

National COVID19 Testing and Outcomes Data

"Cumulative daily totals of national level metrics
for cases, tests, hospitalizations, and outcomes"
-The Covid Tracking Project

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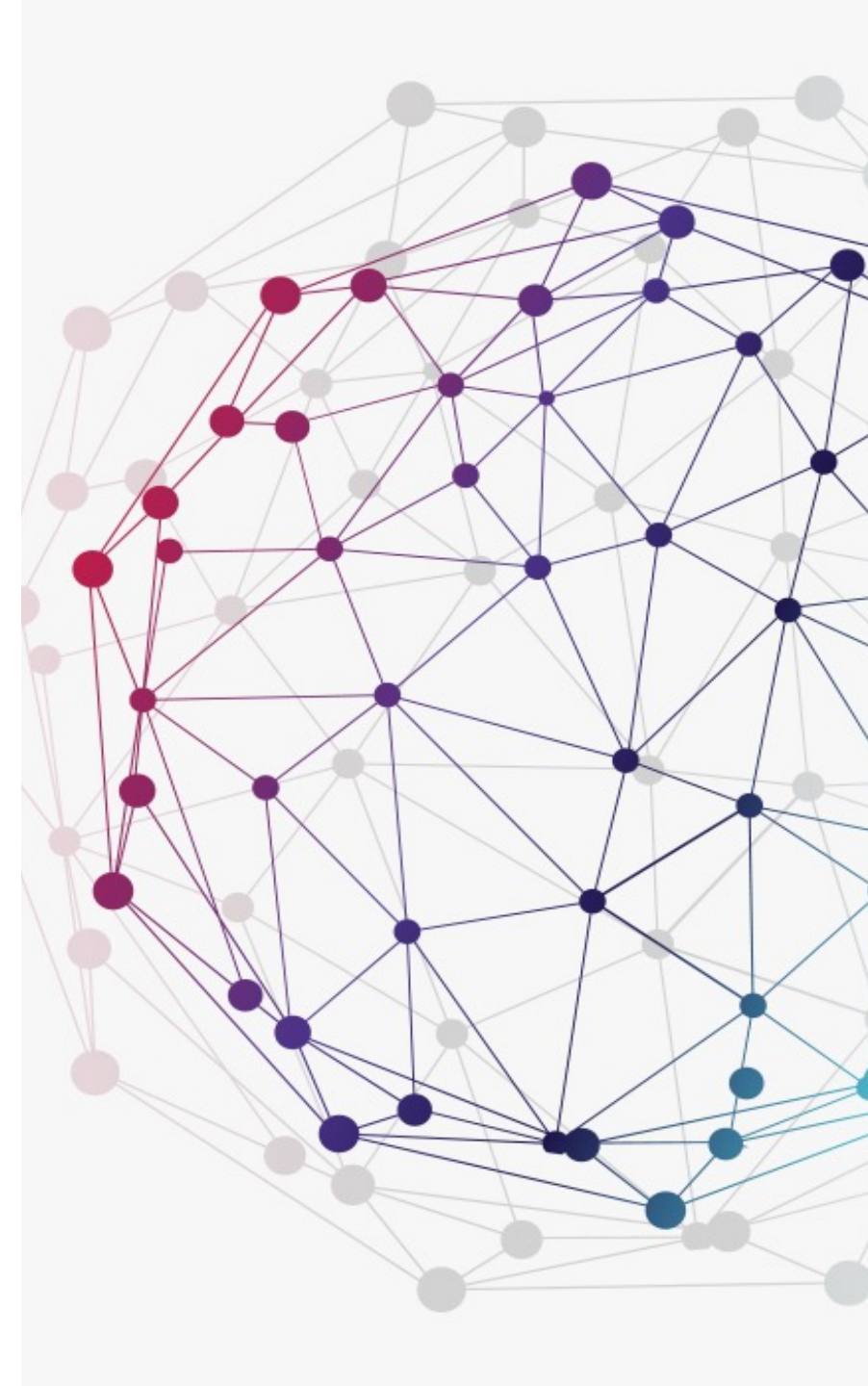
The background of the slide features a microscopic view of coronavirus particles. On the left side, there is a vertical strip with a dark purple background, showing several spherical virus particles with prominent surface spikes in shades of blue and purple. The right side of the slide has a light gray background with a large, faint, and semi-transparent image of a coronavirus particle, showing its characteristic crown-like surface structure in light blue and white.

WHY?

- The next pandemic is not an **if** but a **when**
- Pandemic data analysis for:
 - Learning patterns to improving future outcomes
 - Making better intervention choices in the future
 - Allocating resources
 - Minimizing risk and death

The Data Set:

- Data from The COVID Tracking Project
 - Copyright by the Atlantic Monthly Group – publishing service
- The data measures the 'movement' of the COVID-19 pandemic in the US from Jan 13, 2020 to March 7, 2021 (419 days)
 - Group stopped collecting data after March 7th, 2021
- 56 US states and territories used in this dataset
 - May include: {US Virgin Islands, Palau, Guam, American Samoa, Northern Mariana Islands, Federated States of Micronesia, Republic of Marshall Islands }
- 419 rows and 22 columns
- Columns include cumulative & daily info on:
 - deaths, patients on ventilators, negative tests, positive tests, total tests taken



Our Questions:

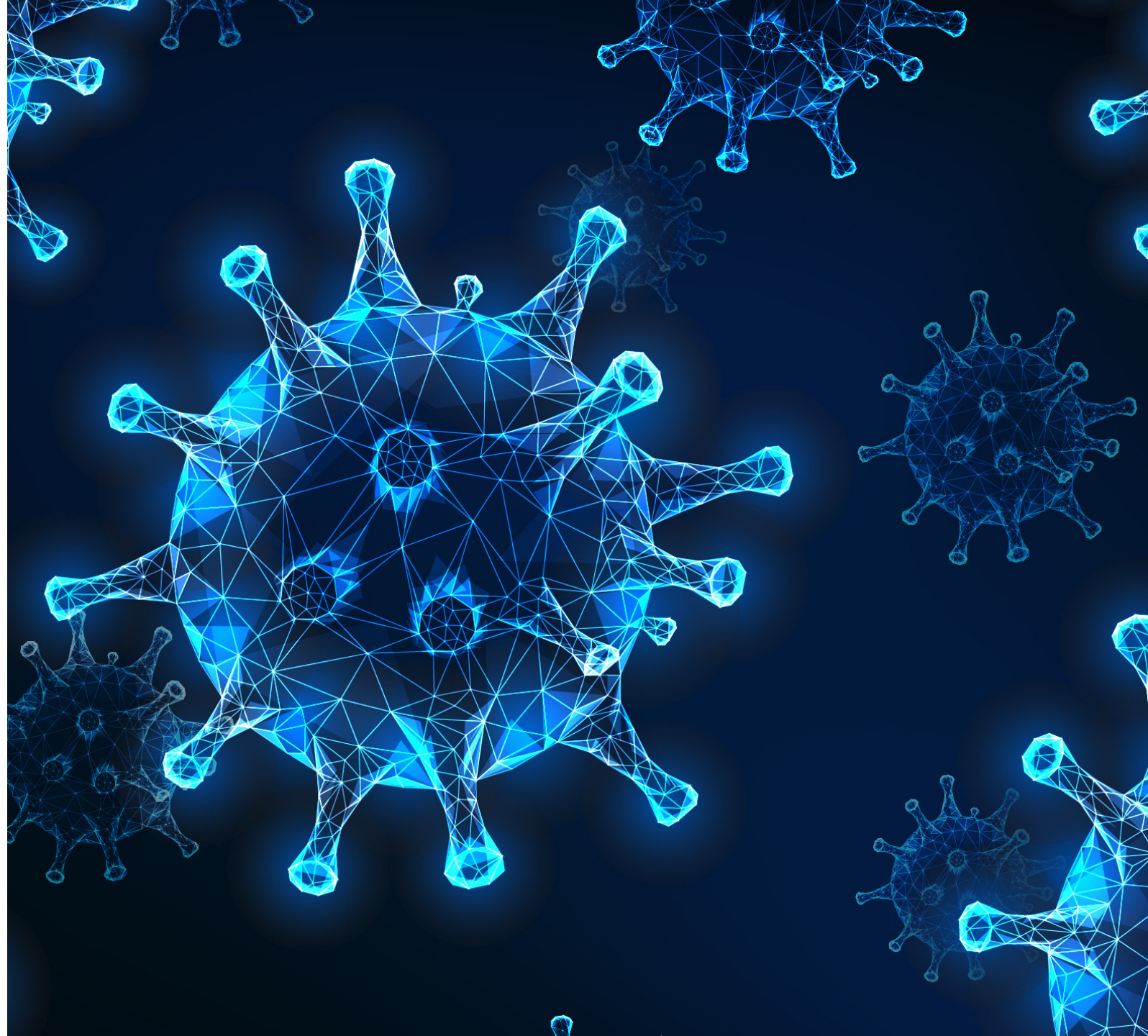
How long did it take for all states and territories to have cases of Covid19?

Was the US ventilator shortage visible in the data?

Did testing numbers & results fluctuate from month to month?

Were there seasonal trends?

Were deaths and positive tests reduced after government intervention methods?



Background Information:

First Covid19 case in
USA was reported on
20th Jan 2020

A public health
emergency was declared
31st Jan 2020

Mask mandate (mid-
April 2020)

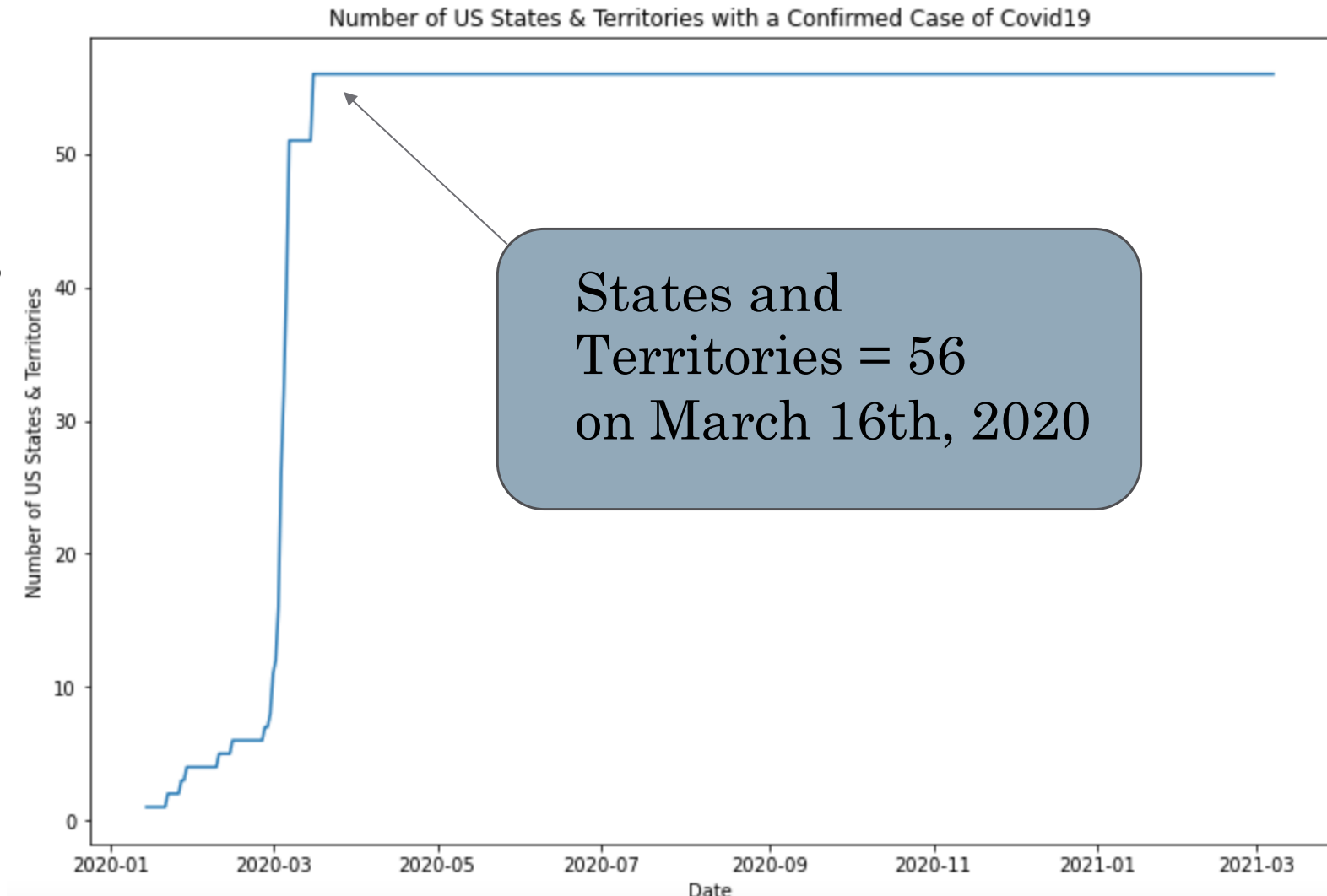
Vaccines became
available in December
2020 for front-line
workers, healthcare
workers and high-risk
individuals

