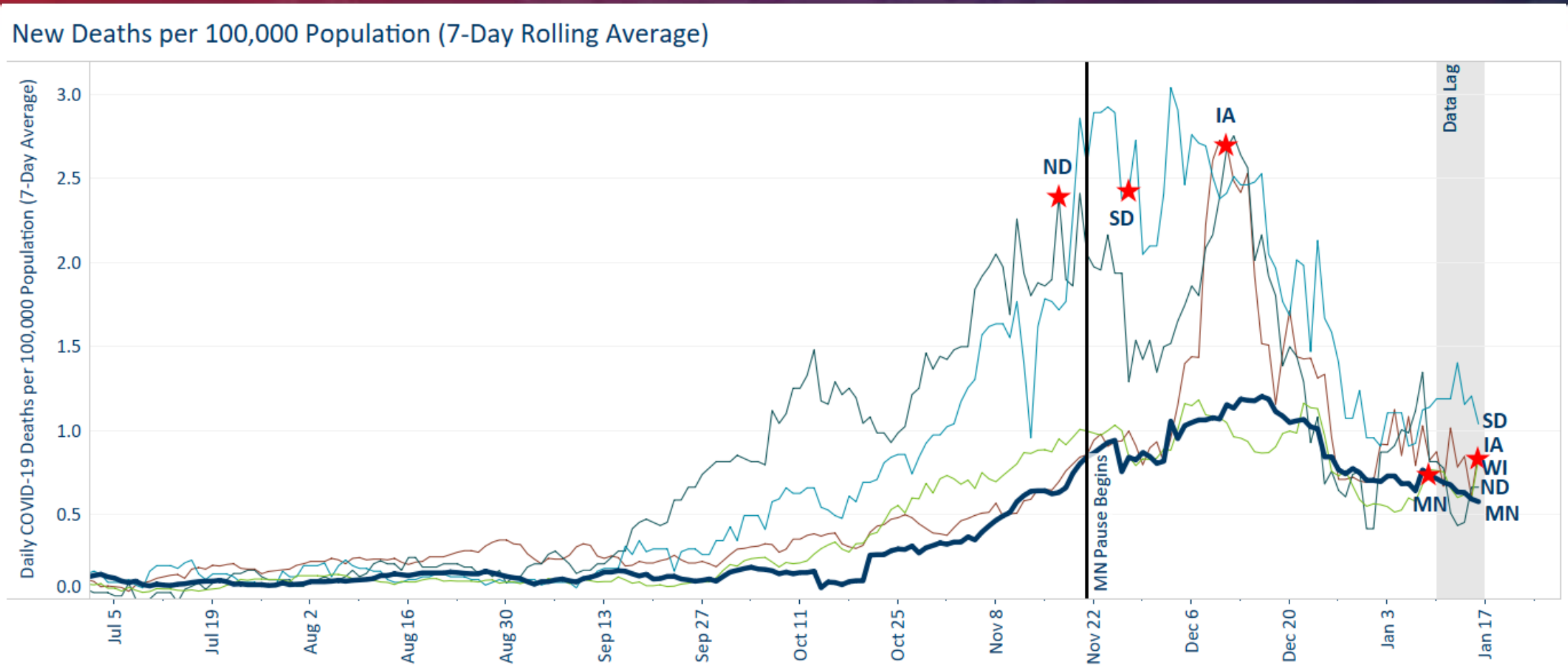
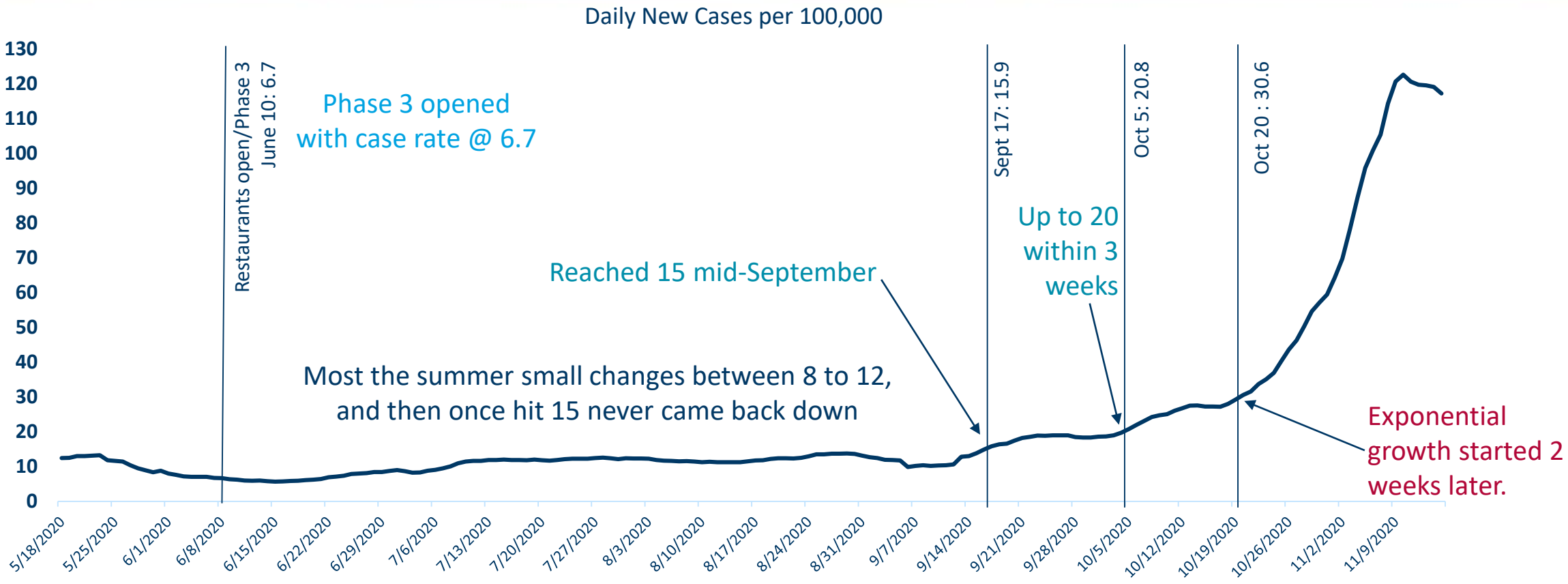


