

COVID-19 in 2021:

Detection + Prevention + Vaccination



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I'M SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2, BUT YOU CAN CALL ME SARS-CoV-2



I HAVE FEVER, A COUGH AND I'M BREATHING PRETTY FAST. I MAY HAVE COVID-19... YOU KNOW, CORONAVIRUS DISEASE 2019

Ian M Mackay for virologydownunder.com



In the past year...

- A new coronavirus (SARS-CoV-2) spread across the world
- >28 million Americans tested positive, more likely infected
- 500,000 Americans have died of COVID-19
 - >536,000 more Americans have died than expected
- >2.4 million worldwide have died of COVID-19
 - U.S. makes up a disproportionate share – 1 in 5

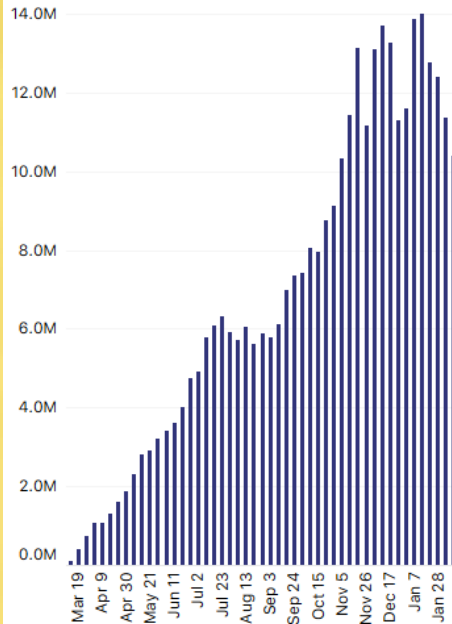


NATIONWIDE COVID-19 METRICS BY WEEK

Mar 12, 2020 - Feb 17, 2021

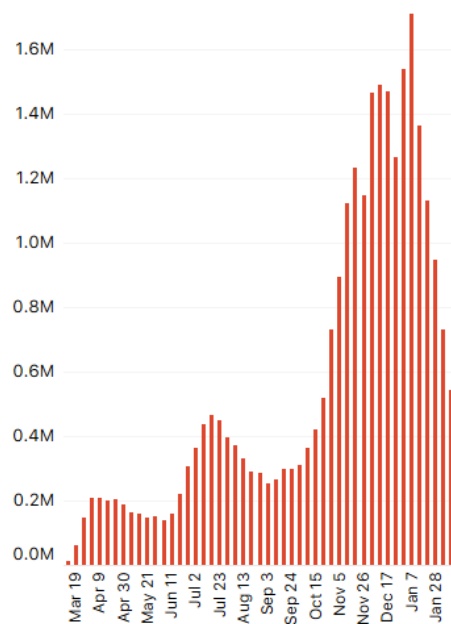
Weekly Tests

-8.7% From Last Week



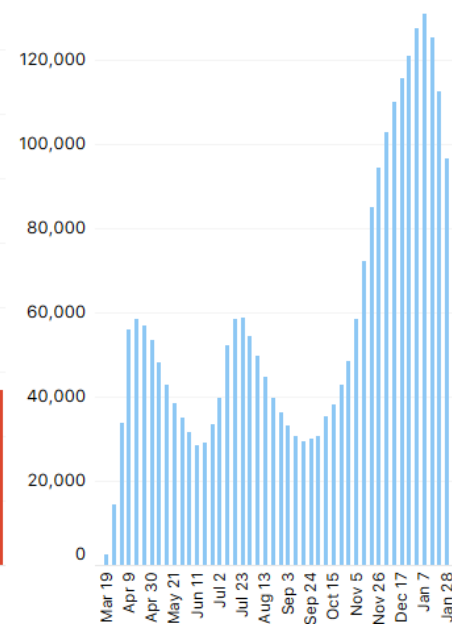
Weekly Cases

-25.8% From Last Week



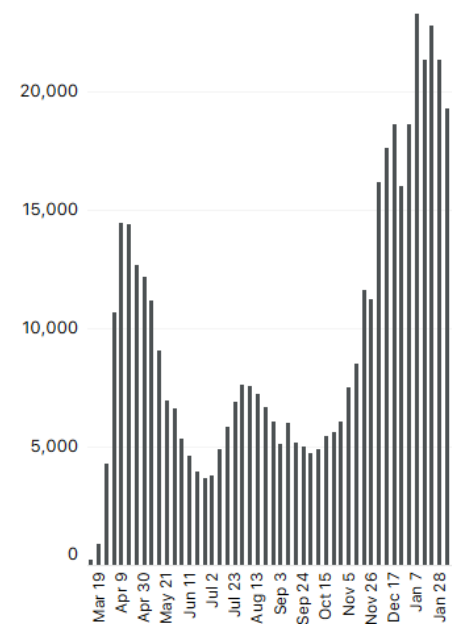
Avg. Weekly Hospitalized

-17.6% From Last Week



Weekly Deaths

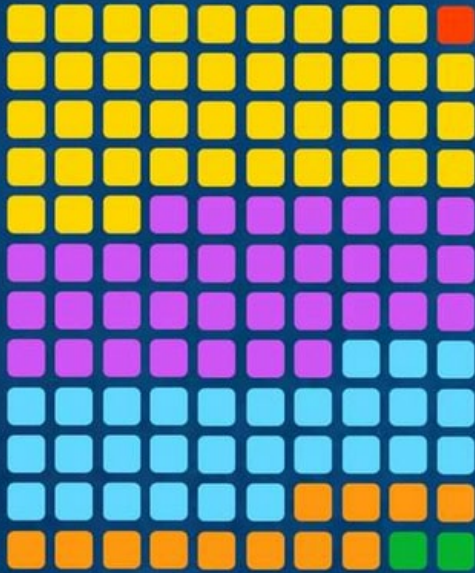
-20.9% From Last Week



Source: The COVID Tracking Project



FOR EVERY 1 PERSON THAT DIES OF COVID-19,



42 EXPERIENCE SYMPTOMS 60+ DAYS LATER

34 SUFFER FROM LUNG DYSFUNCTION

29 EXHIBIT INFLAMMATORY HEART DAMAGE

12 ARE SIGNIFICANTLY FINANCIALLY BURDENED

2 ARE UNABLE TO RETURN TO WORK

SOURCES:

<https://pubmed.ncbi.nlm.nih.gov/32838236/>

<https://pubmed.ncbi.nlm.nih.gov/32644129/>

<https://www.acpjournals.org/doi/10.7326/M20-5661>

<https://jamanetwork.com/journals/jamacardiology/fullarticle/2768916>

Vijay Shimoga

@vijay_shimoga



In the past year...

- Scientists, public health experts & clinicians worldwide cooperated to discover:
 - Genetic makeup & action of the virus
 - How it spreads
 - What can stop or slow it
 - Treatment for all stages of illness
 - Who is most at risk and why



U-M's COVID-19 Biorepository



In the past year...

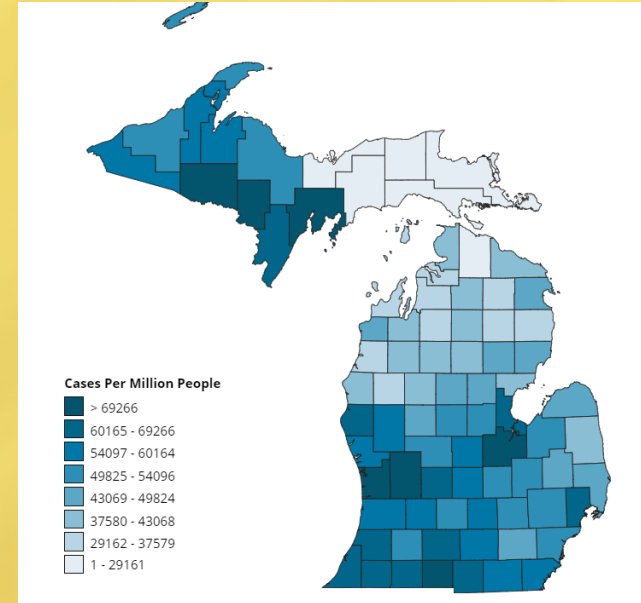
- Supply chain vulnerabilities were revealed
- Pharmaceutical firms developed & tested vaccines & treatments
 - Government pre-paid vaccines “on spec”
- Politics altered our public health response and created variation by state
- Our behaviors fueled uncontrolled spread
- Dramatically uneven effects on some groups



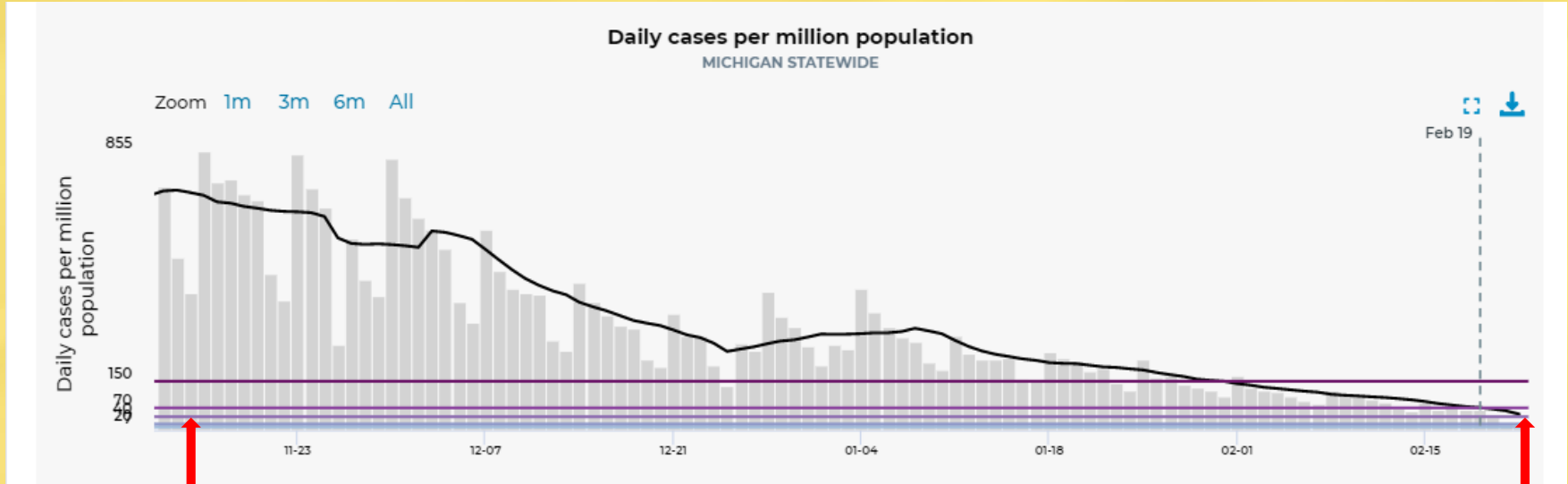
Credit: Detroit Free Press

Where are we now?

