MI COVID RESPONSE DATA AND MODELING UPDATE

NOTE: All data as of Jan. 2 unless otherwise noted

January 5, 2021

Executive summary

Michigan has recorded the **20th highest number of cases (↓1)** , **8th highest number of deaths (↓1)**, **46th highest case rate (↔)**, and **T16th highest death rate (↓3)** in the last 7 days (source: CDC COVID Data Tracker)

Michigan has the **32nd highest hospitalization rate as a percent of total beds (↓7)**, and **12th highest number of COVID patients in the ICU (↓3)** (source: Becker's Hospital Review)

Case rates (237) and **coronavirus like illness** (CLI) are both decreasing but that decrease appears to be slowing

Percent positivity (9.6%) has increased in recent days

13.1% of available inpatient beds are filled with COVID patients (↓1.1%) and state trends for COVID hospitalizations are decreasing

There were **572 deaths** (↓181) during the week of Dec 20-Dec 26 and the state death rate is **8.2 deaths/million/day** (↓2.6), but these are lagging indicators of cases and hospitalizations from several weeks ago

Daily diagnostic tests dropped to an average of 33.4K per day (↓15.2K) over the last week and the state rate is **3,360.3 tests/million/day** (↓904.4)

Vaccine Update: 520,150 doses sent to providers, 152,511 vaccinations reported to be administered ("shots in arms")

Science Round-up: The new variant B.1.1.7 has not been seen in Michigan but could have significant impacts

Comparison across states: Summary 1/4/21

What we see today:

- 33 states seeing increasing 1 week case trends (up vs. 8 last week)
- 48 states (stable) with significant outbreaks (high/increasing cases, increasing/high positivity increasing/high hospitalizations over 2 weeks (>100 per M))
- Arizona (646/M), Nevada, Alabama, California, Georgia have highest per capita hospitalized patient numbers
- Most rapid 1 week case growth: RI, LA, HI, KY, FL
- Midwest:
  - Wisconsin showing slight decline in hospitalizations (175/M), slight rise in cases (433/M)
  - Indiana with stable hospitalizations (407/M), and slight drop in cases (684/M)
  - Illinois showing continued slow decline in hospitalizations (300/M), cases stable/up slightly (448/M)
  - Ohio with slow decline in hospitalizations (364/M) and stable cases (623/M)
  - Michigan showing continued decline in hospitalizations (235/M) and stable/slight rise in cases (310/M)

COVID-19 Spread

Positivity had been declining, reaching a low of 8.2% on 12/27, but **recently increased to 9.6%**

- Four MERC regions remain below 10%
- Upper Peninsula is only region to see an increase in positivity over the previous week (up to 4.9%)

Cases continue to decrease for 46 days but decline has plateaued, and we remain vigilant for a rebound in cases

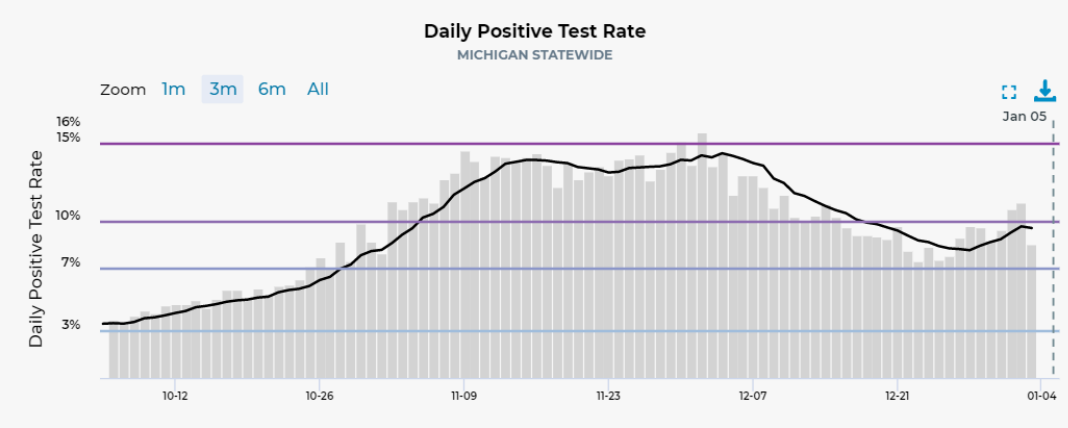
- Decreases among most age groups, races, and ethnicities
  - Nearly a third of cases have race or ethnicity missing

Outbreaks

- Number of active outbreaks is down 9% from previous week
- Number of reported school outbreaks decreased again since last week (119 to 78)

Recent statewide trends

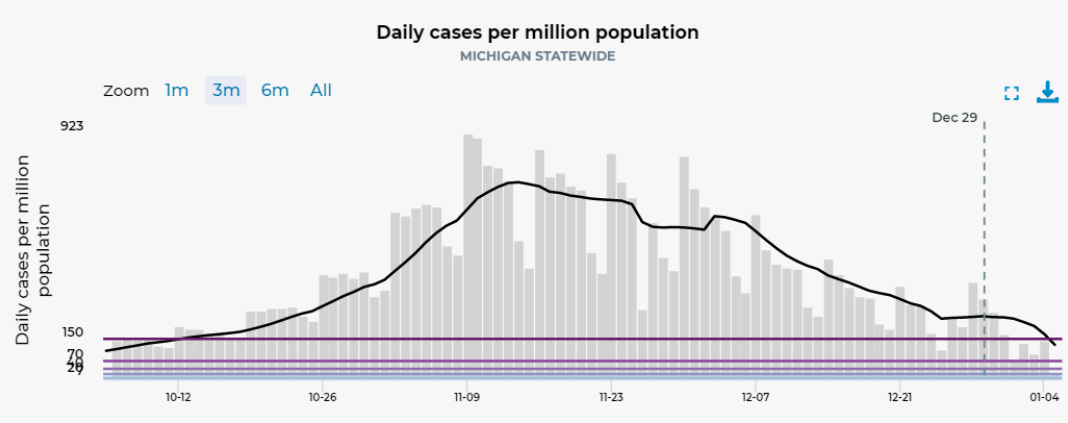
Positivity, %



Positivity reached a low of 8.2% on 12/27

Increasing to 9.6% in most recent 7-day average

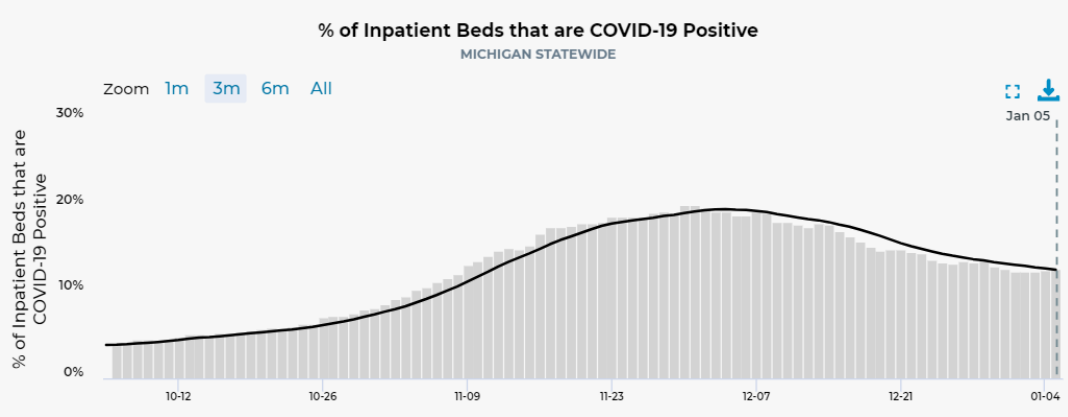
Daily cases per million



Reached 227 cases per million people on 12/25th

Plateaued now at 237 on December 29th

Daily hospitalization rate, %



12.6% of inpatient beds being used to treat COVID 19 patients. Down from 19.6% on 12/4

Source: https://mistartmap.info/

Confirmed and probable case indicators

Table Date: 1/4/2021 (7 days from date table was produced: 12/29/2020)

Risk levels: Low | A | B | C | D | E

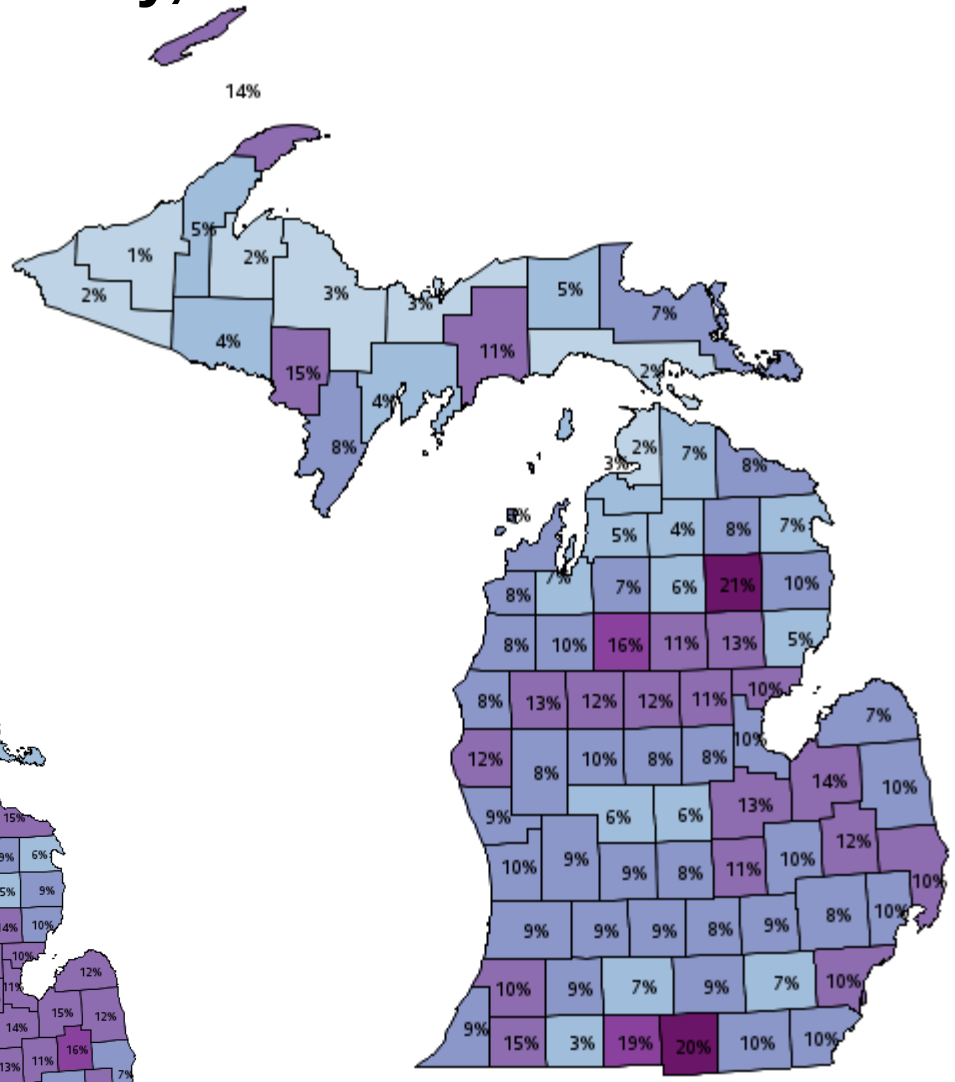
	MERC Region Number	Public Health Region	Overall Risk Level	Absolute cases (per million)	CDC Case Trend	Average percent positivity	Positivity trend	Tests per million	Weekly % CLI cases	Weekly % CLI cases trend	% inpatient beds occupied by COVID-19 cases	Absolute deaths (per million)	Death trend
Detroit	1	2N + 2S	E	211.4	decline [42 days]	10.1	Decrease - 4wk	3081.3	0.6	Increase - 1wk	12.4	6.7	Decrease - 2wk
Grand Rapids	2	6	E	260.9	decline [48 days]	9.9	Decrease - 4wk	3233.3	0.9	Decrease - 5wk	10.9	6.2	Decrease - 3wk
Kalamazoo	3	5	E	258.0	decline [48 days]	10.7	Decrease - 4wk	3063.4	0.9	Increase - 1wk	14.3	11.2	Decrease - 2wk
Saginaw	4	3	E	283.2	decline [47 days]	11.0	Decrease - 3wk	3404.2	0.4	Increase - 1wk	16.1	15.6	Decrease - 3wk
Lansing	5	1	E	296.6	decline [47 days]	9.6	Decrease - 3wk	3177.7	0.4	Decrease - 3wk	18.5	10.5	Increase - 1wk
Traverse City	6	7	E	198.3	decline [41 days]	8.7	Decrease - 3wk	2364.3	1.1	Decrease - 2wk	7.1	9.1	Decrease - 1wk
Jackson	7	1	E	341.6	decline [42 days]	11.5	Decrease - 4wk	4144.1	0.5	Decrease - 2wk	17.4	5.7	<20 wkly deaths
Upper Peninsula	8	8	E	242.6	decline [51 days]	4.9	Increase - 1wk	3764.2	0.7	Increase - 2wk	7.3	3.8	<20 wkly deaths
Michigan			E	237.1	decline [46 days]	9.6	Decrease - 4wk	3351.3	0.7	Decrease - 5wk	12.6	7.8	Decrease - 3wk

Cases Low: <7 | A: 7-20 | B: 20-40 | C: 40-70 | D: 70-150 | E: >=150

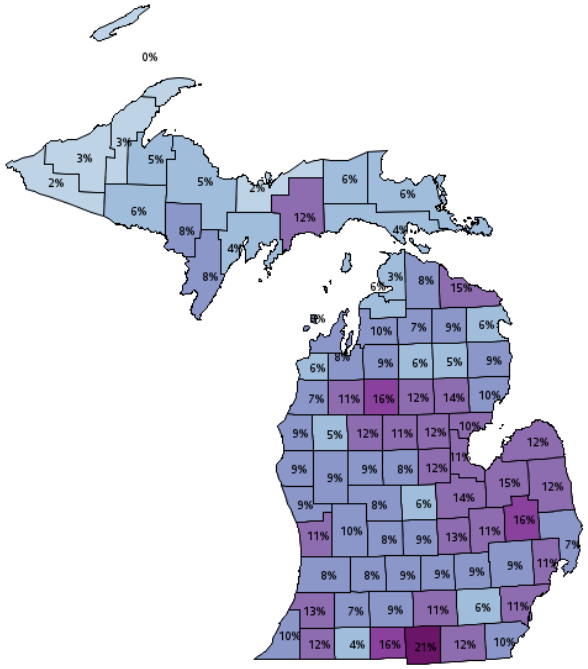
Positivity Low: <3% | A: 3-7% | B: 7-10% | C: 10-15% | D: 15-20% | E: >=20%

PUBLIC HEALTH

Positivity by county, 12/23-12/29



Last week, 12/16-12/22



Average positivity per day	# of counties	This week	Last week
<3%		7	5
3-7%		17	17
7-10%		36	33
10-15%		19	24
15-20%		2	3
>=20%		2	1

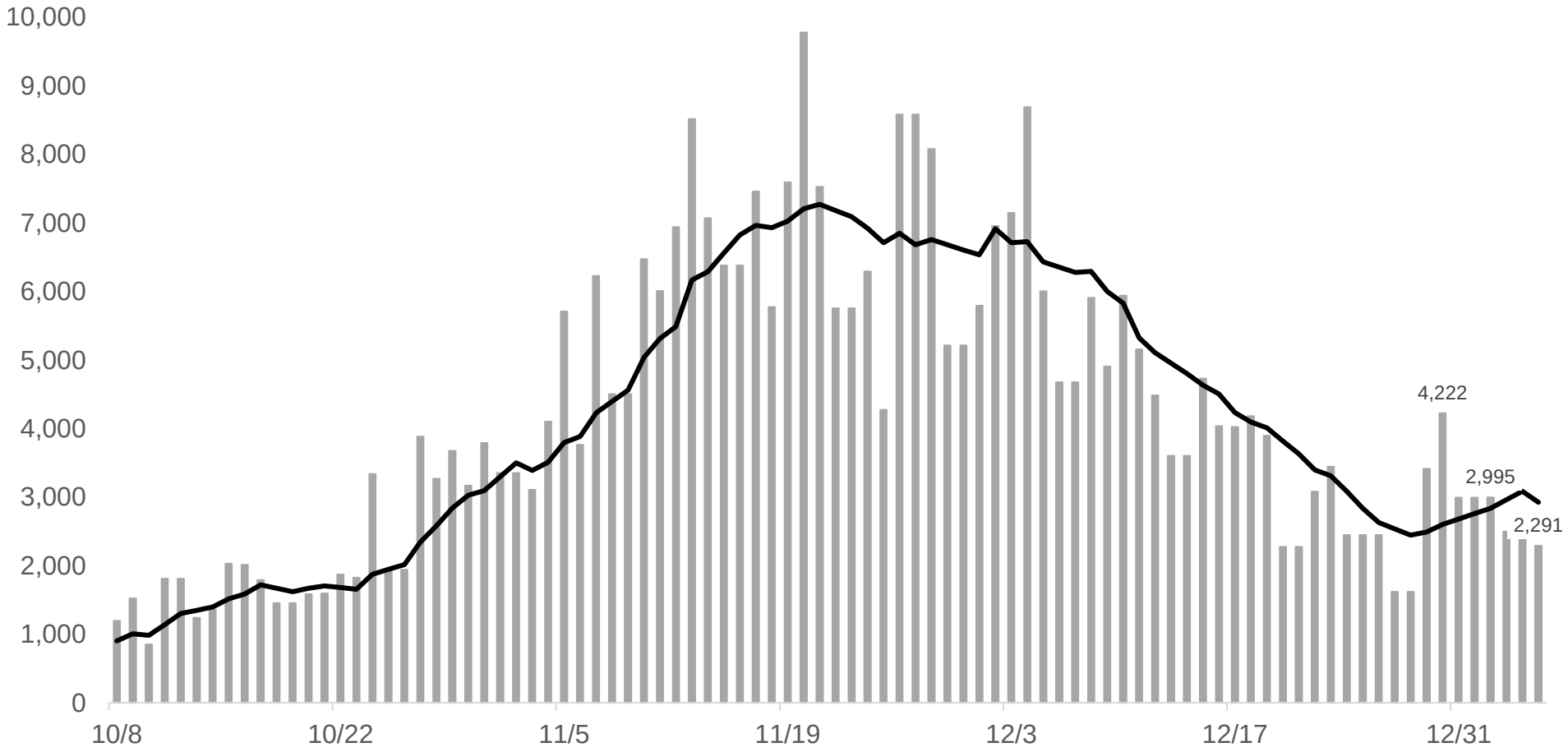
Updates since last week:

23 of 83 counties saw double digit positivity in the last week (5 county reduction)

Source: SEOC Testing Results – Excluding MDOC

Confirmed COVID-19 cases by report date: State of Michigan

Confirmed cases reported on prior day (7-day rolling average)



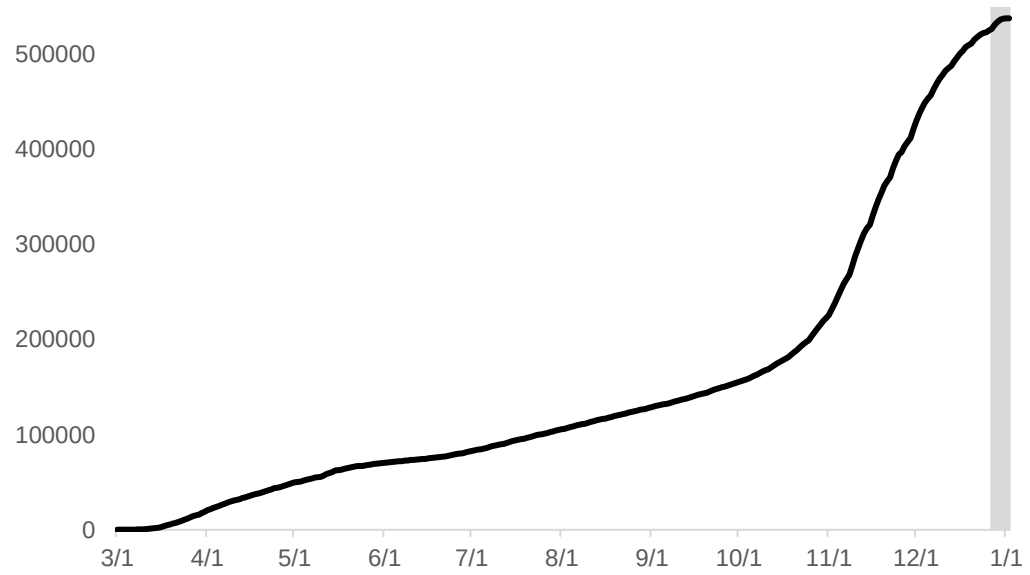
The number of weekly reported cases to public health has plateaued

In the last week, 20,488 cases reported

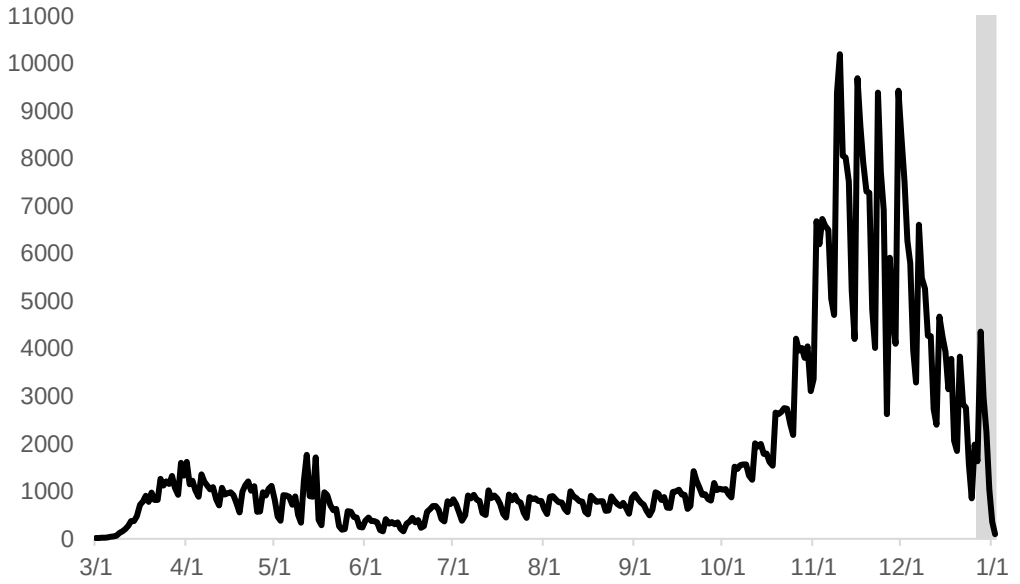
Source: MDHHS – Michigan Disease Surveillance System

COVID-19 cases by onset date: State of Michigan

Cumulative confirmed and probable cases, by date of onset of symptoms



New confirmed and probable cases, by date of onset of symptoms



Updates since last week:

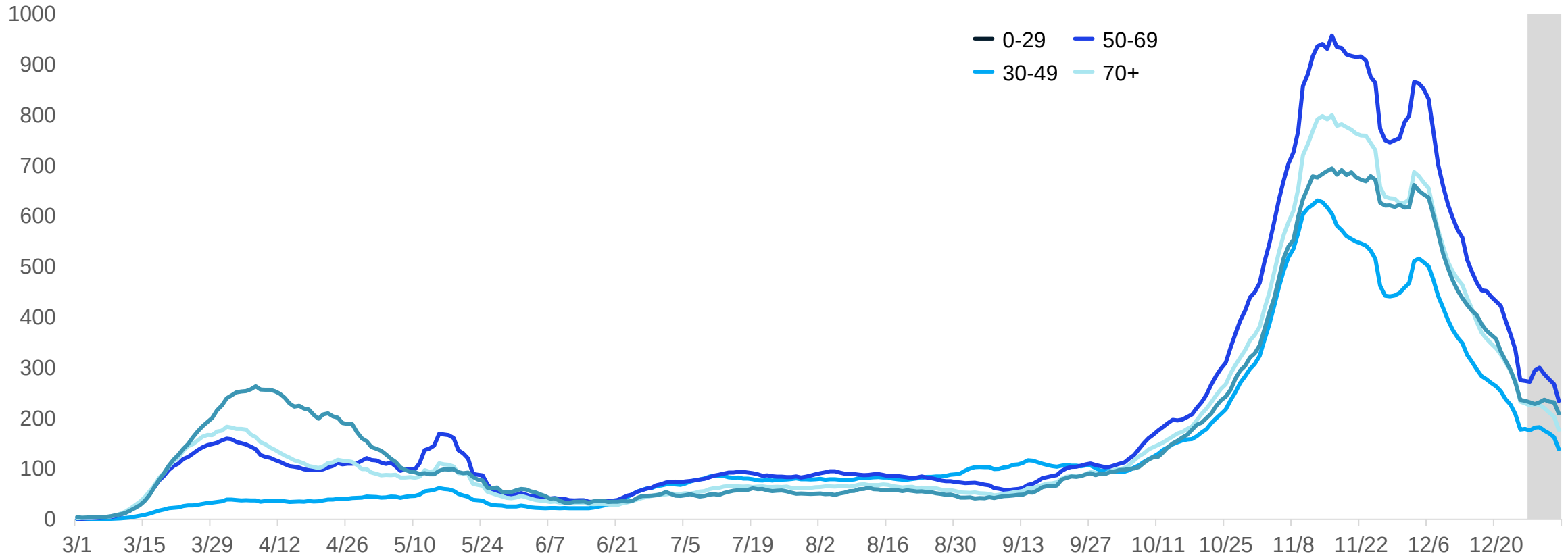
Cases have dropped for the sixth week in a row

Current daily case rate remains more than 2x the rate from early October

Note: Cases information sourced from MDHHS and reflects date of onset of symptoms (refers to lab-confirmed cases). Case spike on 5/12 is a result of batch of test results, not all of which have onset date of symptoms completed
Source: MDHHS – Michigan Disease Surveillance System

Age group: average new daily cases

Daily new confirmed and probable cases per million by age group (7-day rolling average)

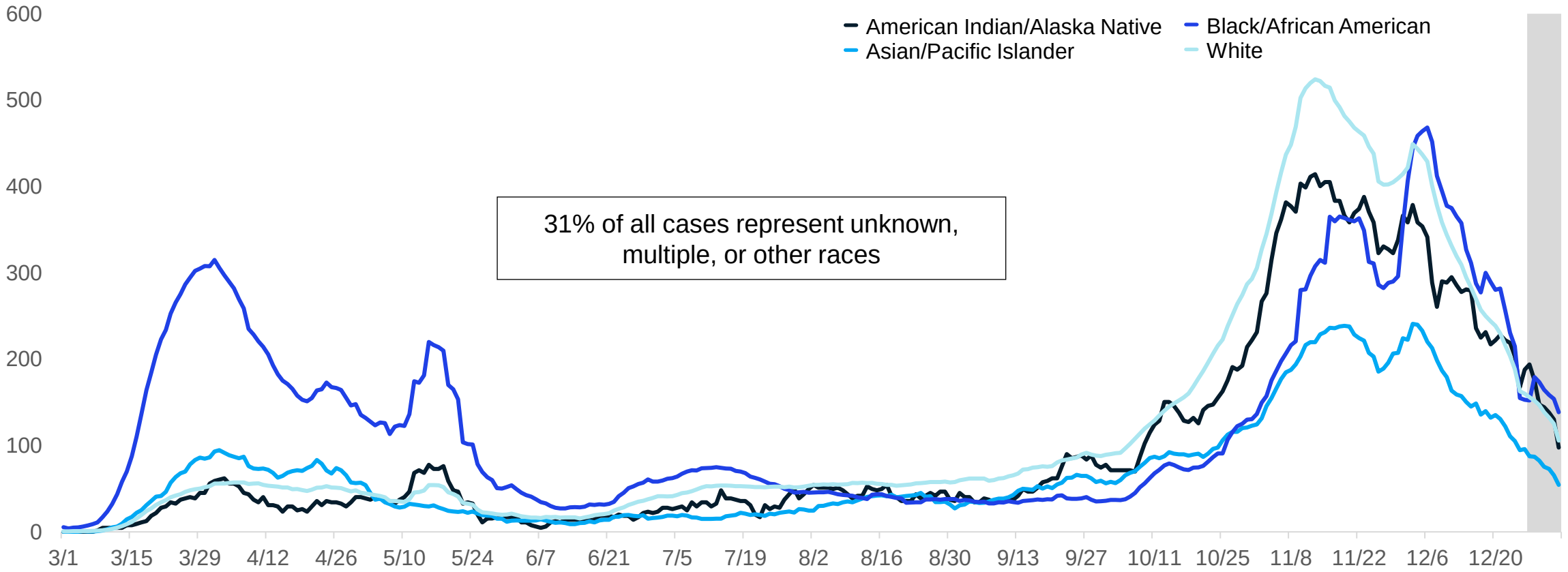


30-49 age group continues to have the highest cases per million, though cases per million have decreased for all age groups over the past 6 weeks

Note: Cases information sourced from MDHHS and reflects date of onset of symptoms
Source: MDHHS – Michigan Disease Surveillance System

Average daily new cases per million people by race

Daily new confirmed and probable cases per million (7 day rolling average) by race category



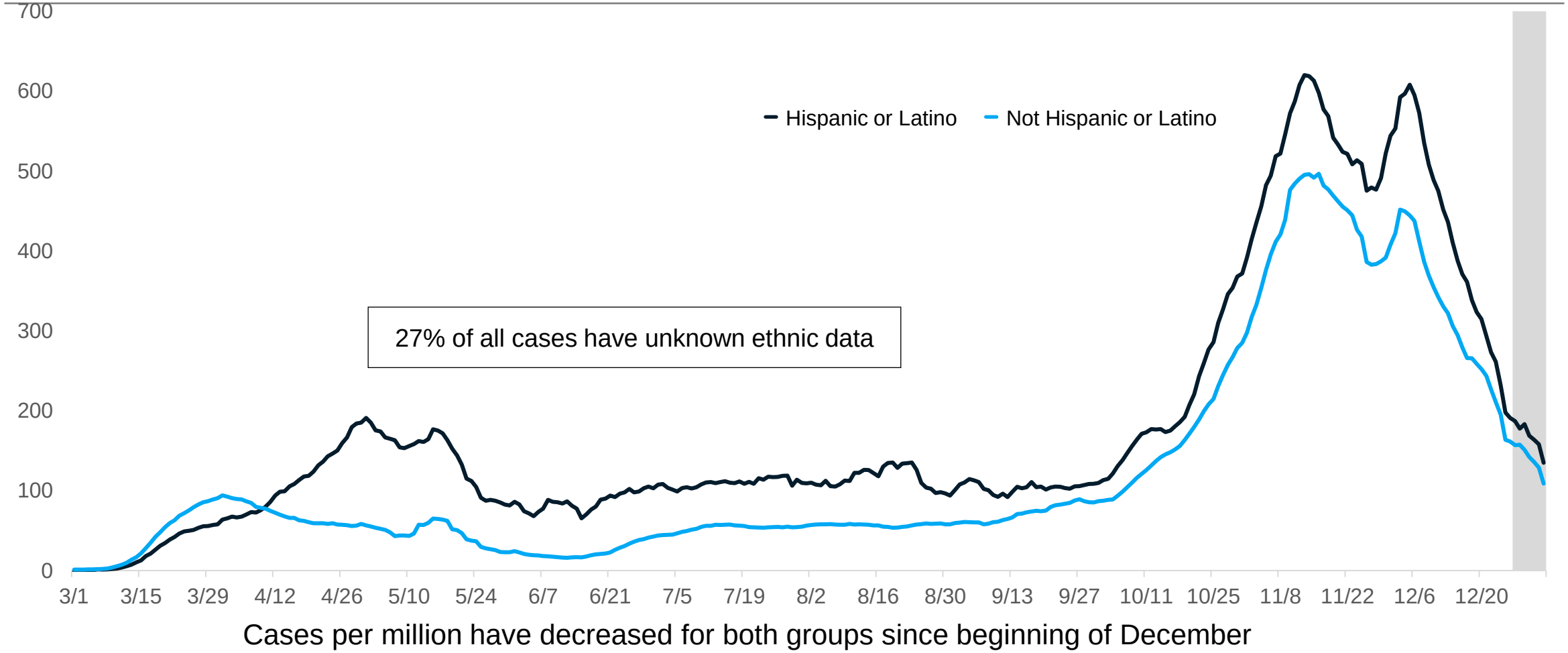
Cases per million have decreased for all racial groups since beginning of December

Note: Cases information sourced from MDHHS and reflects date of onset of symptoms; note that Multiple Races, Other, and Unknown race/ethnicity are not included in calculations

Source: MDHHS – Michigan Disease Surveillance System

Average daily new cases per million people by ethnicity

Daily new confirmed and probable cases per million (7 day rolling average) by ethnicity category