Sources:MDH Health Economics Program analysis of covidtracking.com and MDH daily case data. Deaths include both confirmed and probabl deaths; however, some states do not distinguish between confirmed and probable deaths, or only started to distinguish this data after a duration of time. For MN, deaths are by report date rather than date of death in order to make comparisons as comparable as possible across states. Furthermore, cases, deaths and tests may include non-residents for certain states. State resident population is based on 2018 5-year ACS estimates.

Red stars indicate the point at which states reported the number of cumulative deaths equal to one out of every 1000 people.

Transition to Exponential Growth Happens with Little Warning



Consequences Rise with Case Rates

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	Daily Case rate per 100,000	Average Daily Cases	Weekly Cases	Weekly New Admissions (4.9% of cases)	Weekly New ICU Stays (15.7% of admissions)	Weekly Health Care Workers - Acute Care	Weekly Health Care Workers - Congregate Care	Weekly Deaths (1.5% of cases)
	10	550	3,850	190	30	200	140	60
Current →	15	800	5,600	280	40	290	210	**80**
	20	1,100	7,700	380	60	400	290	110
	30	1,700	11,900	590	90	630	450	170
	40	2,200	15,400	760	120	810	580	220
	50	2,800	19,600	970	150	1,030	730	290
	60	3,300	23,100	1,140	180	1,210	860	340
	75	4,100	28,700	1,420	220	1,510	1,070	420
	100	5,500	38,500	1,900	300	2,020	1,440	560
	150	8,300	58,100	2,870	450	3,050	2,170	850

Updated 1/19; Admissions and deaths based on specimen dates 11/15 to 12/15; health care workers based on MMWR week 51.

Thank you

Daniel Huff, MDH Assistant Commissioner