- Michigan doing better than most because of statewide efforts
- Many schools back to in-person learning
- Vaccination is under way
 - 2 vaccines approved for emergency use in US
 - FDA review of more vaccines soon
- New federal prevention & vaccination plans
 - More active role of CDC



3.5 months into the “pause to save lives”

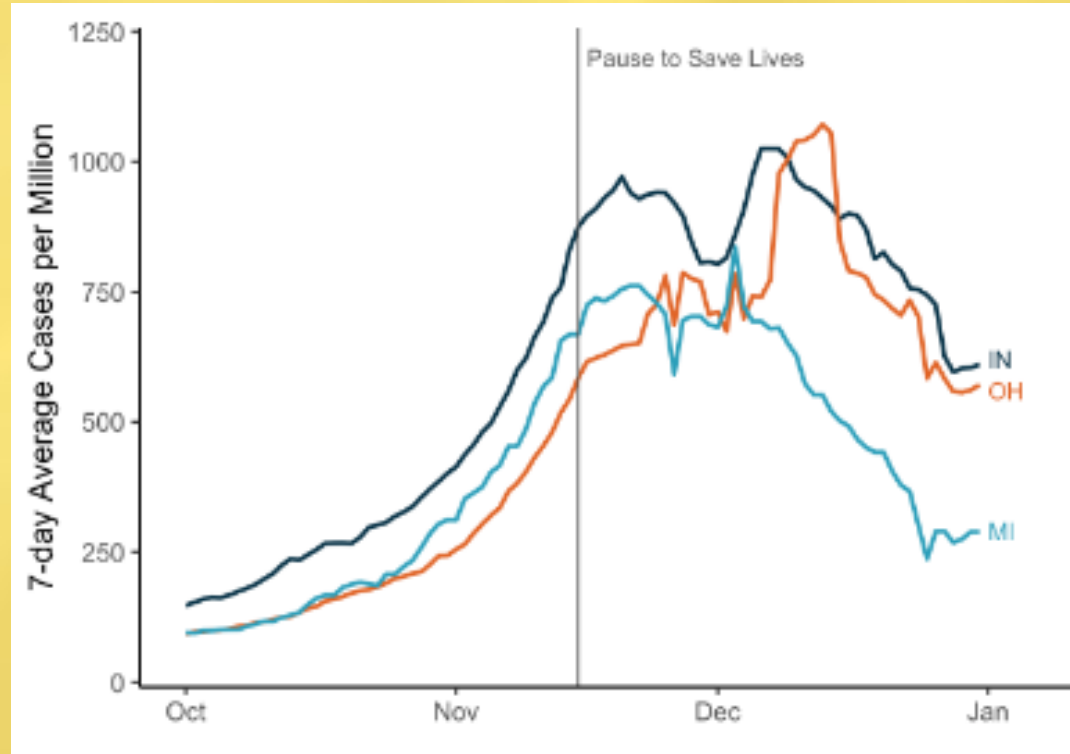


When the pause announced on Nov 15, Michigan had 6th highest rate of cases among U.S. states & territories

Now, we're ranked 47th



- MI cases per population have been low compared to Midwest neighboring states over the holiday season
- Model estimates that increased social distancing following the Pause prevented **~109,000 cases**

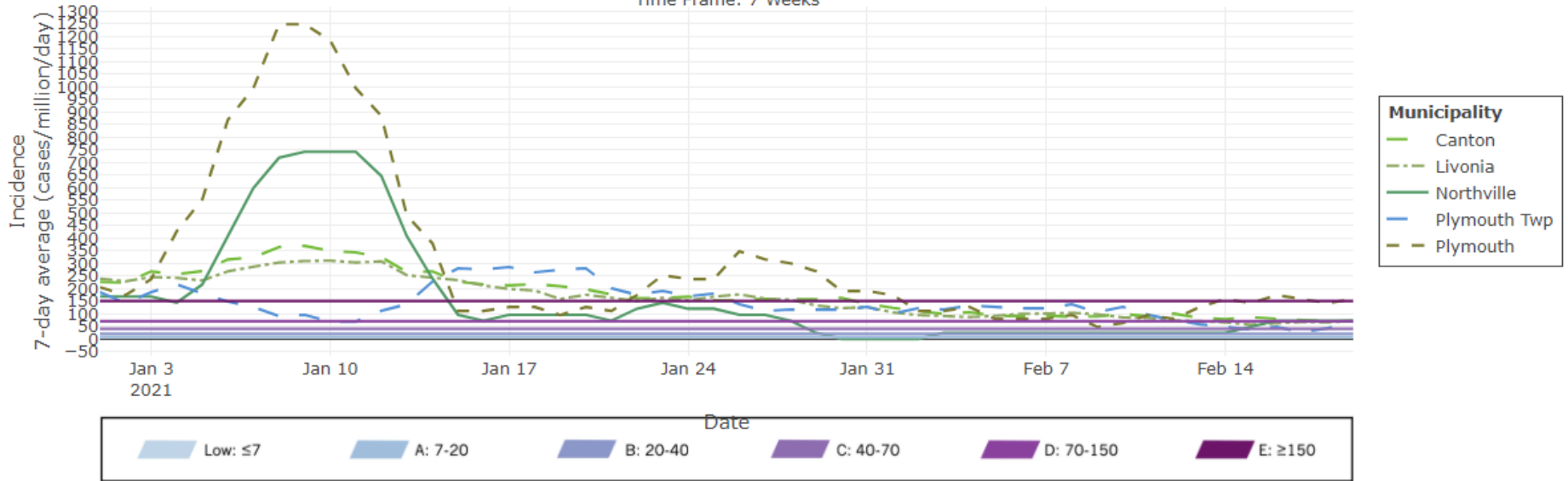


What about western Wayne County?