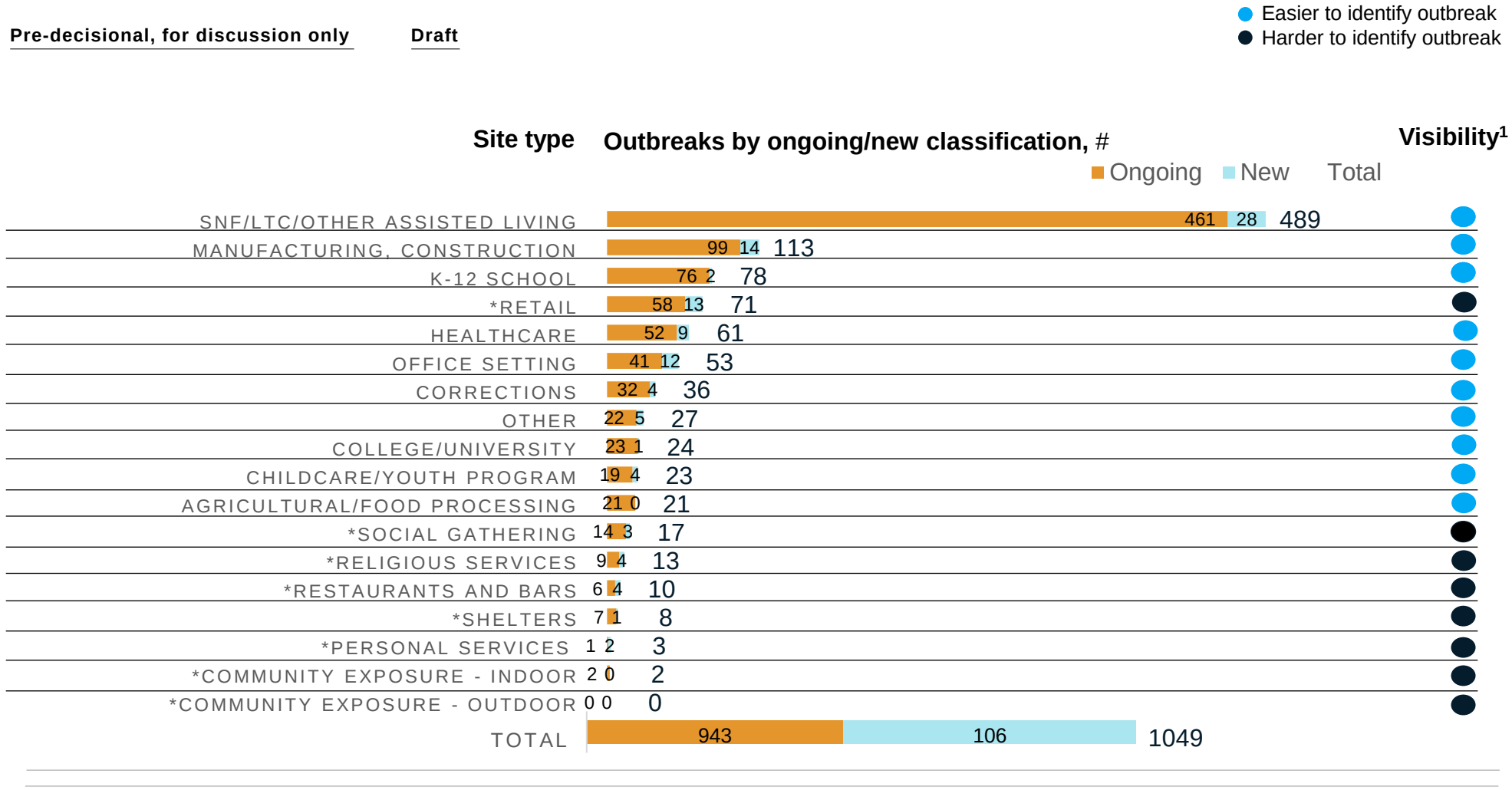


Note: Cases information sourced from MDHHS and reflects date of onset of symptoms; note that Multiple Races, Other, and Unknown race/ethnicity are not included in calculations

Source: MDHHS – Michigan Disease Surveillance System

Number of outbreak investigations by site type, week ending Dec 30

Pre-decisional, for discussion only **Draft**



Total number of active outbreaks is down 9% from previous week

Following LTCs, the greatest number of new outbreaks were reported in manufacturing/ construction (14), retail (13), office setting (12), and healthcare (9).

LHDs reported new outbreaks in all settings except agriculture/food processing/ migrant labor housing, and community exposure

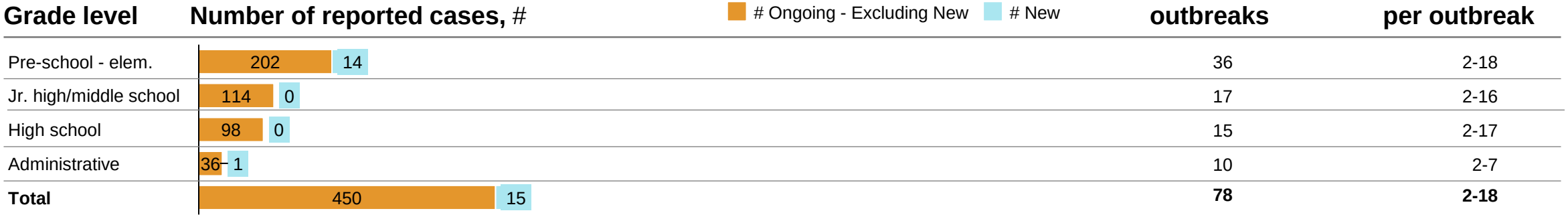
1. Based on a setting's level of control and the extent of time patrons/residents spend in the particular setting, different settings have differing levels of ability to ascertain whether a case derived from that setting

NOTE: Many factors, including the lack of ability to conduct effective contact tracing in certain settings, may result in significant underreporting of outbreaks. This chart does not provide a complete picture of outbreaks in Michigan and the absence of identified outbreaks in a particular setting in no way provides evidence that, in fact, that setting is not having outbreaks.
Source: LHD Weekly Sitreps

K-12 school outbreaks, recent and ongoing, week ending Dec 30

Number of reported outbreaks decreased since last week (119 to 78) including reductions in High School (40 to 15), Middle/Jr High (19 to 17), Pre K-Elementary (49 to 36), and Administrative (11 to 10)

Region	Number of reported cases, #	Number of outbreaks	Range of cases per outbreak
Region 1	50 3	10	6-10
Region 2n	47 0	14	2-9
Region 2s	16 2	3	4-8
Region 3	174 0	27	2-18
Region 5	8 6	4	2-6
Region 6	121 6	13	2-16
Region 7	16 0	4	2-2
Region 8	18 0	3	2-8
Total	450 17	**78**	**2-18**



Grade level	Number of reported cases, #	Number of outbreaks	Range of cases per outbreak
Pre-school - elem.	202 14	36	2-18
Jr. high/middle school	114 0	17	2-16
High school	98 0	15	2-17
Administrative	36 1	10	2-7
Total	450 15	**78**	**2-18**

Many factors, including the lack of ability to conduct effective contact tracing in certain settings, may result in significant underreporting of outbreaks. This chart does not provide a complete picture of outbreaks in Michigan and the absence of identified outbreaks in a particular setting in no way provides evidence that, in fact, that setting is not having outbreaks.

Source: LHD Weekly Sitreps

COVID-19 and Healthcare Capacity and COVID Severity

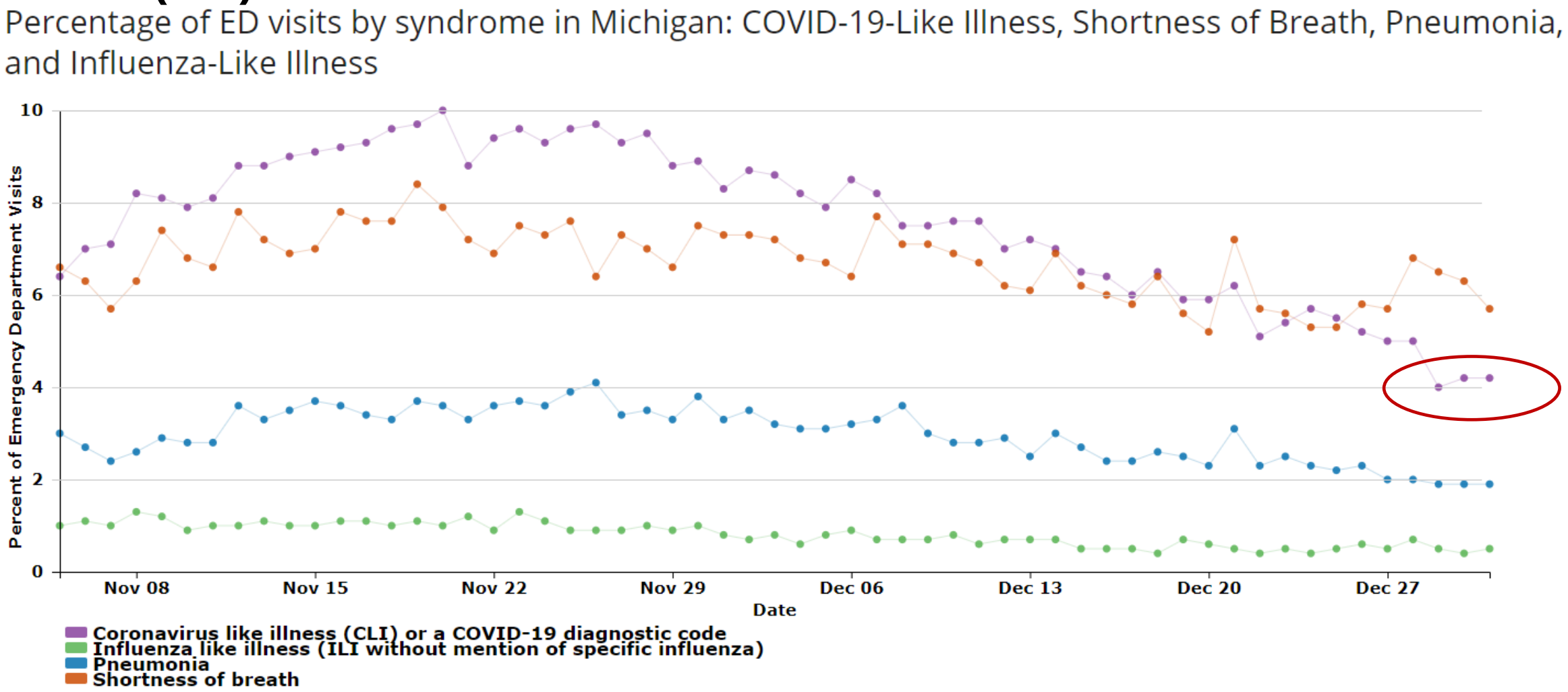
Hospitalizations and ICU utilization are decreasing

- COVID-like illness (CLI) continues with downward trend, however, there is a 3-day plateau
- Hospitalizations down 40% since December 1st peak
- ICU occupancy declined 17% over last week
- All regions now below 30% of Adult ICU beds with patients positive for COVID but 4 regions remain > 20% (regions 1, 3, 6, and 7)

Current deaths are a lagging indicator of cases, but the number of deaths is declined for second consecutive week

- Delay in reported deaths due to the holiday break, expect lag to be slightly longer over the next few days

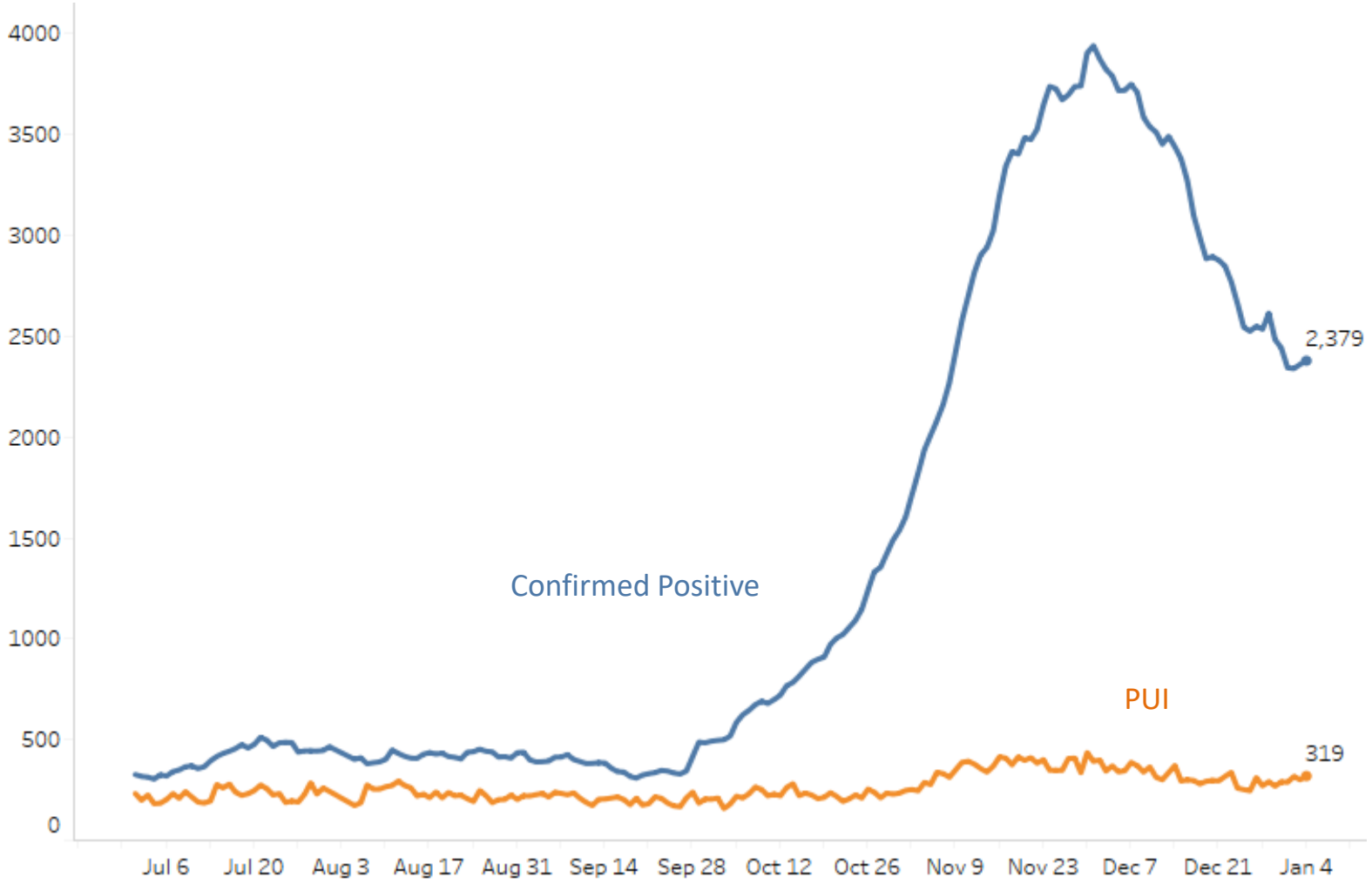
Michigan Trends in Emergency Department Visits for COVID-19-Like Illness (CLI)



Source: https://covid.cdc.gov/covid-data-tracker/#ed-visits

Statewide Hospitalization Trends: Total COVID+ Census

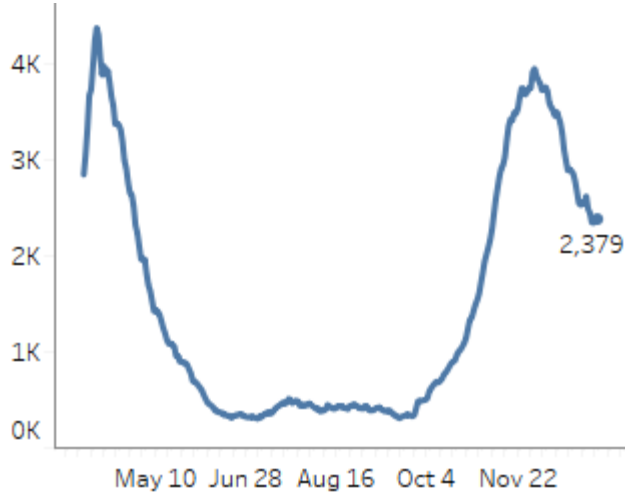
Hospitalization Trends 7/1/2020 – 1/4/2021
Confirmed Positive



This week, COVID+ hospital census is down 6% from the previous week and 40% down from the December 1 peak.