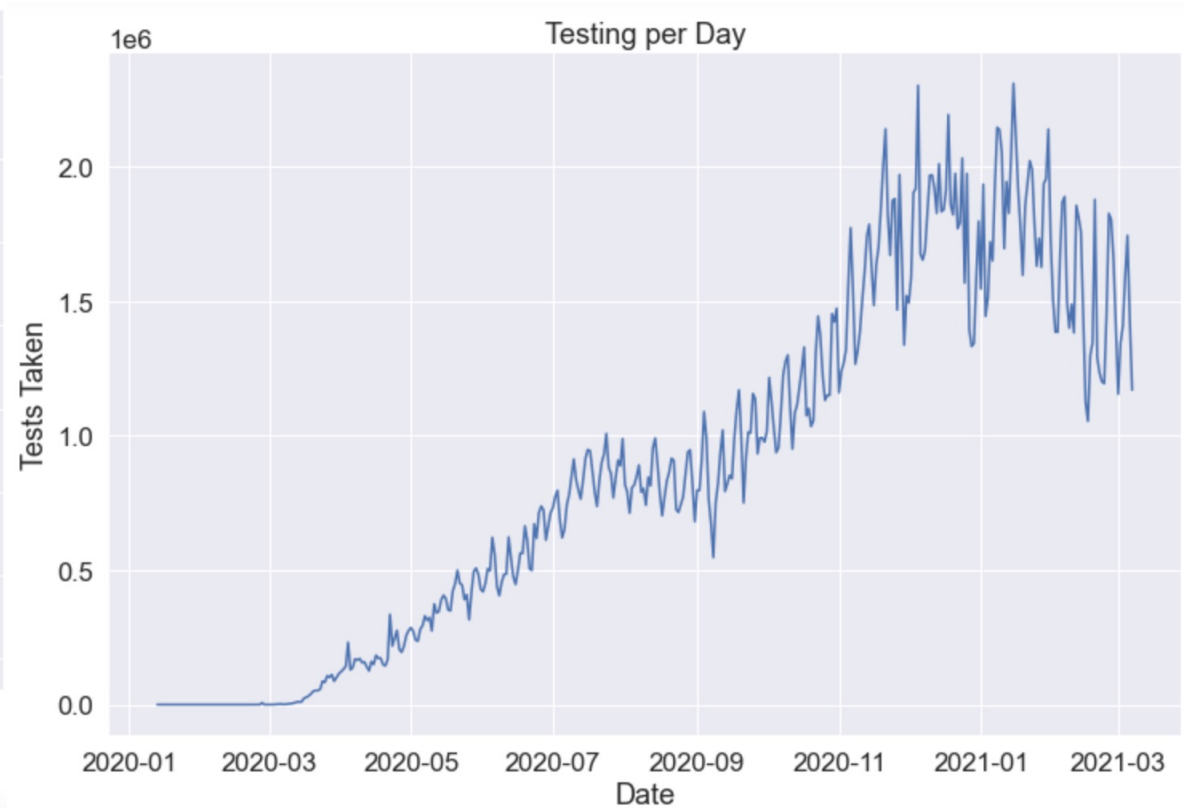
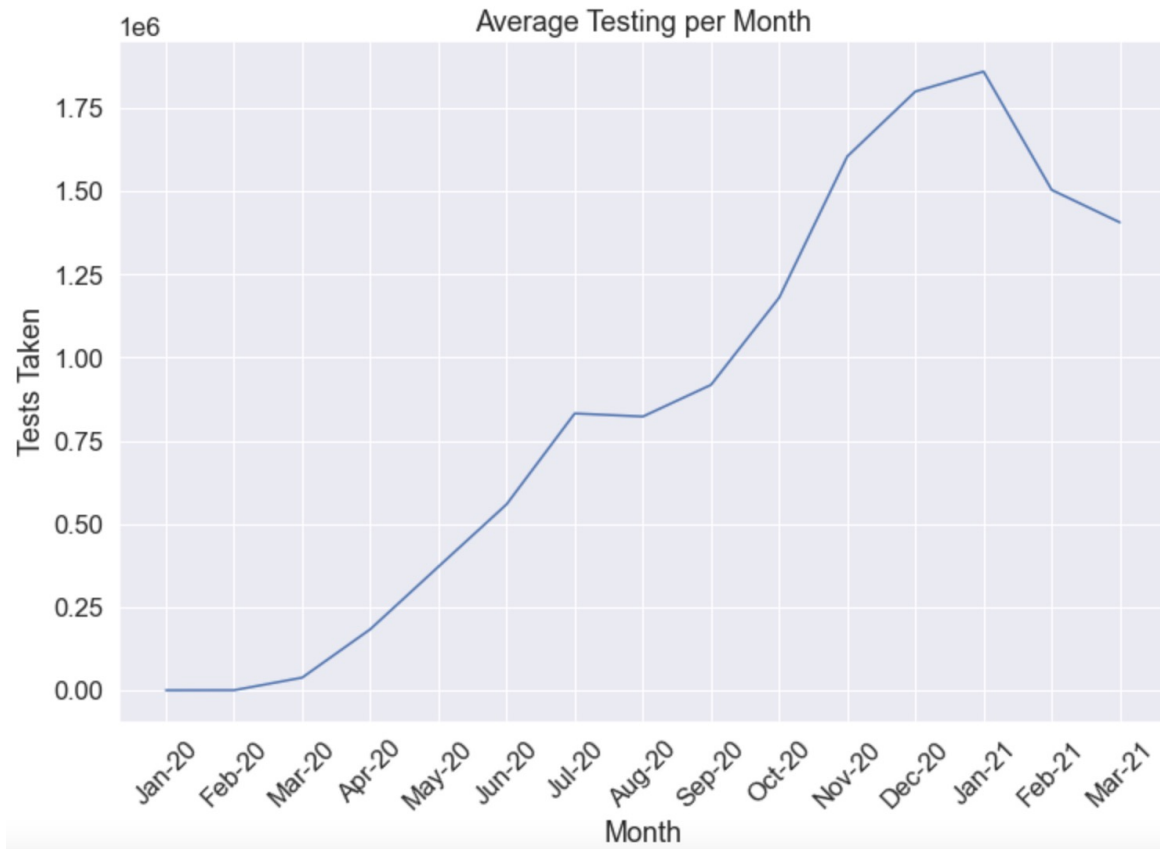
Ventilator and PPE
shortages