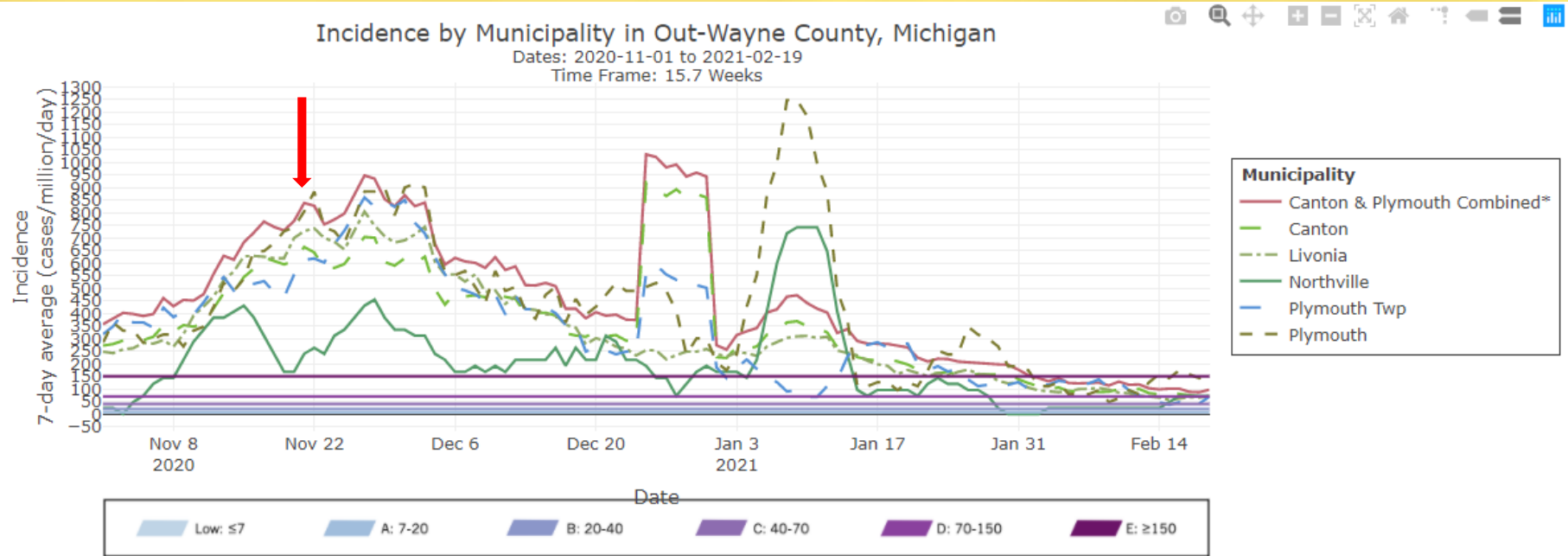
Incidence by Municipality in Out-Wayne County, Michigan

Dates: 2021-01-01 to 2021-02-19

Time Frame: 7 Weeks



The local effects of the “pause”



Testing: Now widely available

Who should get tested?

- ✓ Close contact with someone who tested positive
- ✓ Took part in a high-risk activity
e.g., travel, attending large social or mass gatherings, or being in crowded indoor settings
- ✓ You have COVID-19 symptoms
- ✓ Notified by health department

COVID-19 TESTING

DRIVE UP TESTING NOW AVAILABLE IN CANTON!

LOCATION: Heritage Park (North Pavilion Parking Lot)
46202 Heritage Park Road, Canton

WHEN: Monday - Friday 9 am to 6:30 pm & Saturday 9 am - 1 pm

REGISTER: Pre-register for rtPCR COVID-19 nasal swabs at:

www.MemorialClarity.com

BEGINS
MONDAY,
JANUARY 18,
2021

- DETAILS:**
- Pre-registration is highly recommended.
 - Those pre-registered will have express lane priority.
 - If you are not pre-registered, you will need to register on site.
 - Please bring a picture ID and insurance cards (or copies).
 - If you are uninsured, you can still be tested at no cost to you.
 - Please bring and wear a mask at the collection site.
 - If you choose to self-pay without insurance for any reason (i.e. international travelers), the cost will be \$110 per test (credit/debit cards only).

QUESTIONS ABOUT REGISTRATION, TESTING OR INSURANCE/BILLING?
CONTACT (424) 419-1381

Brought to you by the Wayne County Department of Public Health



Public Health

In partnership with

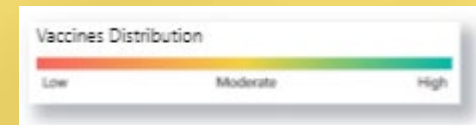
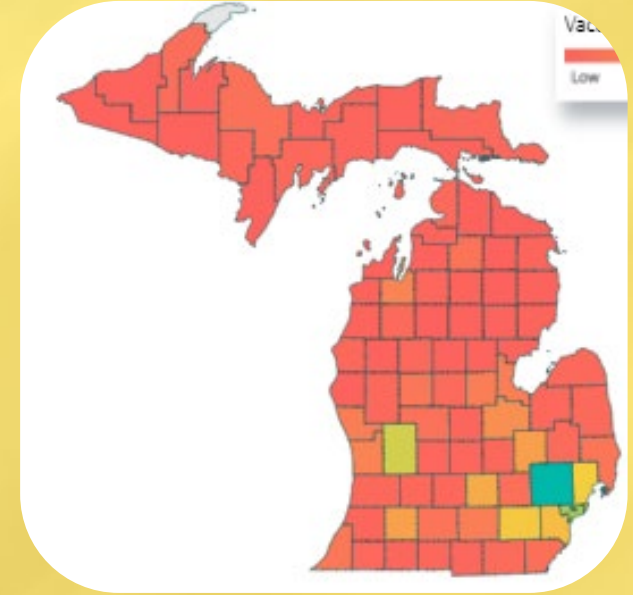


Memorial
Healthcare



BUT...