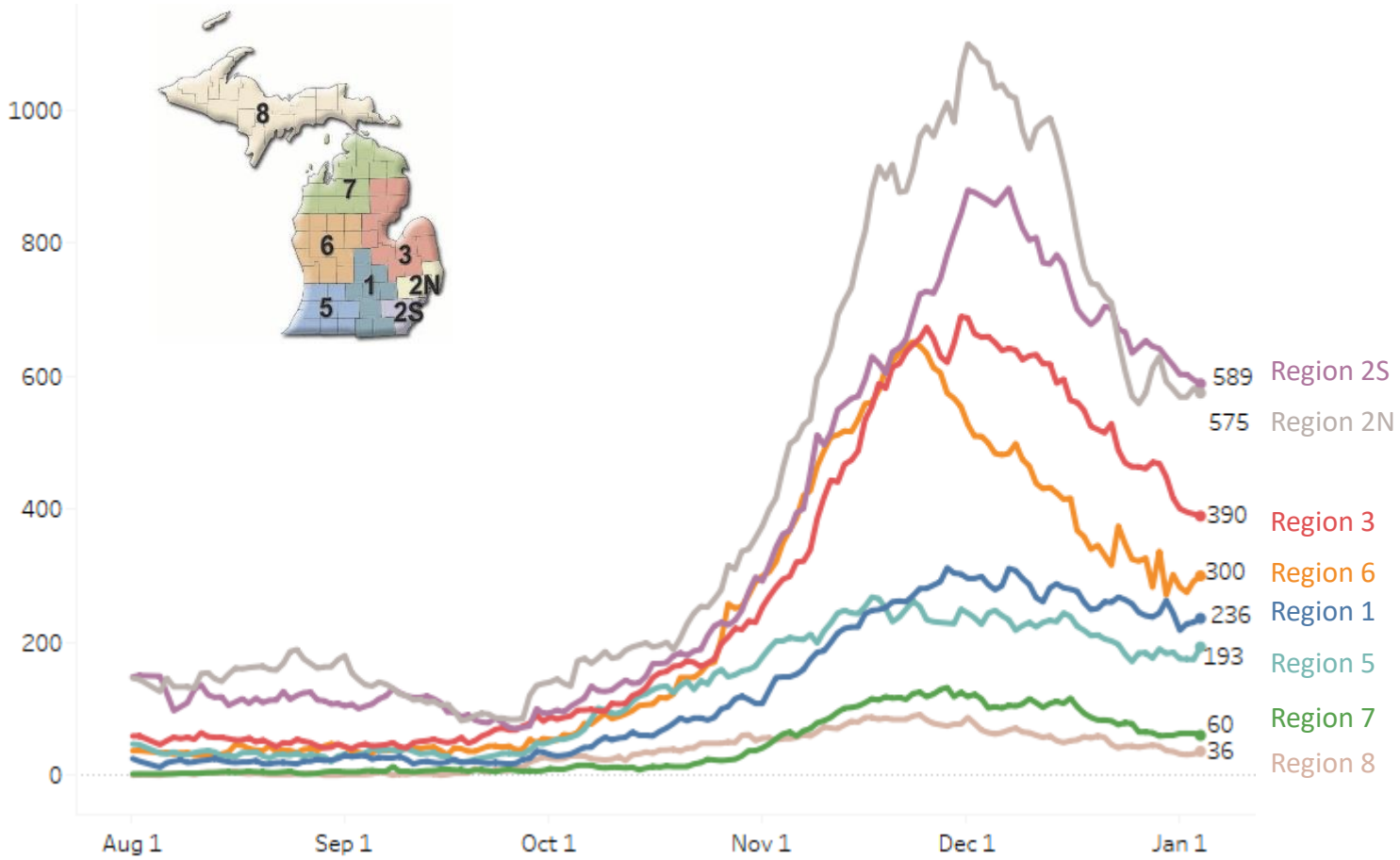
The rate of decline this week is slower than the past few weeks

Hospitalized COVID Positive Long Term Trend (beginning March)



Statewide Hospitalization Trends: Regional COVID+ Census

Hospitalization Trends 8/1/2020 – 1/4/2021
Confirmed Positive by Region



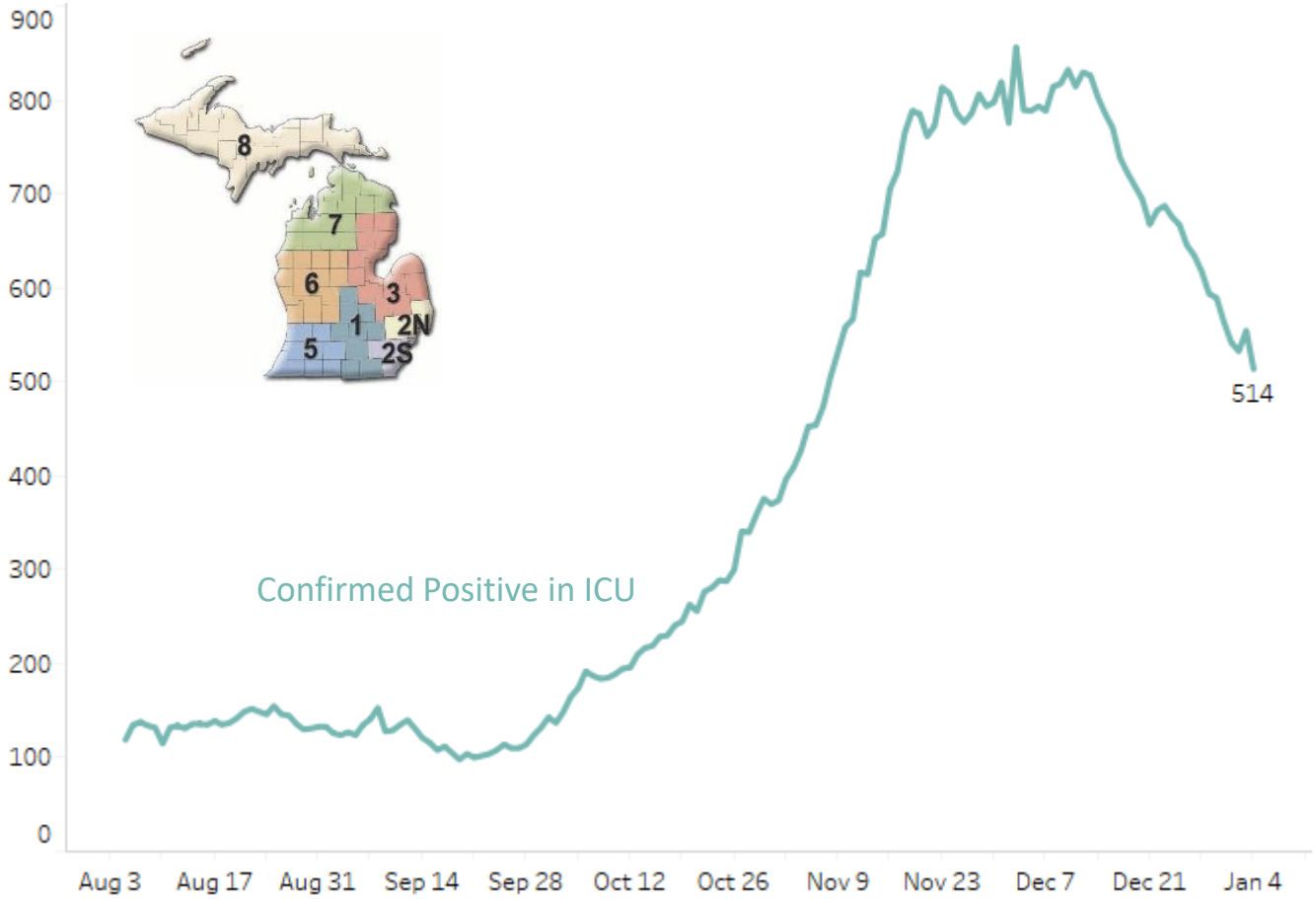
Most regions are showing decreasing trends in COVID+ hospital census this week vs. last week

Regions 5 and 6 have increased slightly from last week although the absolute increases are very small

Region	Trend from Last Week	COVID+ Hospitalizations / MM
Region 1	-1%	219/M
Region 2N	-6%	260/M
Region 2S	-9%	264/M
Region 3	-17%	344/M
Region 5	10%	202/M
Region 6	6%	205/M
Region 7	-6%	120/M
Region 8	-20%	116/M

Statewide Hospitalization Trends: ICU COVID+ Census

Hospitalization Trends 8/1/2020 – 1/4/2021
Confirmed Positive in ICUs



The COVID+ ICU Census has declined by 17% over the past week, with all regions showing declining trend except Region 7 (large percent increase although very small absolute increase)

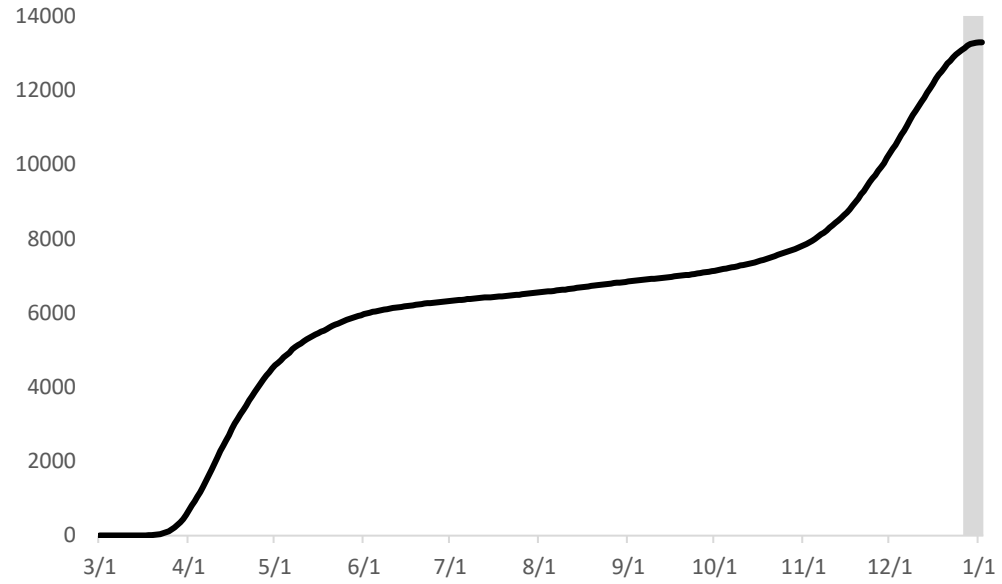
For the first time in many weeks, no regions have >30% of ICU beds occupied by COVID+ patients

Region	Adult COVID+ in ICU (% Δ from last week)	Adult ICU Occupancy	% of Adult ICU beds COVID+
Region 1	47 (-16%)	81%	24%
Region 2N	100 (-15%)	77%	18%
Region 2S	131 (-23%)	81%	17%
Region 3	99 (-20%)	90%	27%
Region 5	20 (-41%)	82%	13%
Region 6	72 (-11%)	67%	20%
Region 7	36 (+33%)	65%	20%
Region 8	9 (-25%)	59%	16%

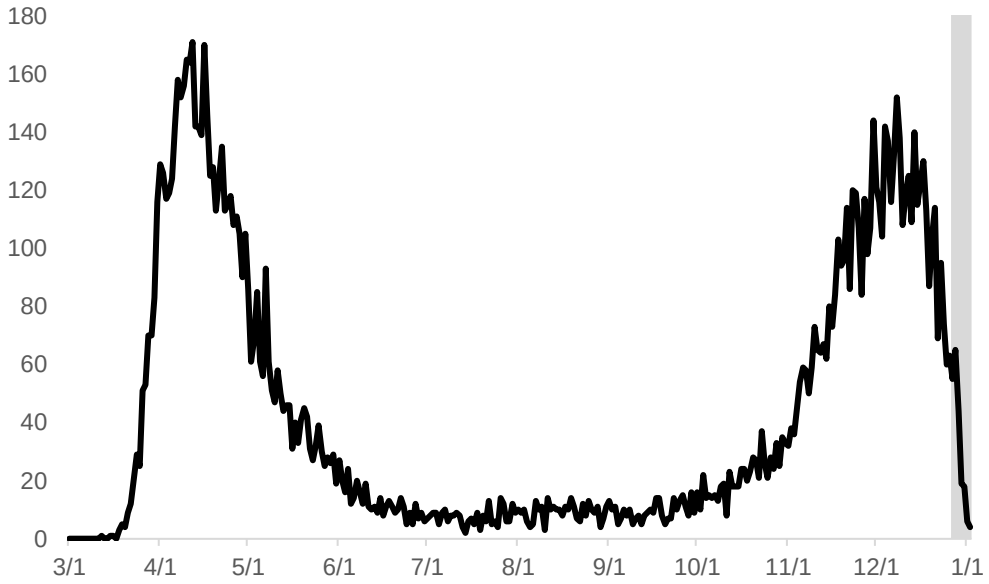
Hospital bed capacity updated as of 12/30

COVID-19 deaths by date of death: State of Michigan

Cumulative confirmed and probable deaths, by date of death



New confirmed and probable deaths, by date of death



Updates since last week:

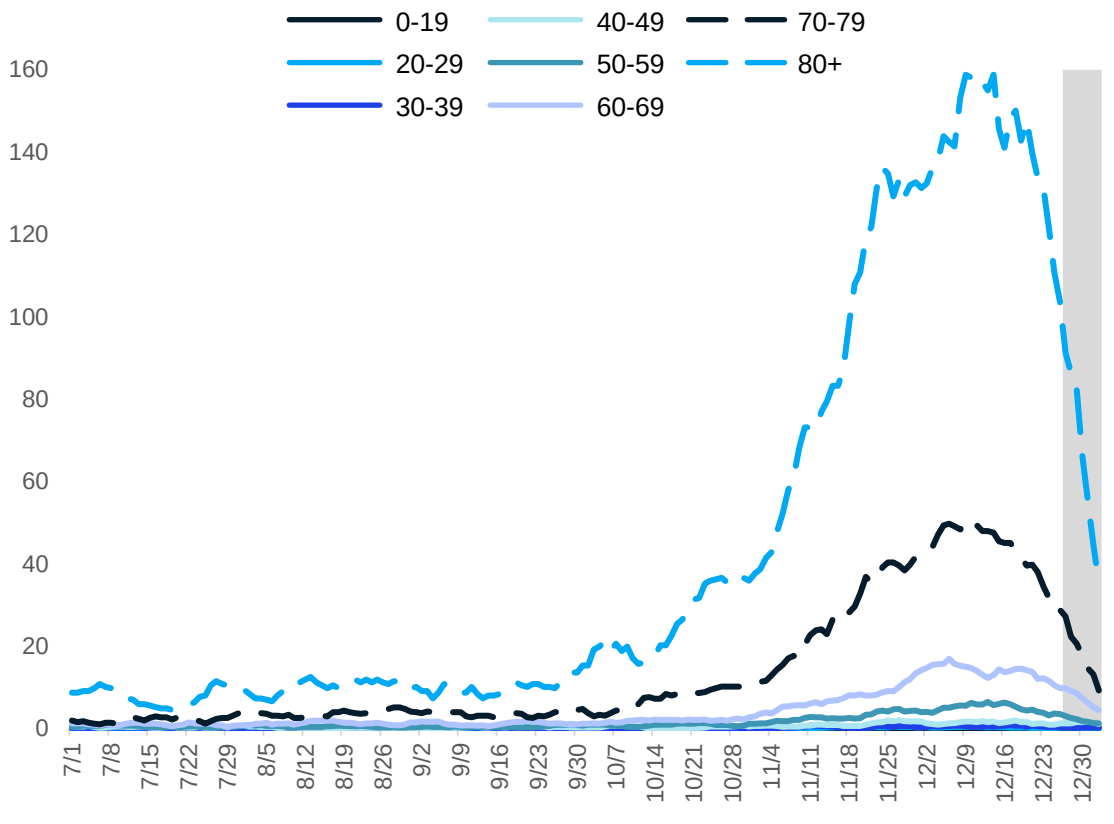
Although deaths are a lagging indicator of cases, the number of deaths has declined for two week

The current number of deaths is more than 6.5x the number of deaths in early October

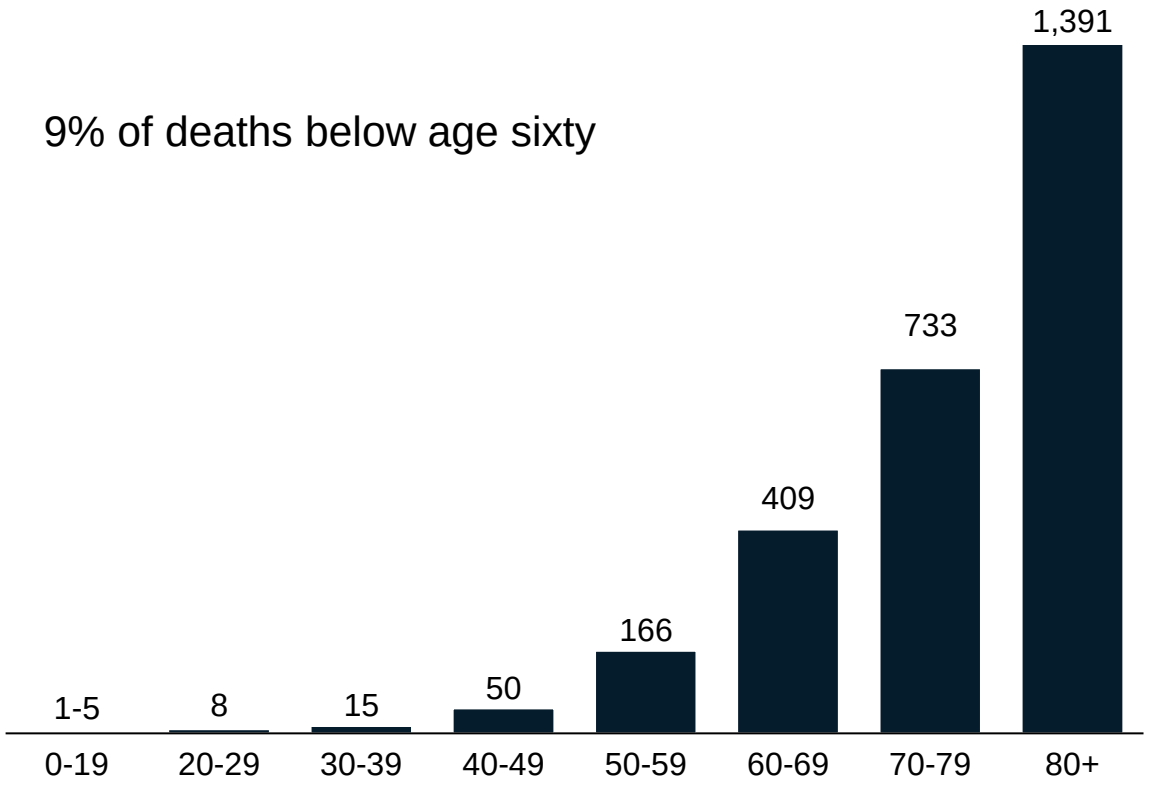
Note: Death information sourced from MDHHS and reflects date of death of confirmed and probable cases.
Source: MDHHS – Michigan Disease Surveillance System

Average and total new deaths, by age group

Daily new confirmed and probable deaths per million by age group (7 day rolling average)



Total new confirmed and probable deaths by age group (past 30 days, ending 12/26)