Initial testing
inaccuracies and
shortages

How long did it take for US States and Territories to report cases of COVID19?

Total of 63 days from first case reported

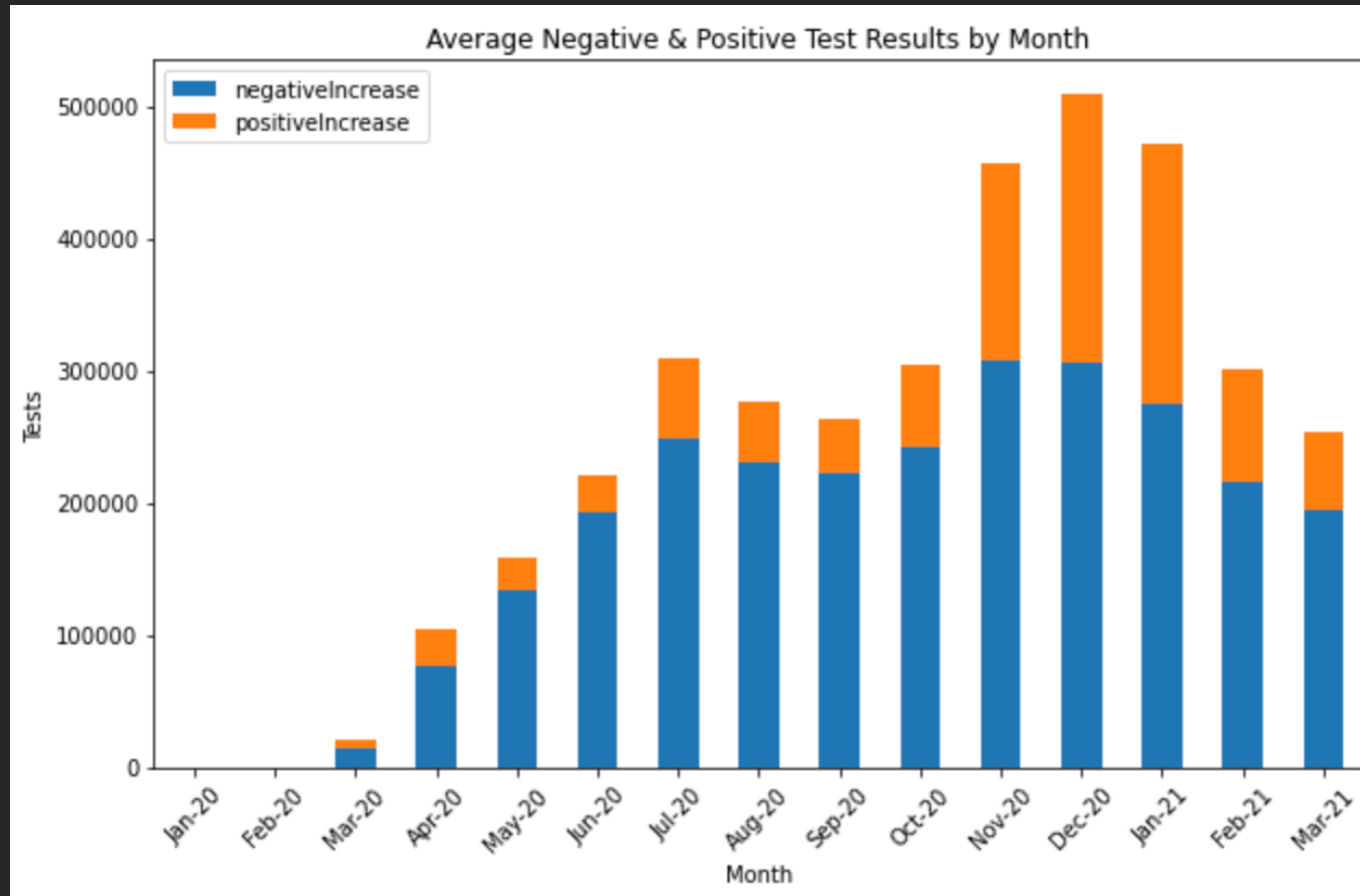




How many tests were taken?

- 363,825,123 total reported tests taken
- Tests that were inconclusive are included
- Tests took time to be available – many early tests were not reliable – caused under reporting of cases

Which Months had the most testing?