- Vaccine supply to states is uneven
- So is vaccine availability within states
- Shortage of vaccine feeds frustration
- Scams reported
- Vaccine myths abound, feeding hesitancy that could slow vaccination
- New variants of virus are emerging, fed by rate of transmission



As of
2/22/2021

We now know for sure:

- **COVID-19 is far worse than the flu**
- “Airborne” transmission can occur, especially indoors. **Ventilation matters!**
- Risk of illness/death rises with age
- Some conditions, including obesity, raise risk of severe illness
- “Long COVID” effects are real
- You can get it twice (re-infected)



U-M COVID ICU

Differences in symptoms

- Classic “cough, fever, shortness of breath” more often in men & ages 30-60
- Women: More likely to have confusion, digestive symptoms, headache, chest pain
- Older/younger – Non-respiratory symptoms
 - Kids: digestive issues, pain, sore throat
 - Older adults: confusion



We now know for sure:

- Masks keep virus from getting out **AND** in
- Mask quality & effectiveness varies
- Fit matters – a 2nd mask can fill gaps
- The more virus you're exposed to, the higher your risk of illness
- Kids & adults can spread virus even if they don't develop symptoms
 - Half of cases come from “silent spread”





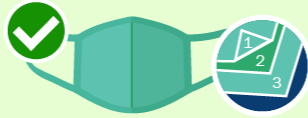
Mask up, Mask right

A face mask is defined as a tightly woven cloth or other multi-layer absorbent material that closely covers an individual's mouth and nose. There are other options to make the fit better (such as **nose wire**, **mask fitter** or **brace**). Here are some guidelines to help you choose the most effective face mask.

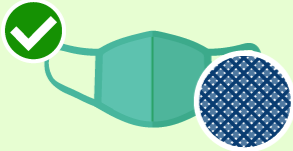
Recommended



Masks that fit properly (snugly around the nose and chin with no large gaps around the sides of the face)



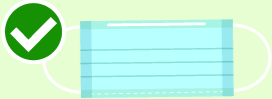
Masks with two or three layers
You can also double mask (wear a cloth mask over medical)



Masks made with tightly woven fabric (i.e., fabrics that do not let light pass through when held up to a light source)



Masks with inner filter pockets



Non-medical disposable masks
knotted and tucked properly for a tight fit

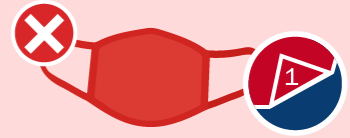


Masks made with breathable fabric (such as cotton)

Not Recommended



Masks that do not fit properly (large gaps, too loose or too tight)



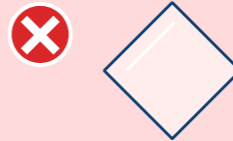
Masks with one layer



Masks made from loosely woven fabric or that are knitted (i.e., fabrics that let light pass through)



Masks with exhalation valves or vents



Masks made from materials that are hard to breathe through (such as plastic or leather)



Wearing a scarf/ski mask as a mask

Need help getting a mask?

Residents can pick up a free mask from partner sites across the state, including most local MDHHS offices and Community Action Agencies. Find a distribution site or call the COVID-19 hotline at 1-888-535-6136.

Masks should:

- ✓ Completely cover nose + mouth
- ✓ Fit snugly against sides of face & not have any gaps
- ✓ Be handled only by the **ear loops, cords, or head straps** (not by the surface of the mask)



Additional mask options

KN95 masks



Available at
some health
depts

KF94 masks



Options to improve mask fit



Nose wire

- ↓air leakage at top of mask
- Can help prevent fogging of eyeglasses



Mask Fitters & Braces

- Can be used over a medical procedure mask or cloth mask to improve fit
- Helps reduce air leakage from around mask edges



Knotting & Tucking

- Can improve fit of a medical procedure mask.
- Knot the ear loops of the mask where they join the edge of the mask, then fold & tuck the unneeded material under the edges.