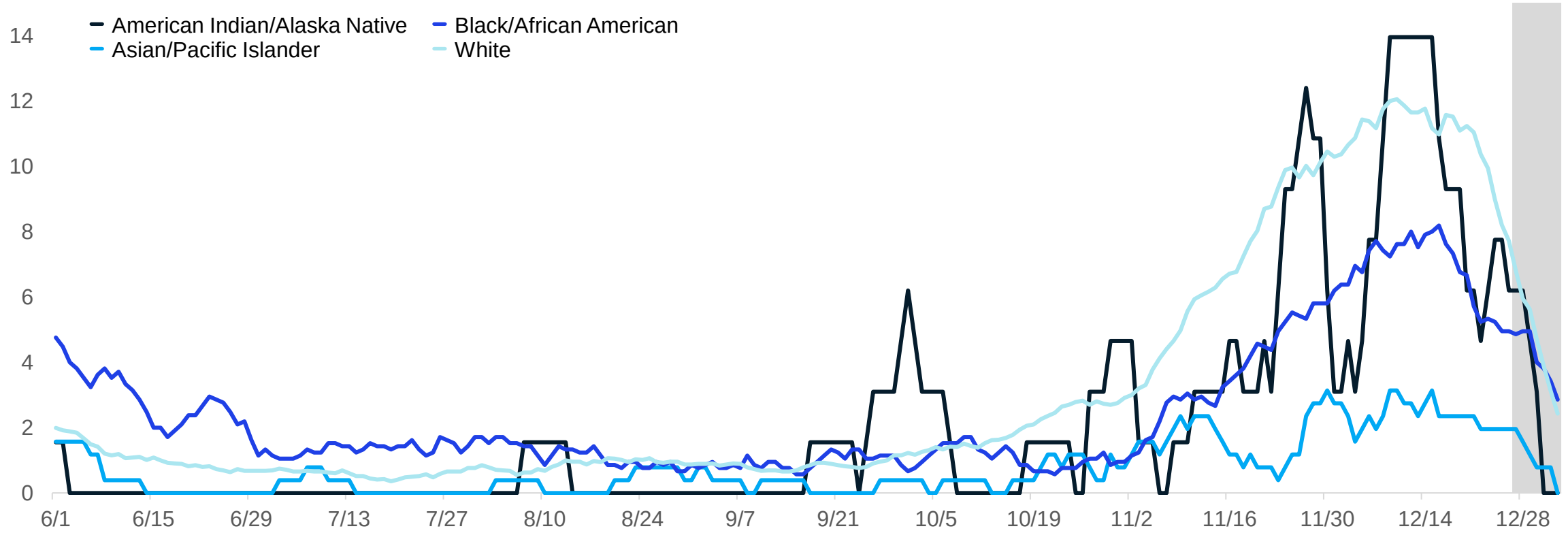


Note: Cases information sourced from MDHHS and reflects date of report

Source: MDHHS – Michigan Disease Surveillance System

Average daily new deaths per million people by race

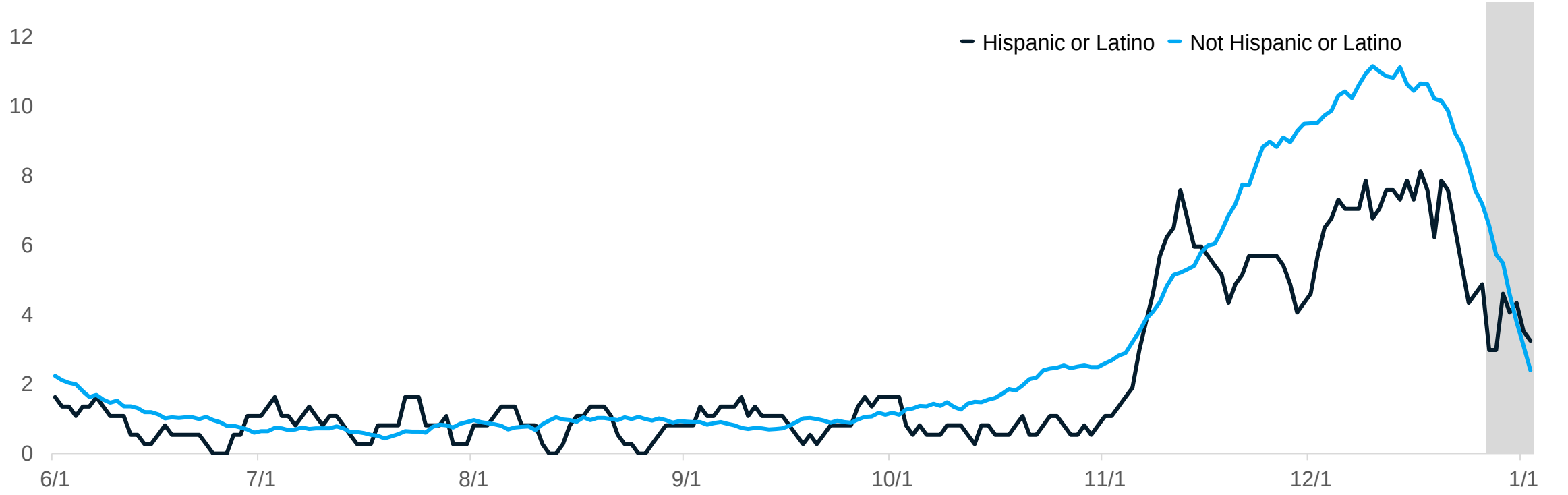
Daily new confirmed and probable deaths per million (7 day rolling average)
By race category



Note: Multiple Races, Other, and Unknown race/ethnicity are not included in calculations
Source: MDHHS – Michigan Disease Surveillance System

Average daily new deaths per million people by ethnicity

Daily new confirmed and probable deaths per million (7 day rolling average)
By ethnicity



Note: Multiple Races, Other, and Unknown race/ethnicity are not included in calculations
Source: MDHHS – Michigan Disease Surveillance System

How is public health capacity?

Testing volume has declined to 36,172

- 15.3% are antigen tests
- Testing by county ranges from 1,600 to 13,000 daily tests per million residents

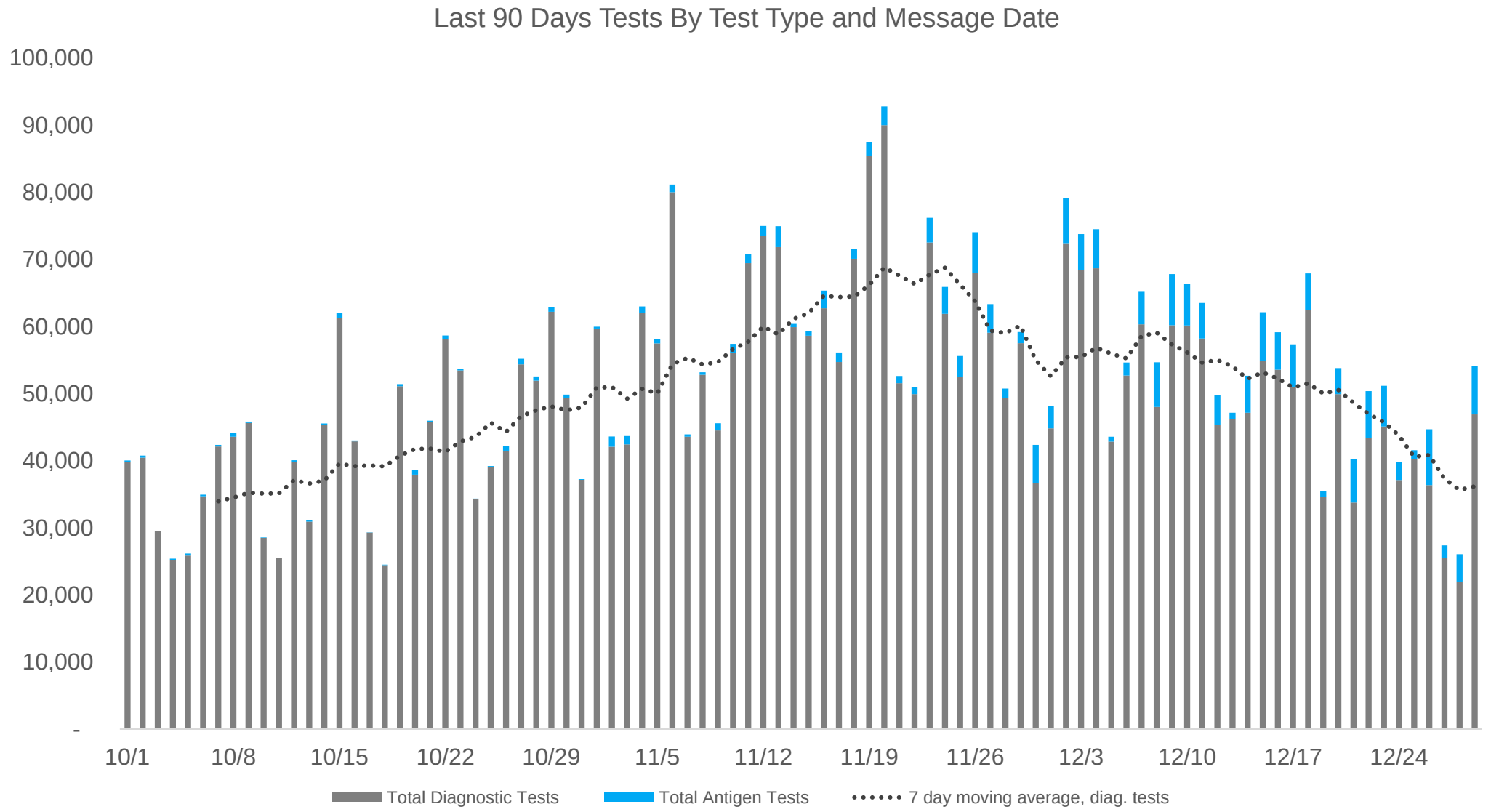
Compared to other states, SARS-CoV-2 testing in Michigan has remained steady since last week

- Number of daily molecular tests and percent positivity are some of the best in the country
- Michigan performs more testing per capita than approximately half of all other states

Case investigations dropped over the holidays

- Proportion of cases interviewed continue to show lower source of known infection indicating community spread
- Among those cases interviewed, there continues to be a low proportion of those quarantining when their symptoms begin

Daily diagnostic tests, by message date



36,172

Average daily diagnostic tests (past week)

15.3% are antigen tests (4.7% positive)

Source: MDSS/Michigan Medical Advantage Group, MDHHS, testing labs

Daily molecular tests

	State	Tests (K)
1	California	285.5
2	Illinois	70.5
3	North Carolina	50.3
4	Florida	44.6
5	**Michigan (↑1)**	**36.2**
6	Georgia	33.5
7	Connecticut	29.1
8	Arizona	22.9
9	Louisiana	22.5
10	New Jersey	21.0
11	Massachusetts	17.1
12	Kentucky	15.0
13	Maryland	12.3
14	Arkansas	12.0
15	New Mexico	10.5
16	Minnesota	9.9
17	Indiana	9.9
18	Alabama	8.8
19	Colorado	7.5
20	Alaska	6.2
21	Maine	6.0
22	Missouri	5.9
23	Kansas	5.5
24	District of Columbia	5.0
25	Montana	4.1
26	New Hampshire	2.7
27	Nebraska	2.4
28	Delaware	2.3

Weekly % of pop. tested

	State	Weekly % tested
1	New York	6.3%
2	Alaska	5.9%
3	Connecticut	5.7%
4	West Virginia	5.3%
5	California	5.1%
6	District of Columbia	5.0%
7	Illinois	3.9%
8	New Mexico	3.5%
9	Louisiana	3.4%
10	North Carolina	3.4%
11	South Carolina	3.2%
12	Maine	3.1%
13	Oregon	2.9%
14	Arkansas	2.8%
15	Montana	2.7%
16	Oklahoma	2.6%
17	Washington	2.6%
18	Virginia	2.6%
19	Tennessee	2.6%
20	**Michigan (↓1)**	**2.5%**
21	Ohio	2.5%
22	Texas	2.4%
23	Kentucky	2.4%
24	Georgia	2.2%
25	Arizona	2.2%
26	Rhode Island	2.1%
27	Nevada	1.7%
28	Massachusetts	1.7%

Percent positive

	State	% Positive
1	District of Columbia	4.4%
2	Alaska	5.6%
3	Oregon	6.4%
4	Connecticut	6.6%
5	New York	7.8%
6	Illinois	8.6%
7	Maine	8.7%
8	Montana	9.2%
9	Washington	9.3%
10	**Michigan (↓1)**	**9.4%**
11	West Virginia	11.0%
12	Vermont	11.2%
13	New Mexico	11.7%
14	California	13.3%
15	Louisiana	13.7%
16	Virginia	14.0%
17	North Carolina	14.0%
18	South Carolina	16.6%
19	Ohio	18.1%
20	Texas	18.5%
21	Georgia	18.9%
22	Minnesota	19.5%
23	Kentucky	19.6%
24	New Jersey	20.7%
25	Maryland	21.7%
26	Arkansas	21.7%
27	Oklahoma	23.1%
28	Tennessee	25.3%

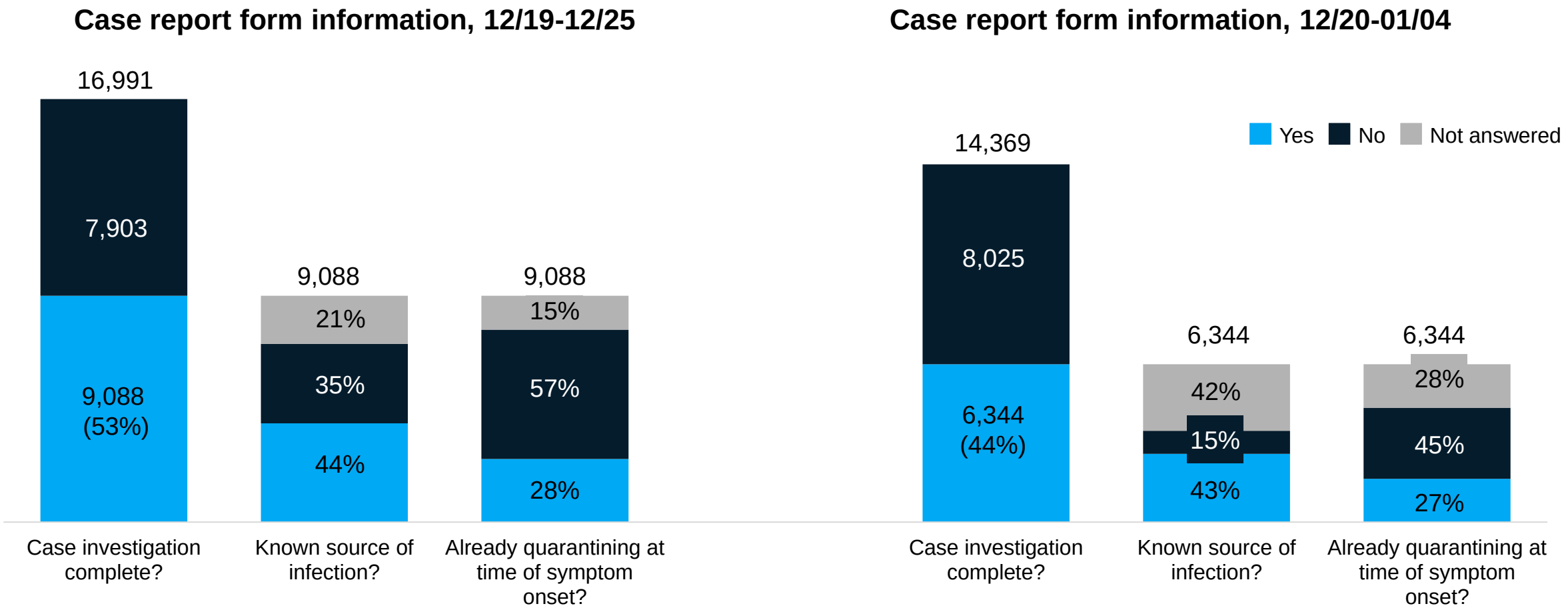
Michigan average uses most recent MAG data and includes all tests, including MDOC and “Region Unknown”

SOURCE: Numerical Data – MDSS, COVID Tracking Project, U.S. Census Bureau.