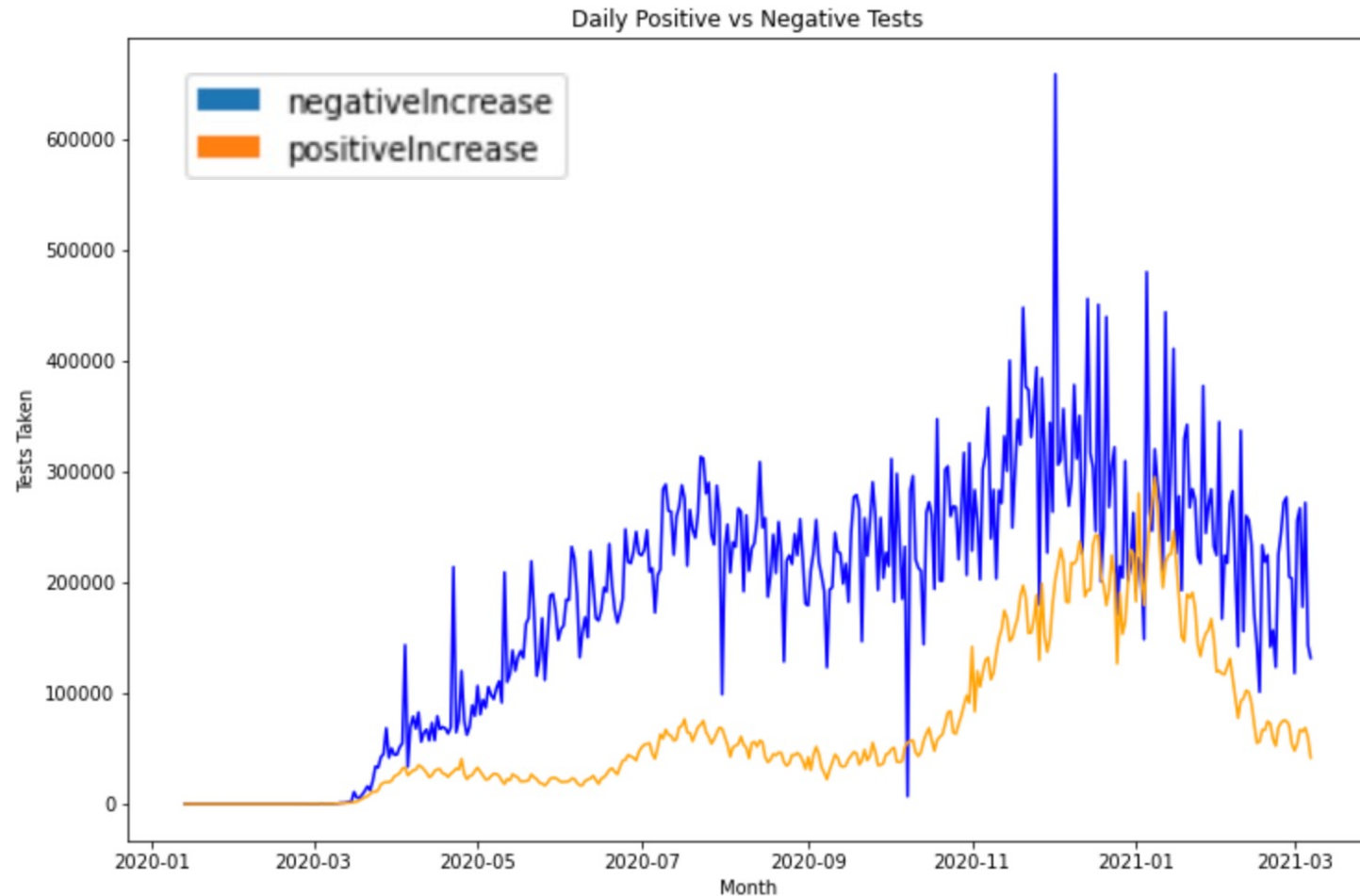
Neg high
Pos high

	negativeIncrease	positiveIncrease
month		
Jan-20	0.000000	0.105263
Feb-20	0.000000	0.551724
Mar-20	14858.129032	6353.129032
Apr-20	75698.966667	29209.300000
May-20	134563.580645	23167.903226
Jun-20	192426.733333	27719.900000
Jul-20	247878.193548	61296.129032
Aug-20	230209.870968	47006.870968
Sep-20	222806.166667	39755.433333
Oct-20	242665.387097	61032.741935
Nov-20	307506.733333	149199.700000
Dec-20	305196.612903	203976.322581
Jan-21	275074.516129	197179.741935
Feb-21	215890.750000	84794.392857
Mar-21	195200.142857	57900.000000

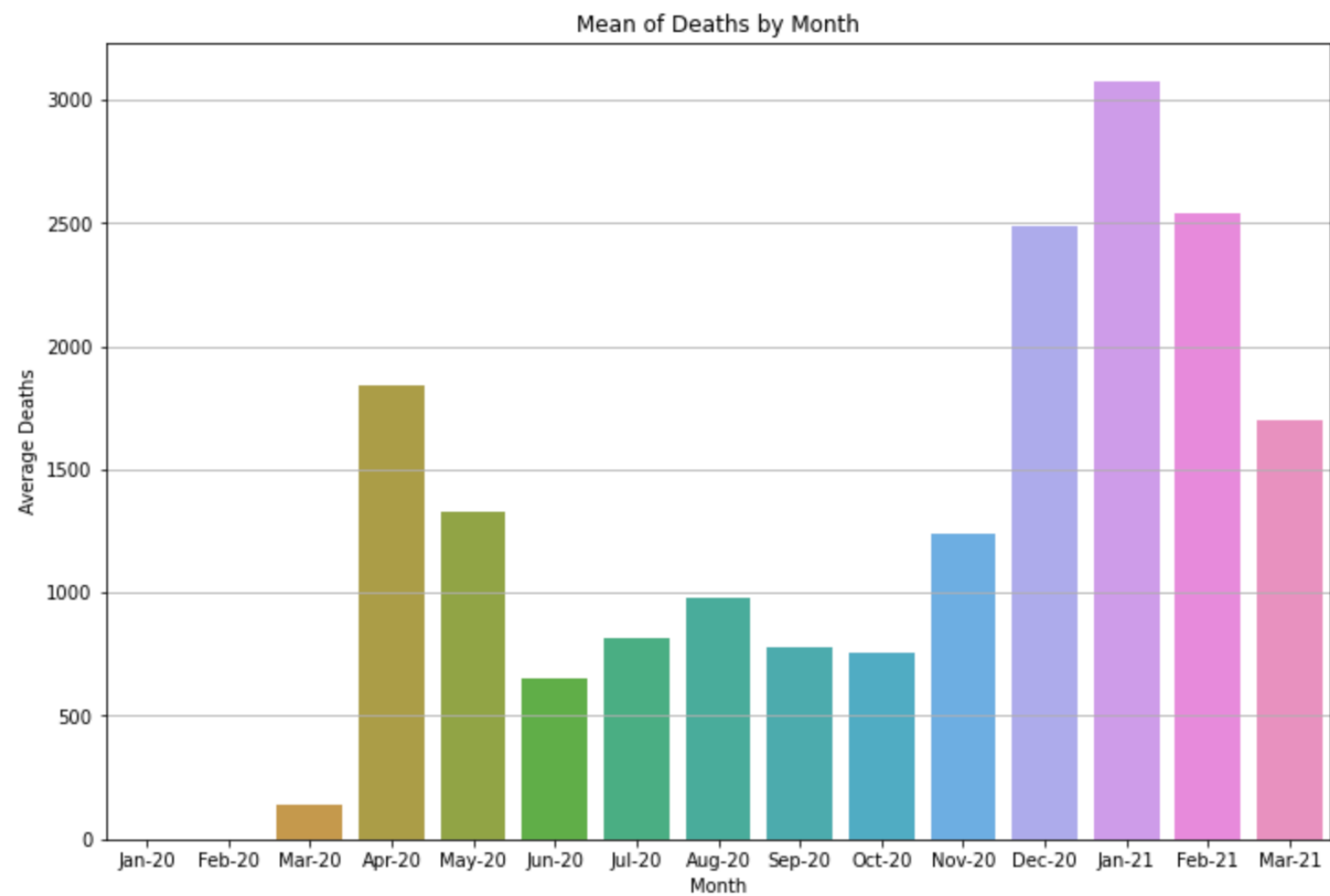
Were There More Positive or Negative Test Results?