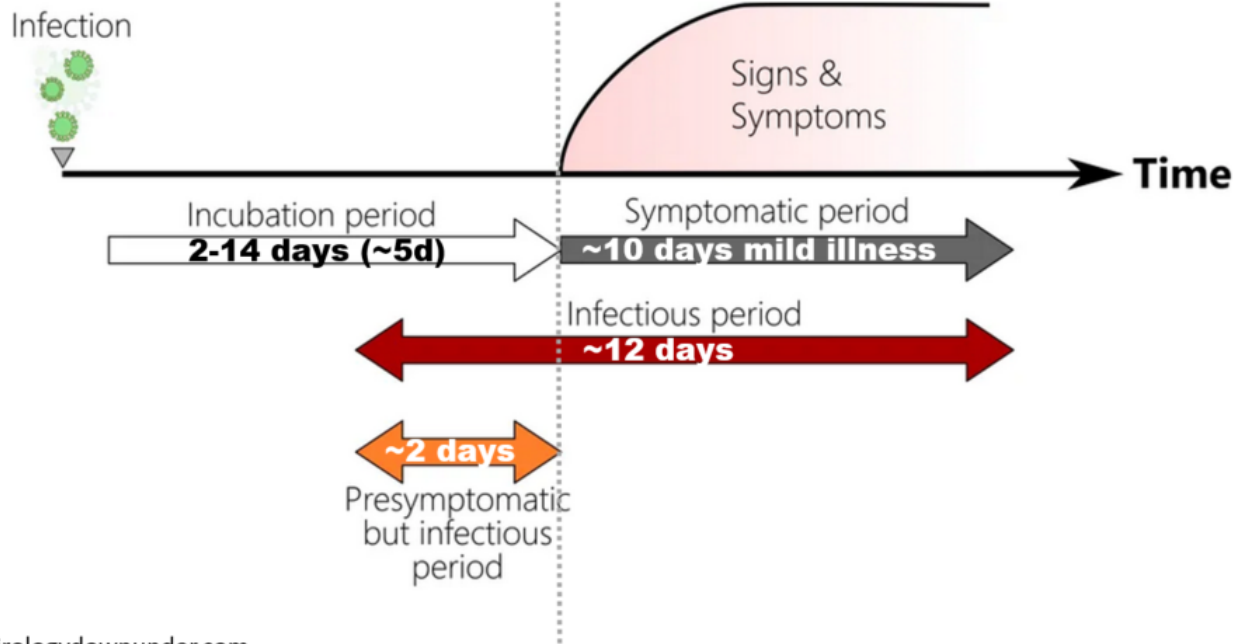
Incubation & infectious periods



SARS-CoV-2



COVID-19



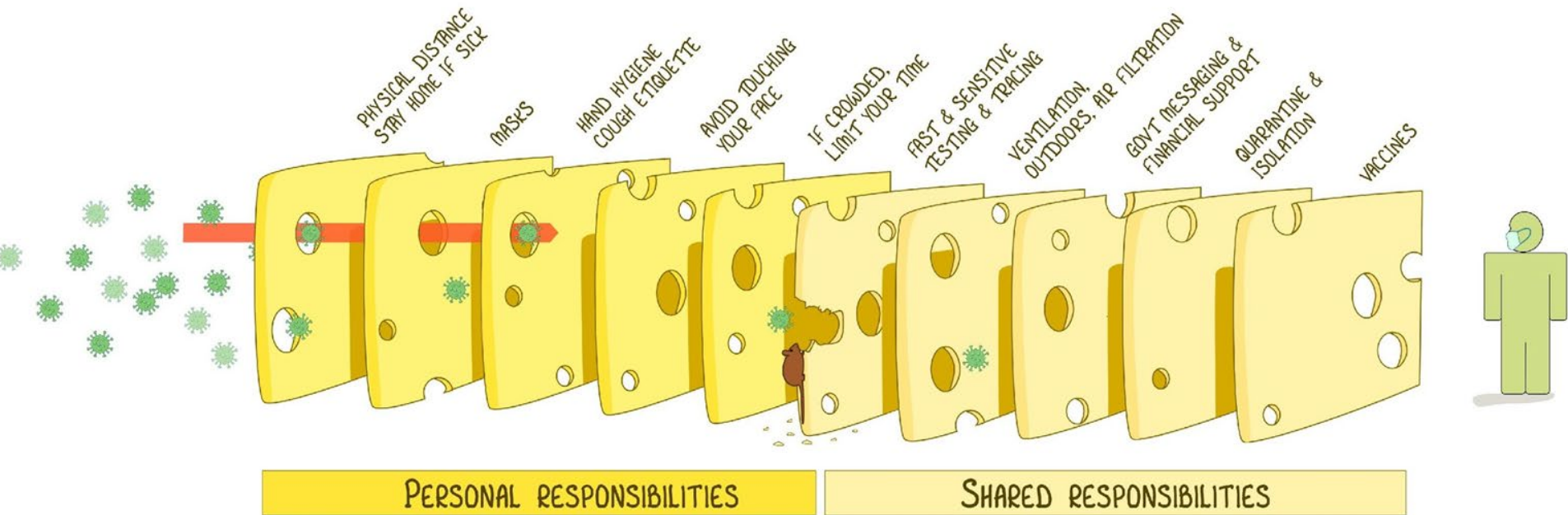
<https://virologydownunder.com>

<https://preventepidemics.org/covid19/science/insights/covid-19-case-iceberg/>



THE SWISS CHEESE RESPIRATORY VIRUS PANDEMIC DEFENCE

RECOGNISING THAT NO SINGLE INTERVENTION IS PERFECT AT PREVENTING SPREAD



EACH INTERVENTION (LAYER) HAS IMPERFECTIONS (HOLES).
MULTIPLE LAYERS IMPROVE SUCCESS.

We still don't know...

- Whether a person who has been fully vaccinated can be a “silent spreader”
- How best to treat high-risk people early in the course of their illness
- What makes some children & healthy adults vulnerable to severe illness
- How best to treat “Long COVID” effects
- Full impact of new SARS-CoV-2 variants

Yoga Teacher Practicing Again After COVID-19 Triggered Cardiac Arrest

Haley Otman June 04, 2020 9:00 PM

Clare Carr thought her COVID-19 infection was going to be mild. But then it sent her to the intensive care unit and baffled her doctors.







Carr practices yoga for the first time in seven weeks, after her hospitalization and cardiac arrests related to COVID-19 infection. Photo courtesy of Carr.

The first vaccines

THE UNBIASED SCIENCE PODCAST @unbiasedscipod

COVID-19 Vaccines

HOW DO THEY COMPARE?