New Case Investigation Metrics

New Communicable Disease metrics slightly increased since last week:

- 44% of investigated cases having a known source (44% last week, 41% week prior)
- 27% of investigated cases noting that they were quarantining before symptoms (28% last week)



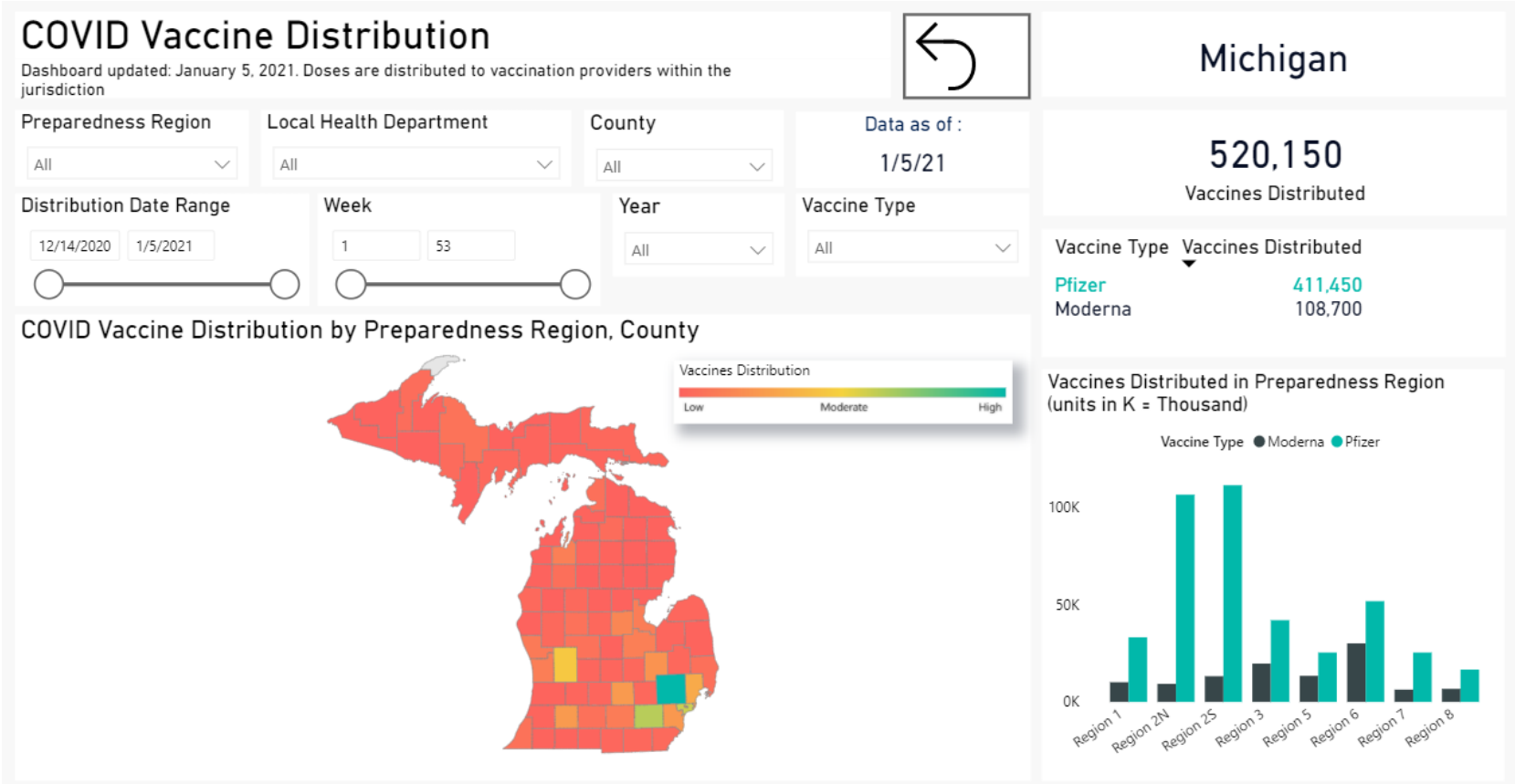
Source: MDHHS – Michigan Disease Surveillance System

Distributed: Where the vaccine was sent based on date it left the distributor

Note: All doses are not going to the local health department, but are going to providers in the LHD jurisdiction

411450 Pfizer first doses: hospitals, LHD

108,700 Moderna first doses:
hospitals, LHD, FQHCs and Tribal Health Center



Federal Pharmacy Partnership Program for Long Term Care

Michigan is participating the Federal Pharmacy Partnership Program for Long Term Care. Based on estimates of the number of staff and residents in long term care facilities, MDHHS has or is about to transfer over 300,000 first doses to the Federal Program over five weeks. These doses go into a bank that the Federal Program can pull from for distribution to CVS and Walgreens Pharmacies as they hold clinics at LTC facilities.

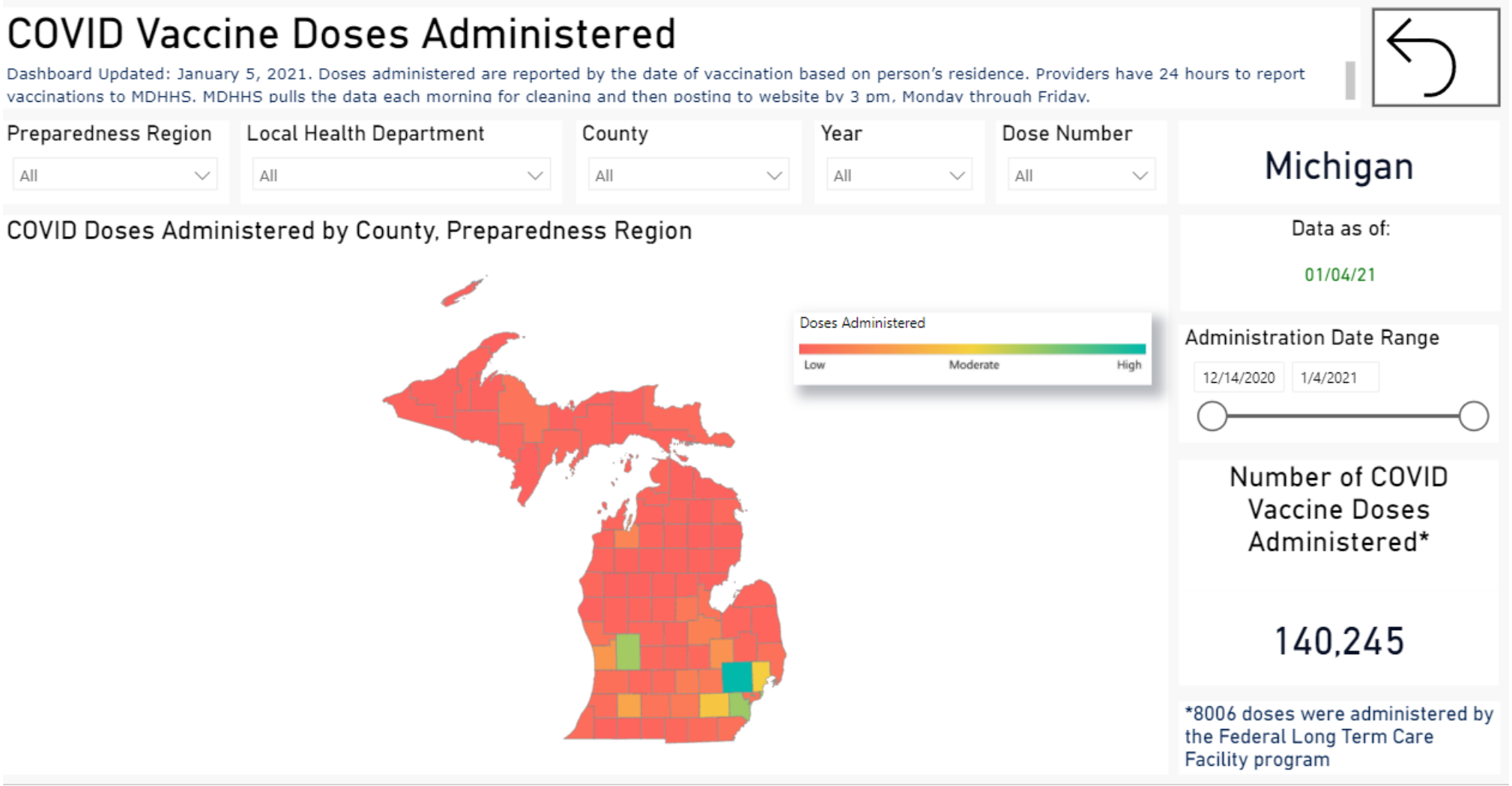
65,300 doses were transferred the week of December 20th
60,400 doses were transferred the week of December 27th
60,400 doses were transferred or are held for transfer the weeks of January 3rd, January 10th, and January 17th.

Thus far 185,100 doses have been transferred to the Federal Program.

Our dashboard is being updated to include information on these transferred doses.

Vaccines Administered (‘doses in arms’) reported by where people live

- December 14 to January 6: 152,511 vaccinations reported as administered
- Majority by hospitals, local health departments and federal long term care pharmacy partnership



Questions we have received

- Administered/Distributed does NOT equal percent administered in a jurisdiction
  - Dose administered is plotted where the patient lives
  - Dose distributed is plotted where the vaccine was shipped to

- CDC dashboard
    - Updated three times a week, not meant to be real time
    - Has not reflected records of doses with incomplete provider information

COVID Vaccine Doses Administered - Vaccine Type and Provider Facility Type

Dashboard Updated: January 5, 2021. Doses administered are reported by the date of vaccination based on person's residence. Providers have 24 hours to report vaccinations to MDHHS. MDHHS pulls the data each morning for cleaning and then posting to website by 3 pm, Monday through Friday.

Provider Facility Type

All

Age Group

All

Week

1 53

Number of COVID Doses Administered*

140,245

Vaccine Type

All

Pfizer

109,250

Number of Doses Administered

Moderna

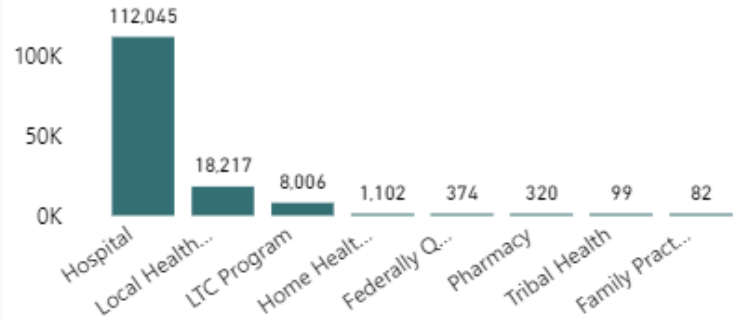
30,995

Number of Doses Administered

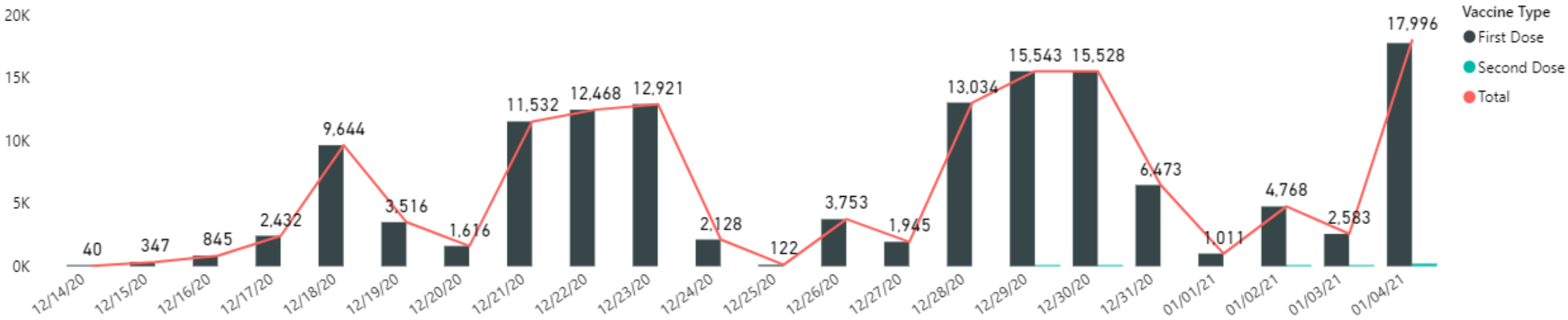
Data as of:

01/04/21

COVID Vaccine Doses Administered by Provider Facility Type (units in K=1000)



COVID Vaccine Doses Administered by Vaccine Type (units in K = 1000)



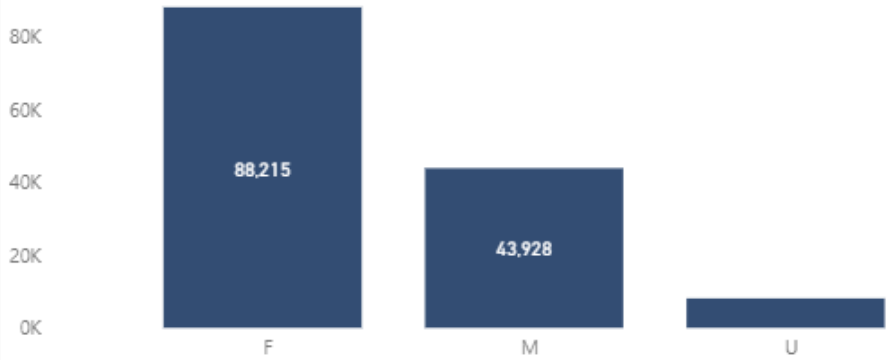
COVID Vaccine Doses Administered by Sex, Age Group

Dashboard Updated: January 5, 2021. Doses administered are reported by the date of vaccination based on person's residence. Providers have 24 hours to report vaccinations to MDHHS. MDHHS pulls the data each morning for cleaning and

Data as of :

01/04/21

COVID Doses Administered by Sex (units in K = 1000)



Provider Facility Type

All

Administered Date

12/14/2020 1/4/2021

Vaccine Type

All

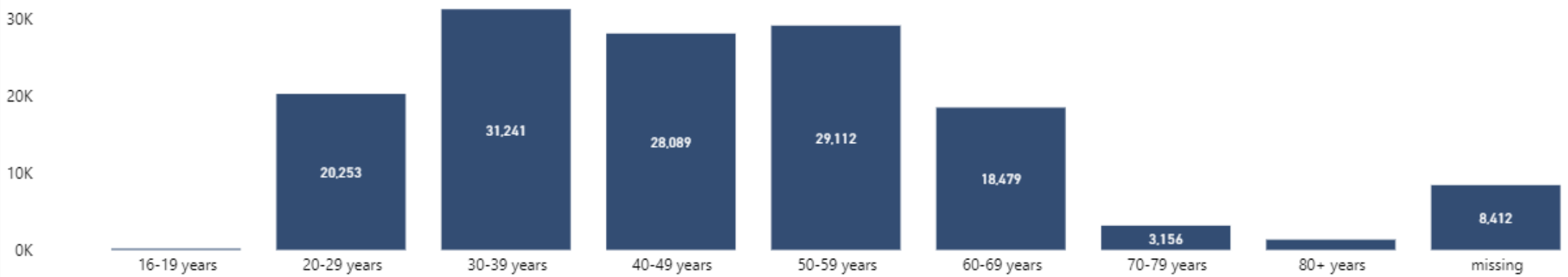
Week

1 53

Dose Number

All

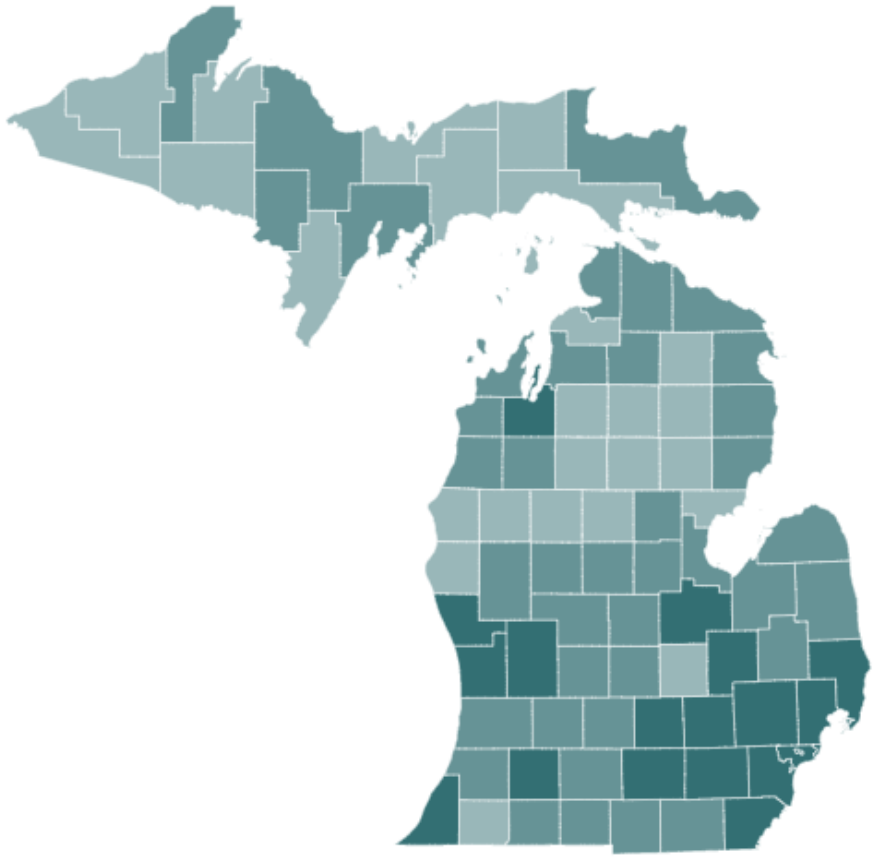
COVID Vaccine Doses Administered by Age Group (units in K = 1000)



COVID Vaccination Program Enrolled Providers

Dashboard Updated: January 4, 2021. Based on data reported to Michigan's immunization registry, the Michigan Care Improvement Registry. The provider information will be updated every Monday and Thursday.