- Total of 76,328,335 negative tests taken
- Total of 28,756,489 positive tests taken

Overall, 47,571,846 more negative test results than positive



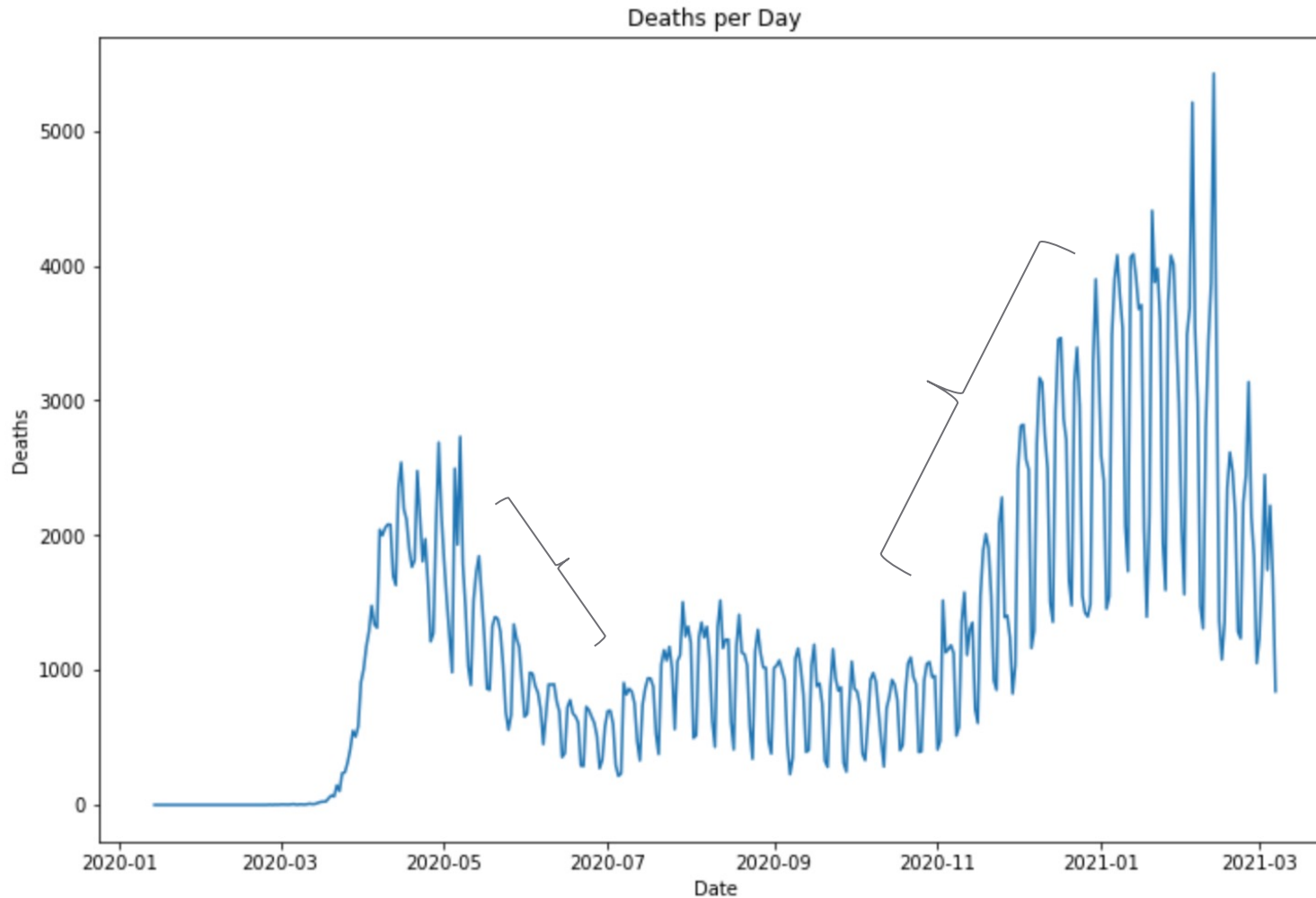
What Month had the Highest Death Average?