 <p>Moderna</p>	<p>TECHNOLOGY: mRNA <i>RNA instructs our cells to produce the SARS-CoV-2 spike protein to trigger an immune response.</i></p> <p>EFFICACY: 94.1%</p> <p>CLINICAL TRIALS: Completed Phase 3. Authorized for use in USA, Canada, U.K., Israel, Switzerland, and EU.</p> <p>DOSE: 2 doses, 28 days apart.</p> <p>STORAGE: 30 days with refrigeration, 6 months at -20°C.</p>	 <p>Pfizer-BioNTech</p>	<p>TECHNOLOGY: mRNA <i>RNA template for the spike protein.</i></p> <p>EFFICACY: 95%</p> <p>CLINICAL TRIALS: Completed Ph3. Authorized/approved in USA, Canada, U.K., Switzerland, Bahrain, Saudia Arabia, EU, Argentina, Chile, Costa Rica, Ecuador, Jordan, Kuwait, Mexico, Panama, and Singapore.</p> <p>DOSE: 2 doses, 21 days apart.</p> <p>STORAGE: Freezer storage at -70°C, 5 days with refrigeration.</p>
 <p>Oxford-AstraZeneca</p>	<p>TECHNOLOGY: Viral Vector <i>A harmless virus is engineered to contain the gene for the SARS-CoV-2 spike protein</i></p> <p>EFFICACY: 62% at the approved dosing scheme.</p> <p>CLINICAL TRIALS: Completed Phase 3, authorized for use in U.K., Argentina, India (called CoviShield), and Mexico.</p> <p>DOSE: 2 doses, 4 weeks apart.</p> <p>STORAGE: refrigerated at 2-8° C.</p>	 <p>Johnson & Johnson</p>	<p>TECHNOLOGY: Viral Vector <i>A harmless virus is engineered to contain the gene for the SARS-CoV-2 spike protein</i></p> <p>EFFICACY: not yet known</p> <p>CLINICAL TRIALS: Completed Phase 2a, expected phase 3 trial data to be released soon.</p> <p>DOSE: 1-dose option being tested.</p> <p>STORAGE: 2 years frozen at -20° C, 3 months refrigerated at 2-8° C.</p>

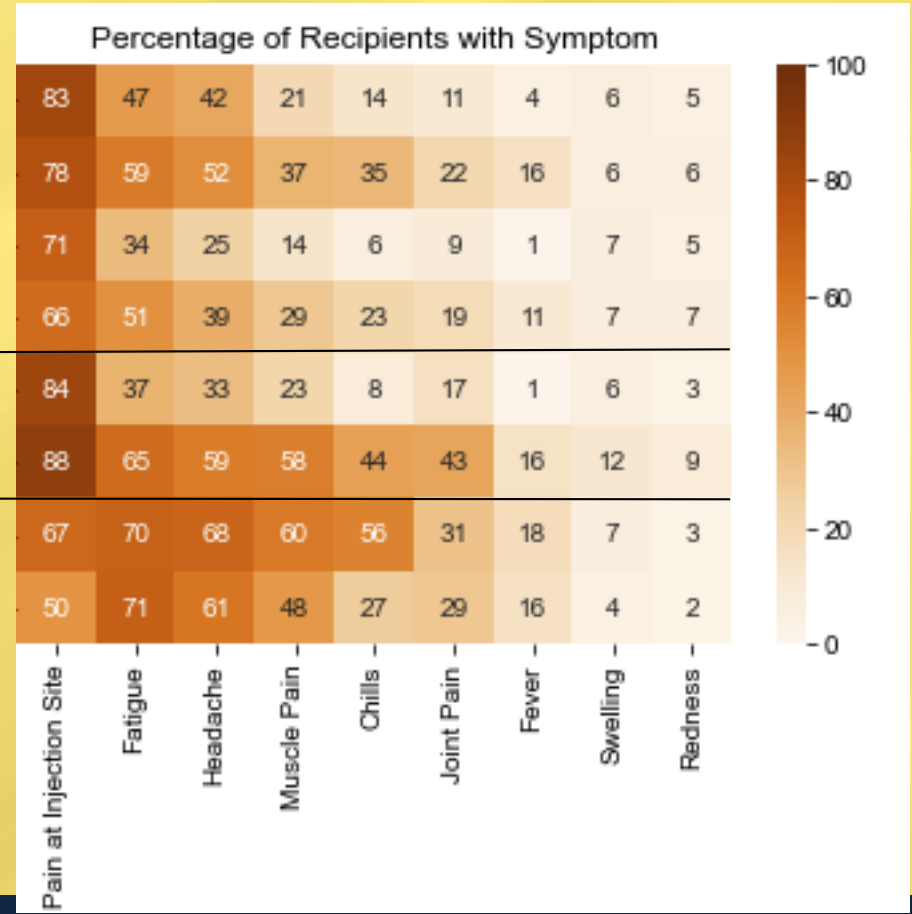
- As effective as our best vaccines for other diseases
- Dozens more in development/testing globally
- A few have failed in testing

COVID vaccine side effects

1st dose Pfizer 55 & under
 2nd dose Pfizer 55 & under
 1st dose Pfizer over 55
 2nd dose Pfizer over 55





1st dose Moderna
 2nd dose Moderna

1st dose AstraZeneca, no Tylenol
 1st dose AstraZeneca, with Tylenol



Vaccine side effects, compared

(<55 yr, after Dose 2 - highest side effect group found)

	 SHINGRIX <small>(ZOSTER VACCINE RECOMBINANT, ADJUVANTED)</small> Shingrix	 moderna <small>messenger therapeutics</small> COVID-19 mRNA-1273	 Pfizer COVID-19 BNT162b2	 Influenza Vaccine FLUCELVAX QUADRIVALENT Flu
Local Pain	88.4%	90.1%	77.8%	45.4%
Redness	38.7%	9.0%	5.9%	13.4%
Swelling	30.5%	12.6%	6.3%	11.6%
Myalgia	56.9%	61.3%	37.3%	15.4%
Fatigue	57%	67.6%	59.4%	17.8%
Headache	50.6%	62.8%	51.7%	18.7%
Chills	35.8%	48.3%	35.1%	6.2%
Fever	27.8%	17.4%	15.8%	0.8%