Number Of Providers By Practice Type Enrolled In COVID Vaccination Program



COVID Preparedness Region

All

Local Health Department

All

Provider Facility Type

All

County

All

Michigan

Data as of :

Sunday, January 3, 2021

Enrolled Provider Sites In COVID Vaccination Program

845

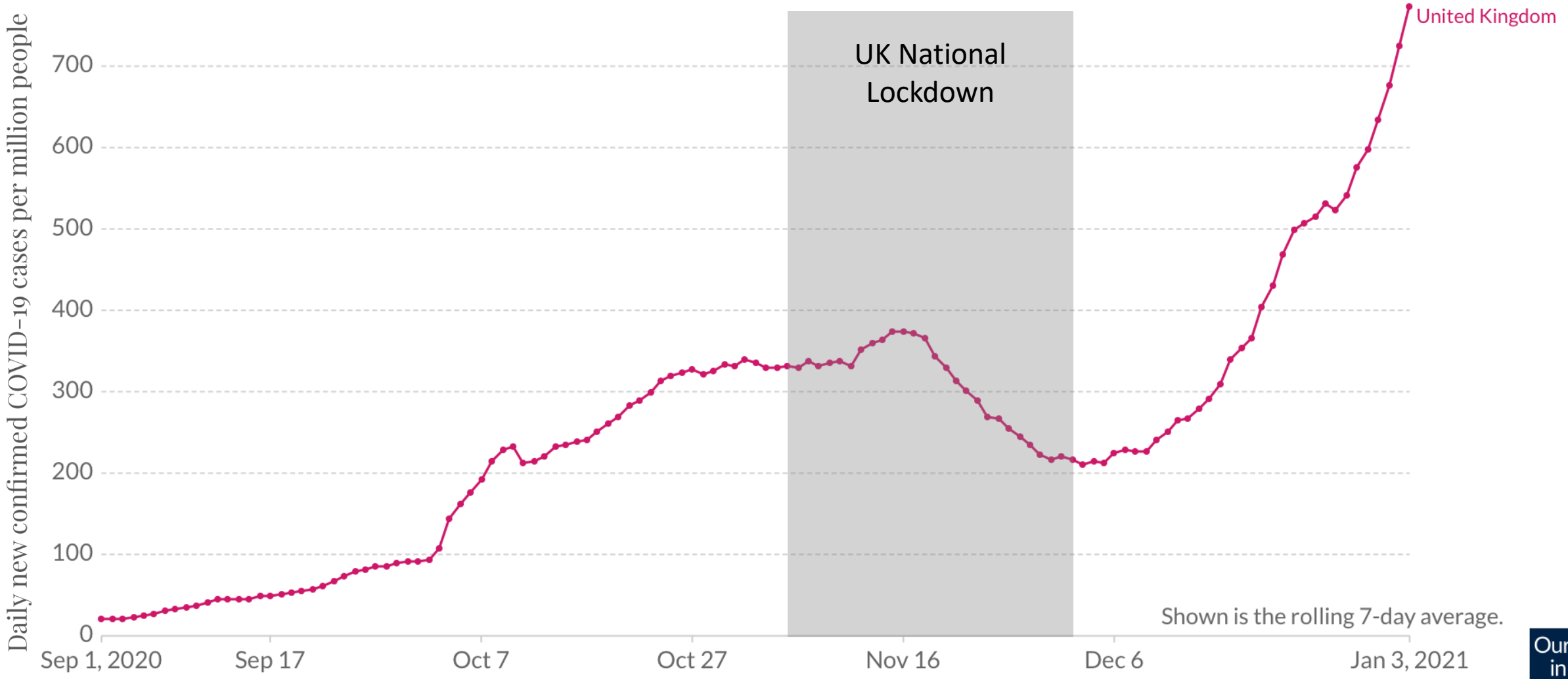
B.1.1.7 Variant

B.1.1.7 variant identified in the UK has shown increase transmissibility

- This has impacted the UK's ability to control virus spread and will require stricter mitigations
- Impacts the threshold to achieve herd immunity if it becomes the predominant strain in Michigan
- Mathematical modeling shows what the Michigan epidemic would have been in the autumn with a higher R_t

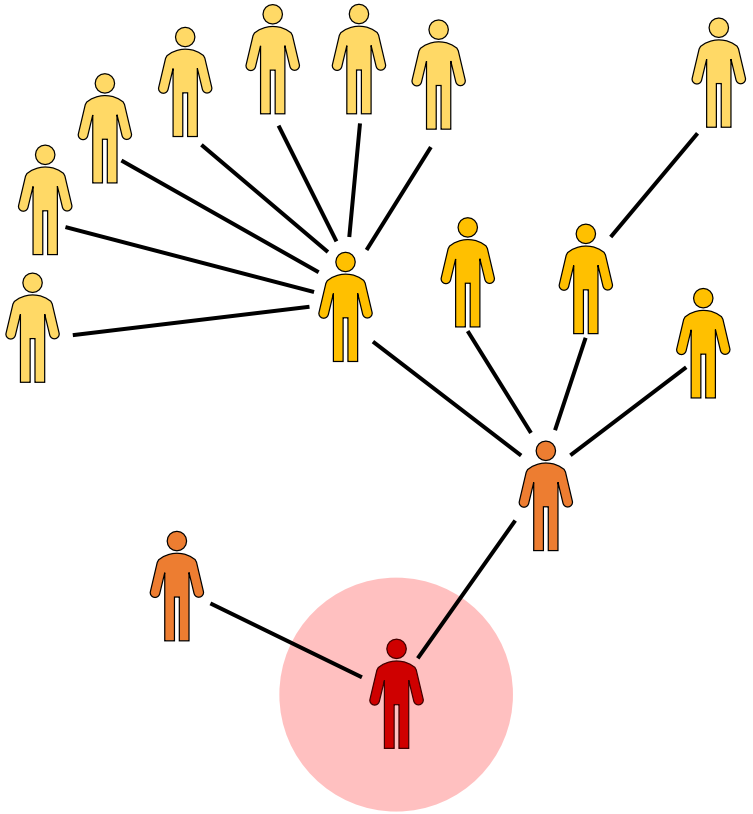
Michigan mobility remains low with Michiganders staying home although recent upticks

UK national restrictions and recent increases



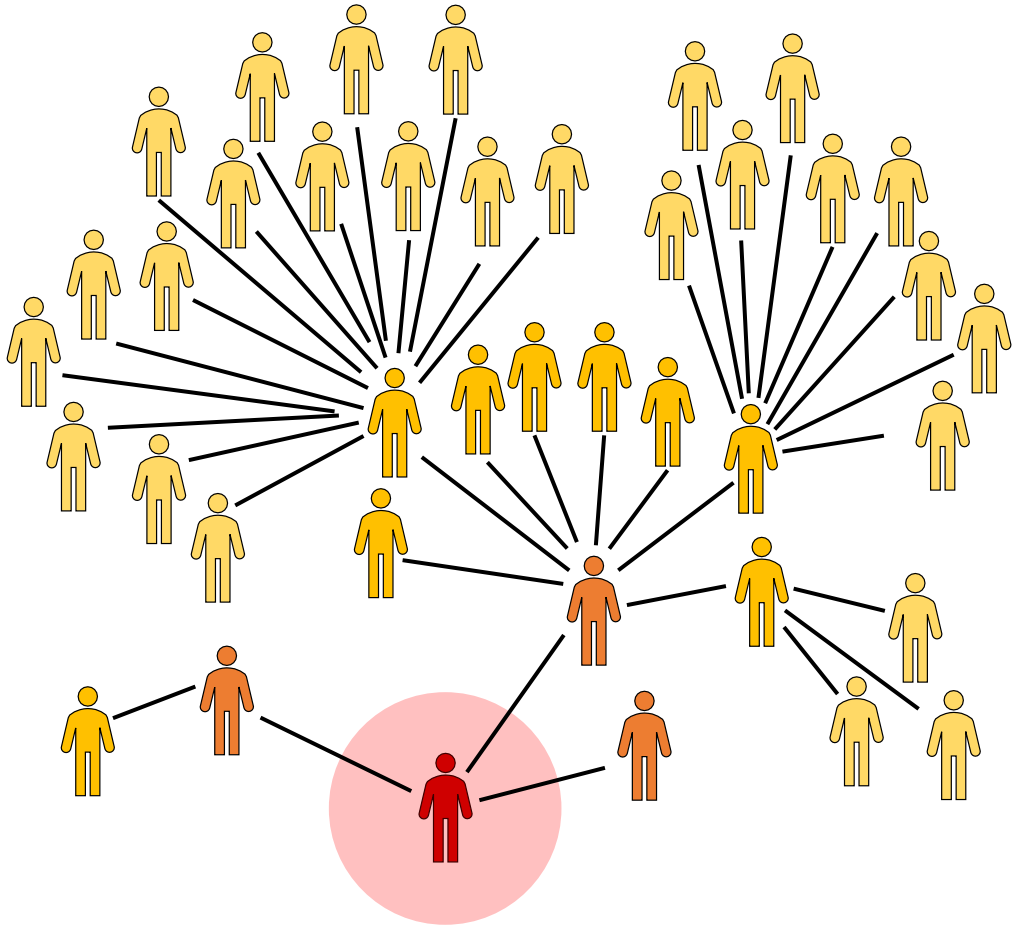
Source: Johns Hopkins University CSSE COVID-19 Data – Last updated 4 January, 06:06 (London time)

How does increased R_t affect disease spread?



$R_t = 2$

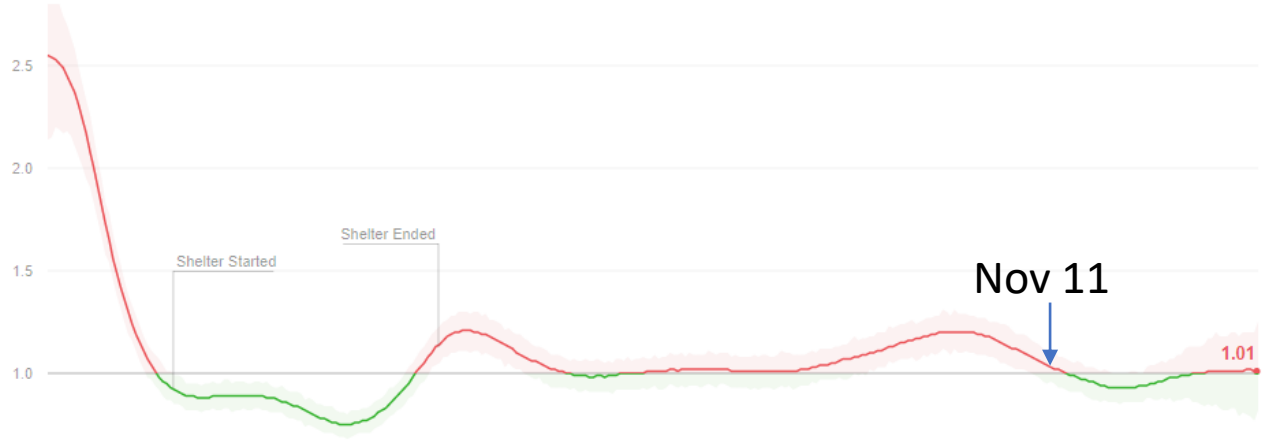
Lower herd immunity threshold



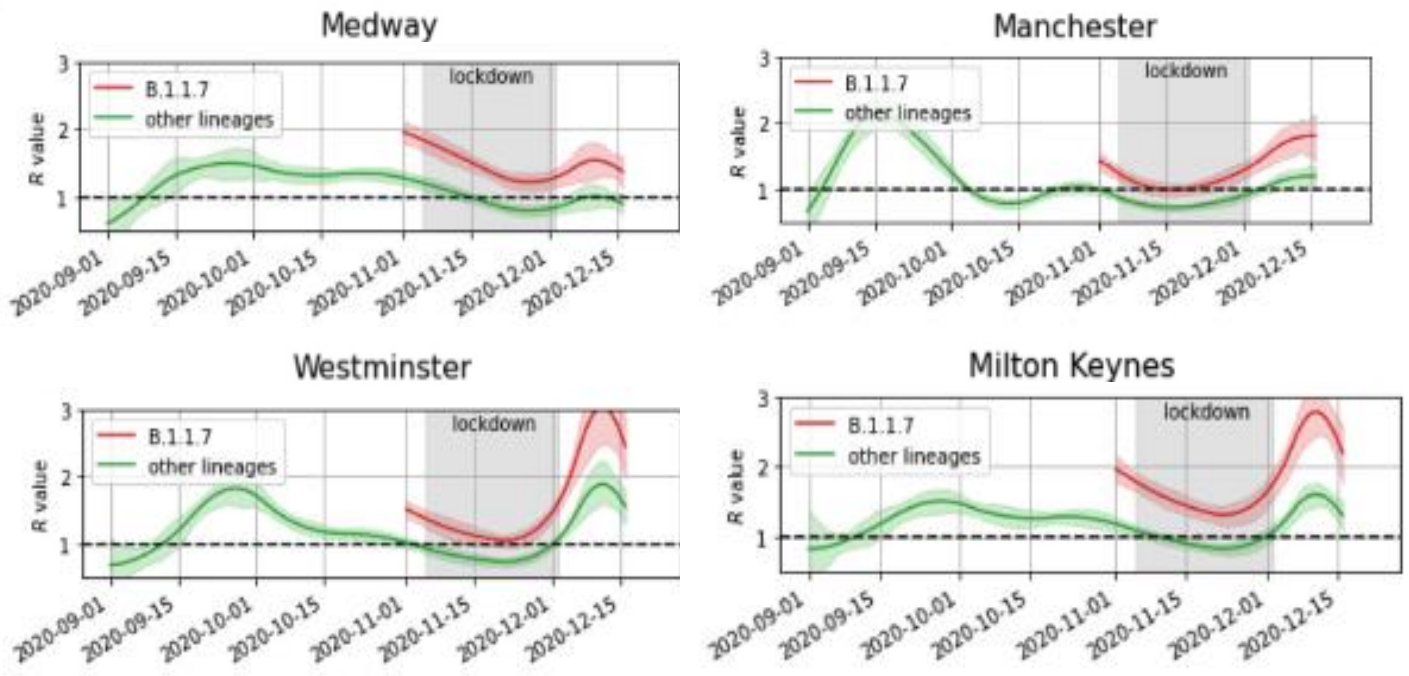
$R_t = 3$ (1.5x increase)

Higher herd immunity threshold

Interventions have previously reduced R_t in Michigan (Source: rt.live)



New variant (red) had higher R_t during restrictions (UK)

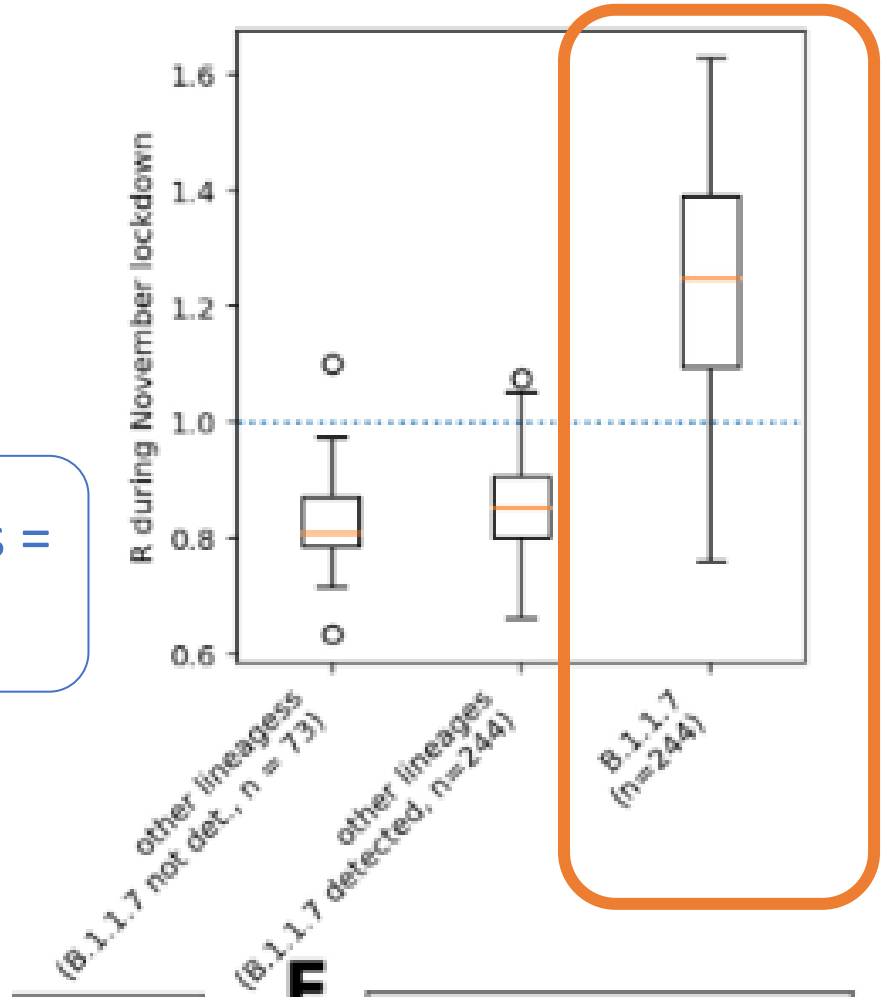


Source: Vöhringer et al. Lineage-specific growth of SARS-CoV-2 B.1.1.7 during the English national lockdown https://virological.org/t/lineage-specific-growth-of-sars-cov-2-b-1-1-7-during-the-english-national-lockdown/575

Stricter restrictions needed to control B.1.1.7 strain in UK.