month	deathIncrease
Jan-20	0.000000
Feb-20	0.172414
Mar-20	139.548387
Jun-20	649.166667
Oct-20	759.516129
Sep-20	777.633333
Jul-20	814.483871
Aug-20	975.612903
Nov-20	1235.500000
May-20	1327.000000
Mar-21	1700.571429
Apr-20	1843.833333
Dec-20	2487.483871
Feb-21	2537.785714
Jan-21	3077.000000

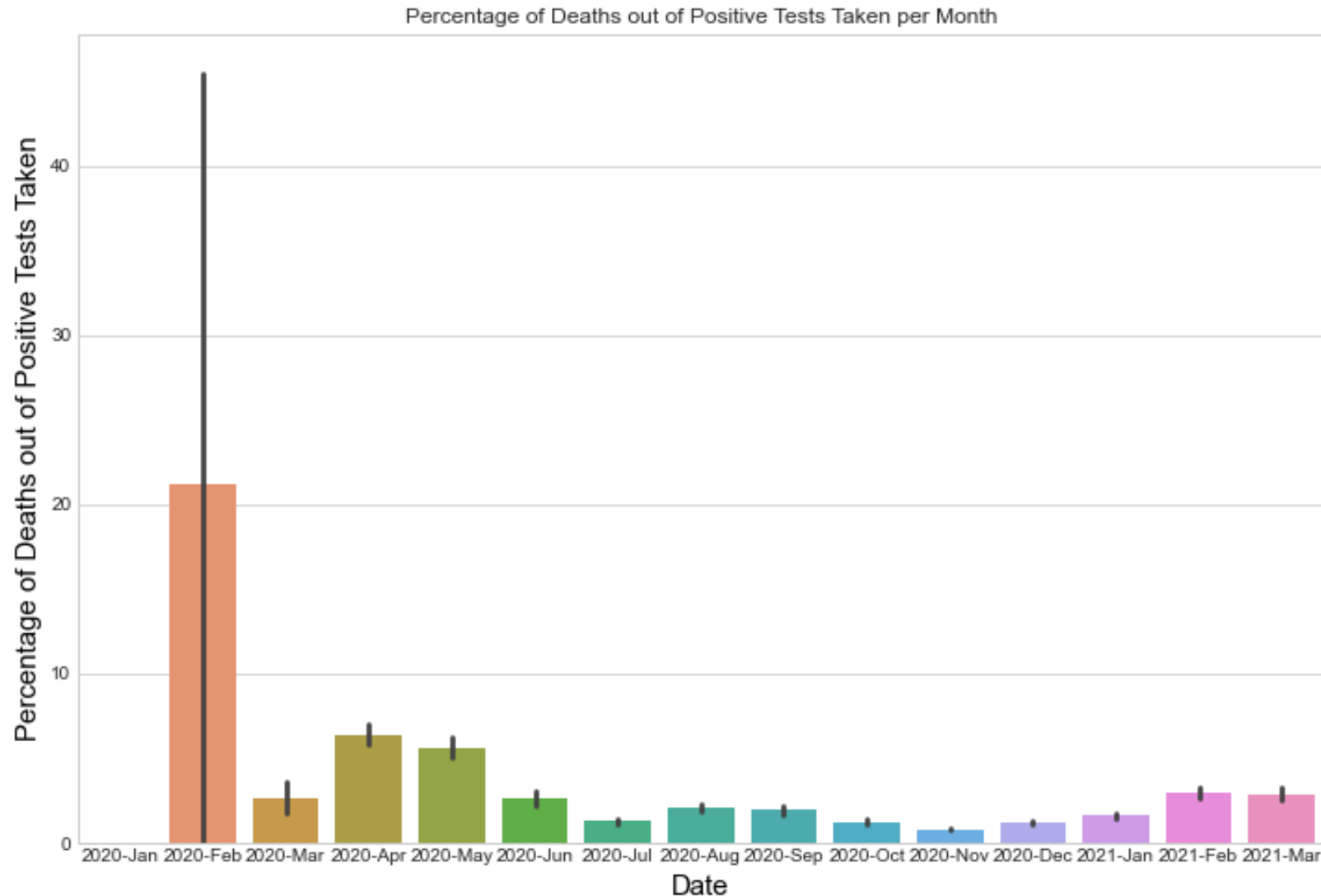


A look at Daily Deaths



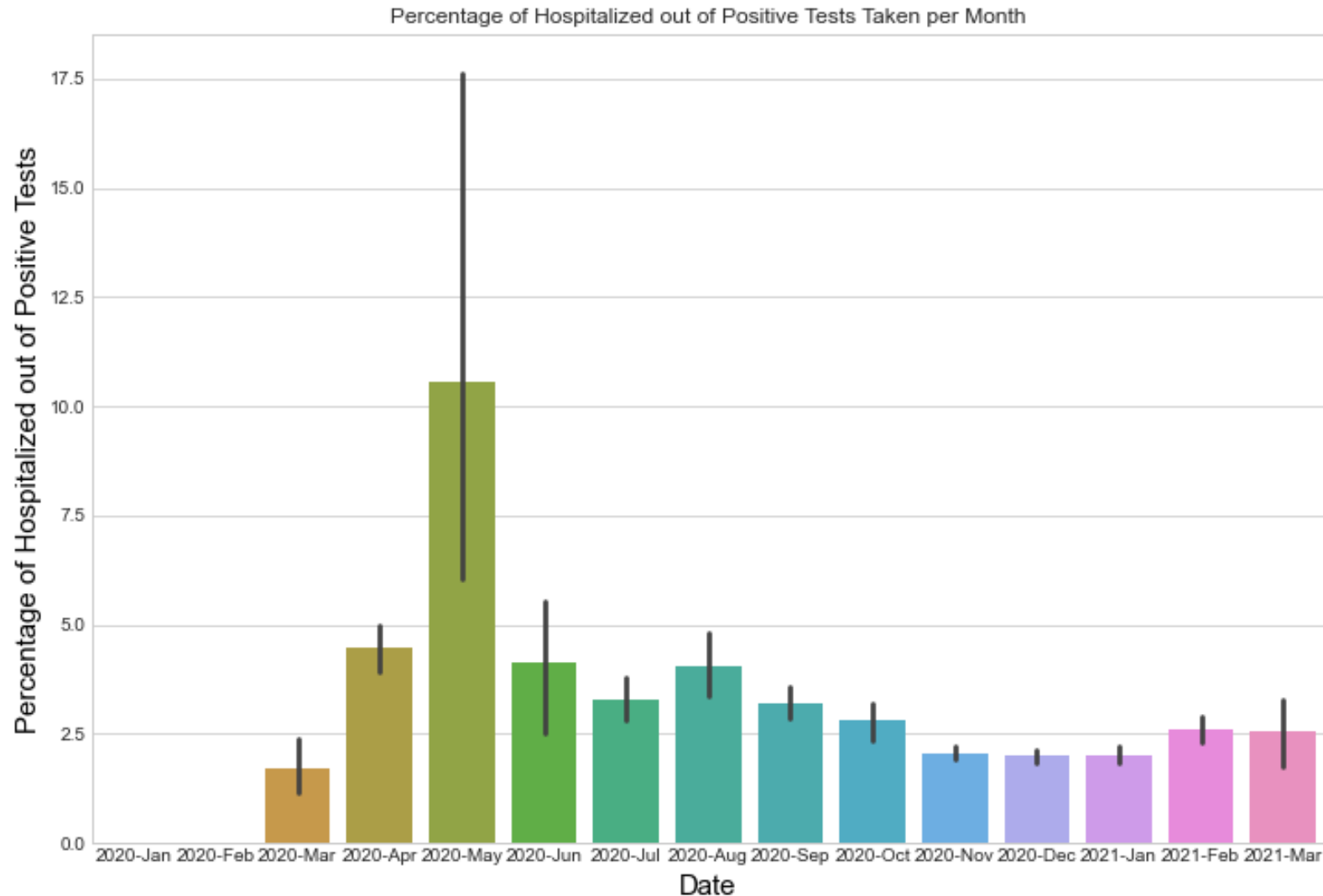
- Slight decrease in summer