Michigan vaccine priority

		Estimated schedule for first doses administered												
Phase	People covered	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1A	Healthcare workers	[Green bar]												
	Long term care residents and staff	[White]	[Green bar]											
1B	75 years and over not covered in Phase 1a	[White]	[Green bar]											
	Prioritized Frontline Responders	[White]	[Green bar]											
	School and child care staff	[White]	[Green bar]											
	Corrections staff	[White]	[Green bar]											
1C	Agriculture and food processing workers	[White]	[White]	[Green bar]										
	Other essential frontline workers	[White]	[White]	[White]	[White]	[Green bar]								
	65-74 years old	[White]	[Green bar]											
2	18-64 with COVID-19 risk factors/pre-existing conditions	[White]	[White]	[White]	[White]	[White]	[White]	[White]	[White]	[White]	[White]	[White]	[White]	[White]
	All remaining essential workers	[Green bar]												
2	16 to 64 years not covered above	[Green bar]												



How to get vaccinated

- If you work in health care or an in-person essential “frontline” job (teacher, first responder):
 - Employer-based clinics (health systems, nursing homes)
 - County/city public health department appointment-based clinics (including at Schoolcraft College)



How to get vaccinated

If you're over 65 AND a patient at a major health system:

- Sign on to your patient portal or sign up for portal access **now** – only 45% of older adults have it!
- Get help from a “proxy” if needed, or help others
- As vaccine arrives, you'll be notified by portal, call or letter when you are randomly assigned to get it
- Also try commercial pharmacies and public health

If you're **over 65** but not a health system patient:

- Check county/city public health websites & pharmacies



How to get vaccinated

- **If you're under 65 but work in a frontline job:**
 - The state will release information to employers
 - County/city health departments & stores/pharmacies
 - Keep wearing a mask and protecting yourself!
- **If you're under 65 but have an underlying condition that puts you at risk:**
 - Sign on to patient portal system of your doctor's health system.
 - You will be notified when vaccine is available to you.
 - Talk to your specialist or primary care provider if you have concerns
 - Not in a health system: Check county/city websites & stores/pharmacies.



How to get vaccinated

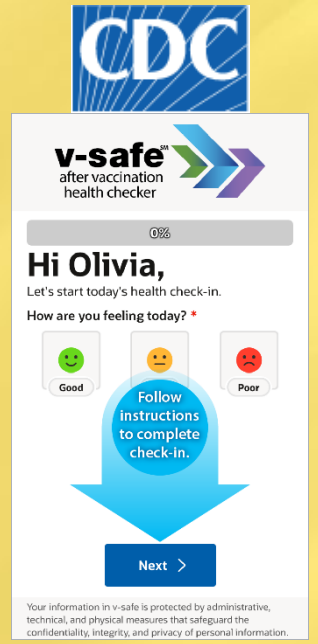
- If you're under 65 and don't have underlying conditions:
 - It's going to be a while before vaccine is available to you.
 - Remember you can infect at-risk people even if you don't get sick.
- If you have children/teens:
 - Clinical trials are finishing up for teens, just starting for kids
 - The more volunteers, the faster FDA approval could expand to <18





Rumors & misinformation

- Anti-vaccination sentiments mixing with politics, anecdotes, inaccuracy & deliberate falsehoods
 - Overstatement of side effects/focus on rare ones
 - Suspicion of development & approval process
 - Worries about DNA, ingredients, certain groups
- We must help those “on the fence” know where to get reliable information to aid their decision



Vaccine-related scams

Oakland County warns of possible COVID-19 vaccine appointment scam
Christina Hall Detroit Free Press
Published 6:01 a.m. ET Feb. 23, 2021

- Reports of scammers leveraging public interest in the vaccine to acquire personal info, especially targeting Medicare beneficiaries
- Be alert for phone calls, door-to-door sales, unsolicited emails (that may have links to fake sites), and too-good-to-be-true social media posts that phish for personal information, including insurance ID number or payment with false promise of:
 - early access to COVID-19 vaccine
 - holding a vaccine appointment
 - special program offerings, such as testing kits or personal protection equipment.
- Better Business Bureau: warning not to post images of COVID-19 vaccination cards w/ personal info on social media



The new variants

COVID-19 variant now confirmed in 157 cases in 12 Michigan counties

Updated Feb 17, 2021; Posted Feb 17, 2021



The New York Times

2/22/21

Vaccines Adapted for Variants Will Not Need Lengthy Testing, F.D.A. Says

The agency's new guidance will speed the development of vaccines that protect against more contagious variants of the coronavirus.



No matter what...

Preventive steps will be needed until most people are vaccinated.

- Masks even after you're vaccinated
- Limits on gathering, occupancy & travel
- Virtual connection to others



No matter what...

- Don't delay medical/dental care, emergency care or screening
- Get outdoors and stay active & connected in safe ways
- Prevent spread to keep hospitals from getting overwhelmed & affecting normal care



If you can...

- **Lead by example.** Be the one who gently but firmly insists on masks (worn properly) & on outdoor gatherings over indoor ones
- **Spread good information** on social media, by email and in conversation
- **Counteract misinformation** with information from reliable sources



If you can...

Give, buy or volunteer to help those hurt most.

- Food banks, diaper banks, United Way
- Arts & cultural organizations, nonprofits
- Local restaurants and stores
- Neighbors & friends with high risks, active cases at home or long-term effects
- Tutoring
- Patient portal access help



The future of COVID-19

- **Could become endemic, such as flu** (though still more severe)
 - Annual “season”
 - Adjust vaccine to fight circulating strains
- **Research:** understand the virus & disease better, study effects of state/local responses, track social impacts, improve care & recovery
- **Fully fund our public health system** to be ready for emerging diseases
- **Repair economic damage** and strengthen supply chains
- **Address the underlying inequalities** that this pandemic exposed



Questions?