New restrictions announced Monday Jan 4.

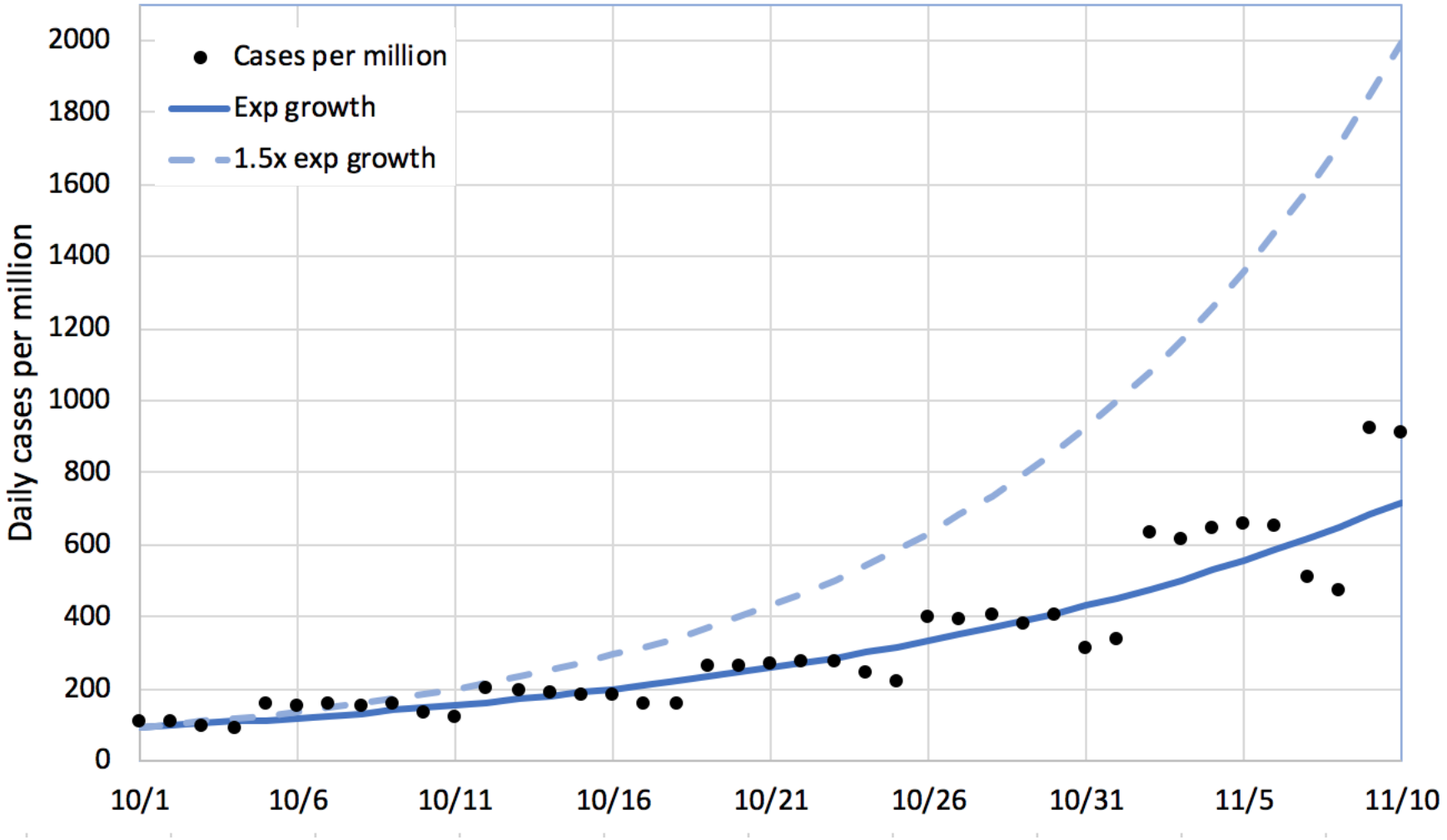
R_t of other strains = 0.83



R_t of B.1.1.7 = 1.25

Source: Vöhringer et al. Lineage-specific growth of SARS-CoV-2 B.1.1.7 during the English national lockdown https://virological.org/t/lineage-specific-growth-of-sars-cov-2-b-1-1-7-during-the-english-national-lockdown/575

What-if scenario: how fast could the fall surge have grown if it was the B.1.1.7 strain?

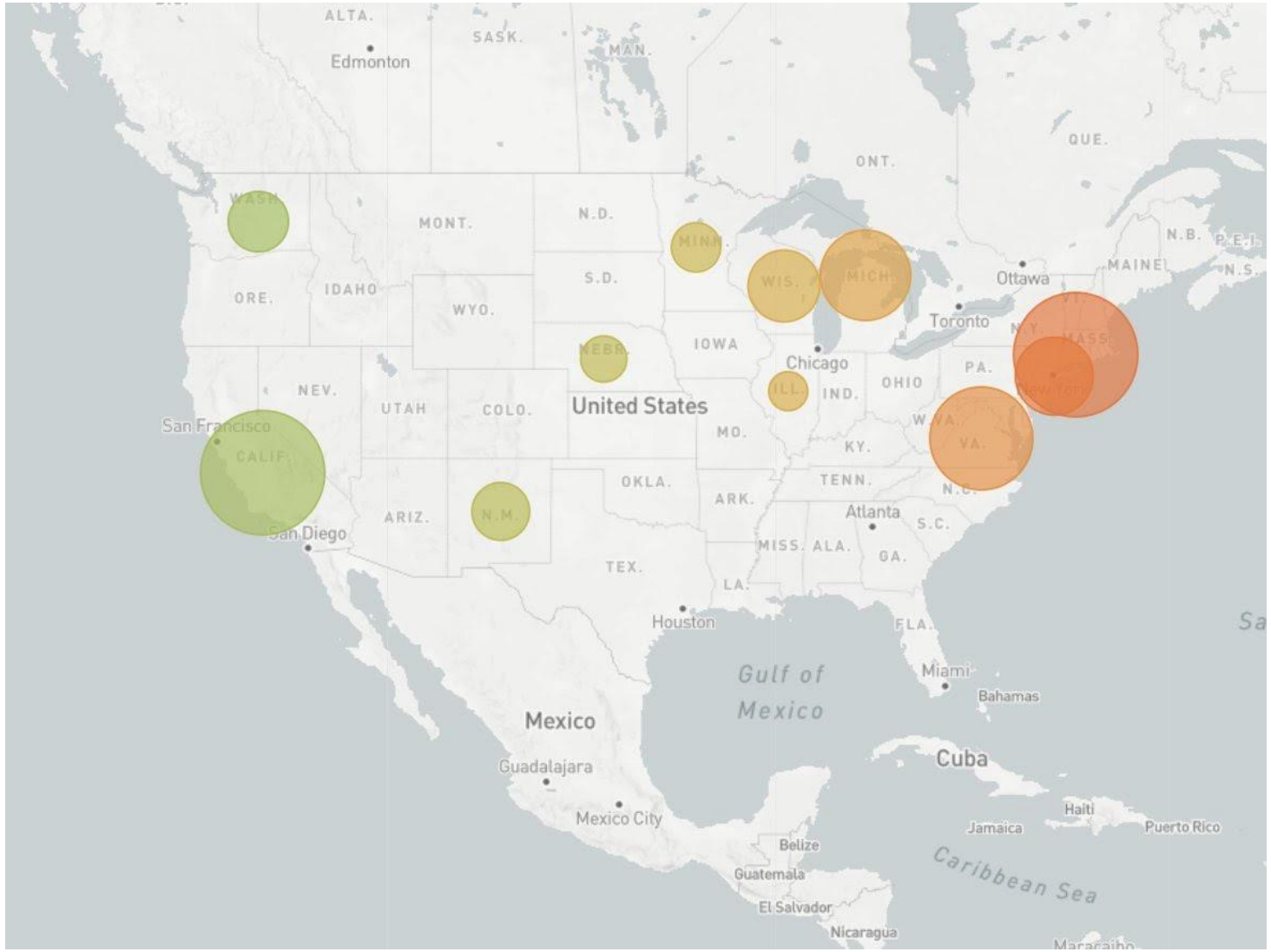


- Solid dark blue curve: actual exponential growth estimate from the fall surge in cases
- Light blue dashed curve: **What if R_t was 1.5x higher, as we might expect for B.1.1.7 based on the UK data?**

- Results in faster growth and higher case counts
  - Peak cases are over 2x higher
  - **Increased transmissibility requires faster response to increases.**
  - **Expansive vaccine roll-out.**

Source: MDSS data

Surveillance for SARS-CoV-2 variants



~6% of sequencing in US has been done in Michigan (MDHHS or U-M or other universities)

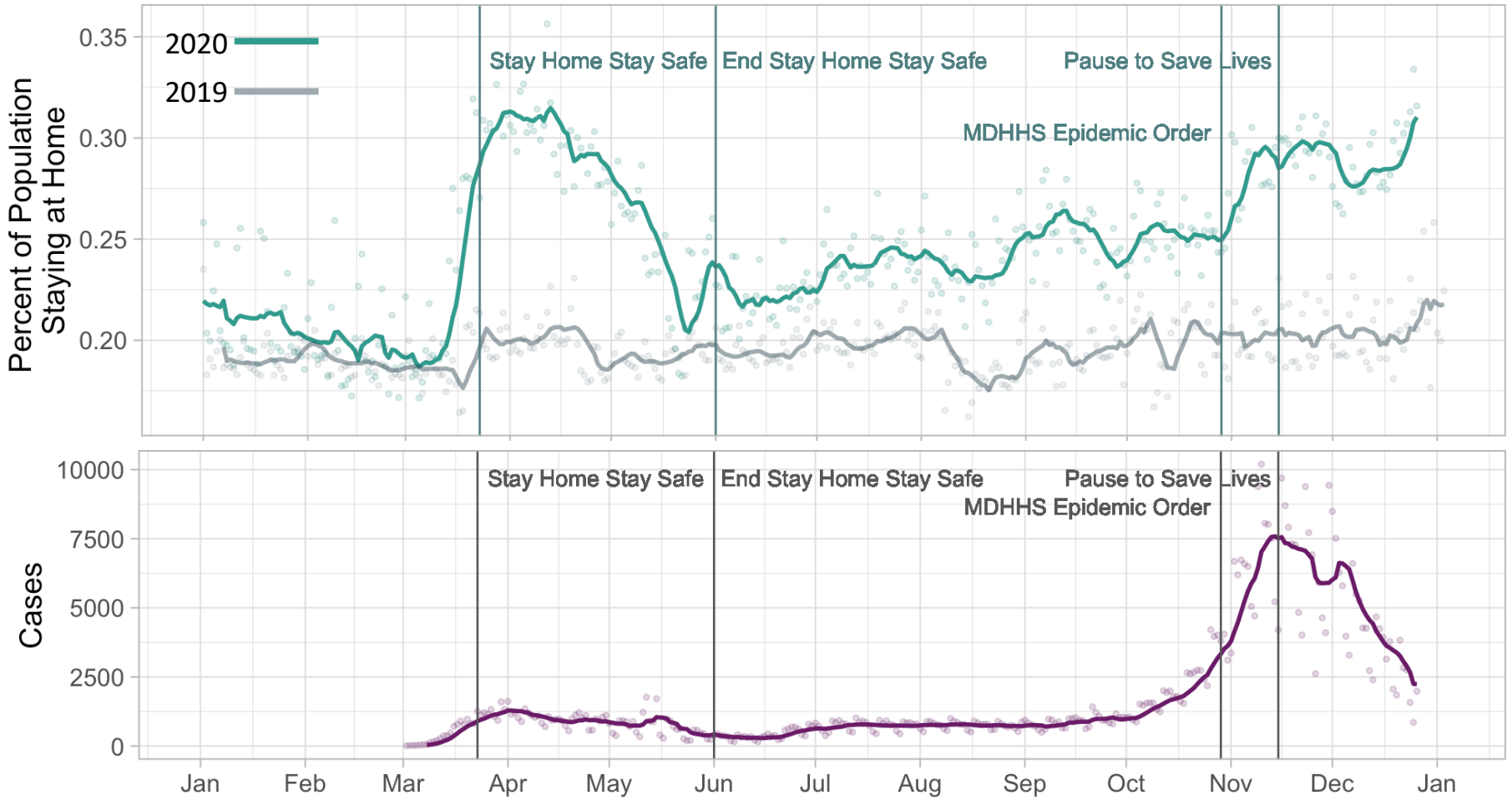
Mobility update

Stay-at-home levels increased in November

Overall increase compared to 2019

Stay-home levels have largely remained high (most recent data is 12/26)

How many people are staying at home in Michigan?



- Stay-at-home levels increased in November
- Overall increase compared to 2019
- Stay-home levels have largely remained high (most recent data is 12/26)

Data Sources: Bureau of Transportation Statistics, MDHHS

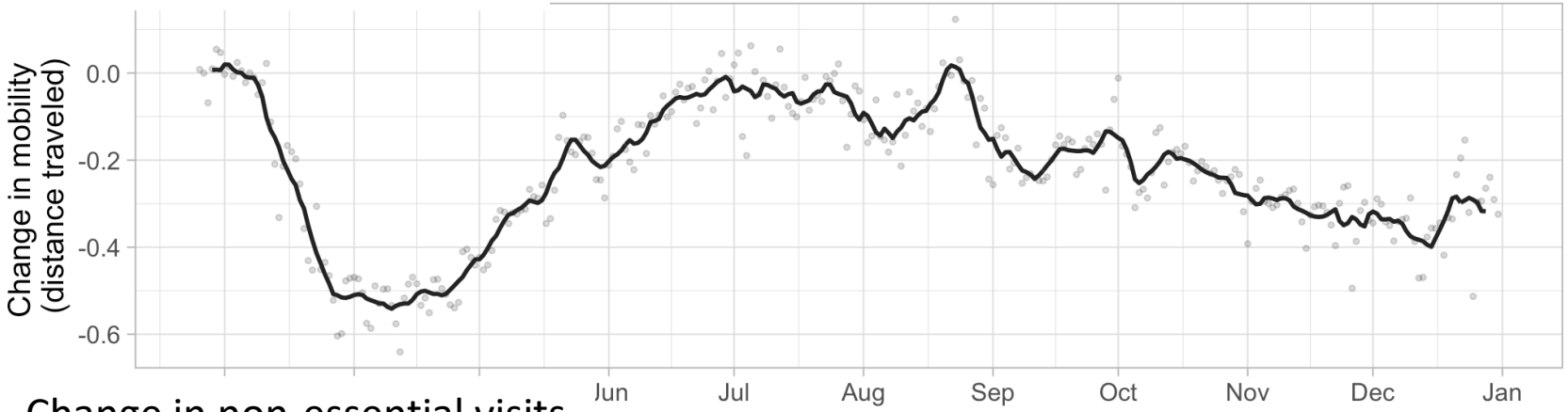
PUBLIC HEALTH

Unacast mobility patterns in MI

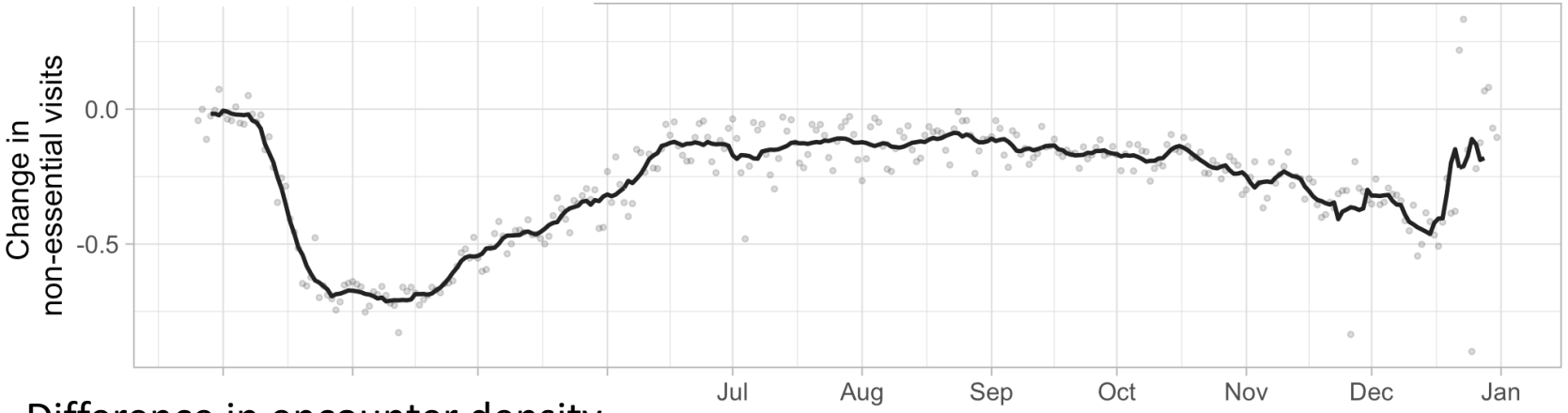
Most recent data shows some return toward baseline mobility patterns, particularly for non-essential visits (data through 12/31/20)

unacast social distancing scoreboard https://www.unacast.com/covid19/social-distancing-scoreboard

Change in average mobility



Change in non-essential visits



Difference in encounter density