 - Many gov interventions
 - Mini surge around July
- Winter spike in holiday season
 - Less abundance by restrictions
- March 2020 sharp increase in deaths

What percentage of people with positive covid test died?



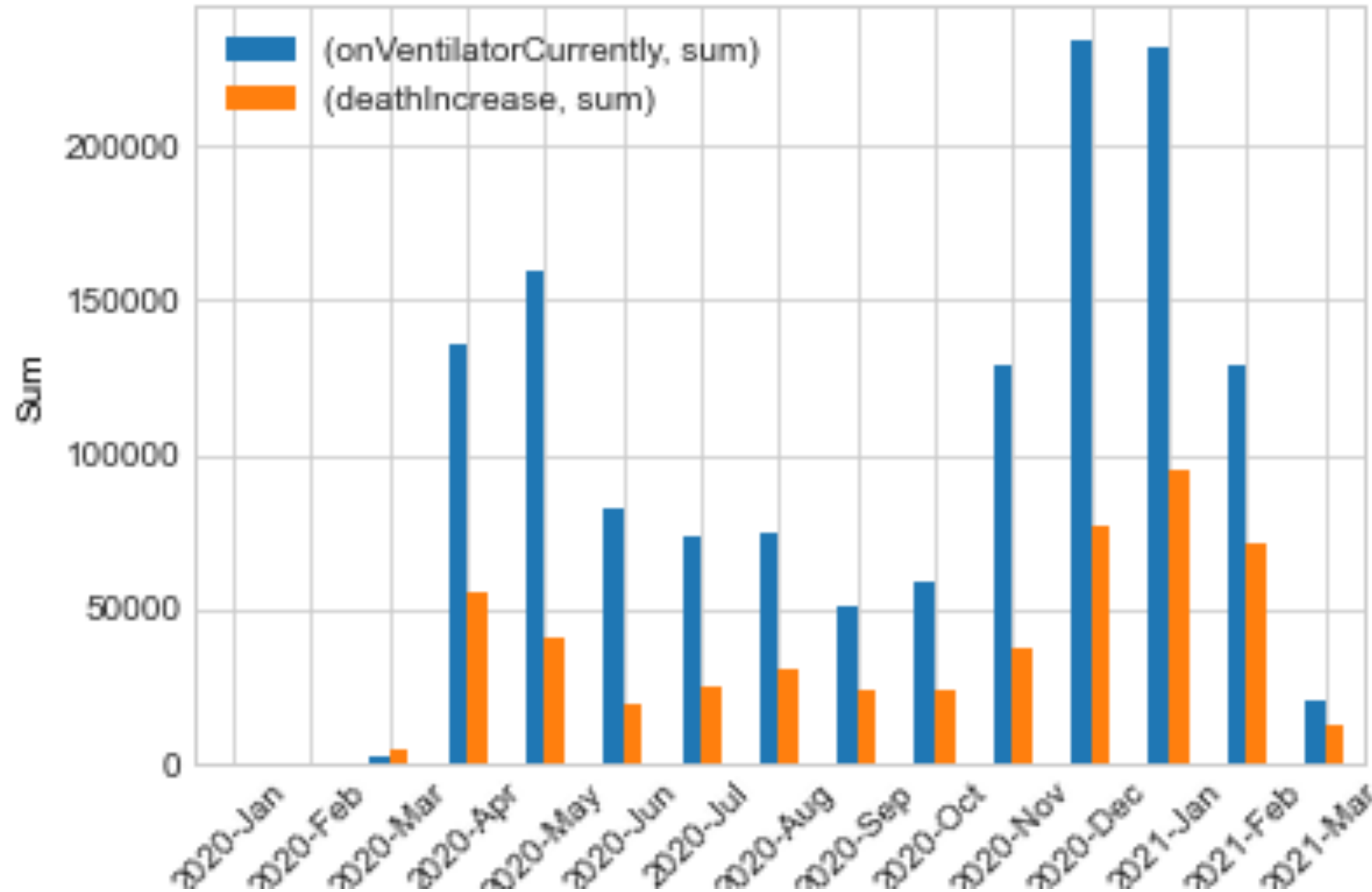
- **Feb-2020**
The highest percentage of death out of positive-tested people.
- **Feb-2021**
less percentage of death of positive-tested people than April-2020.

What percentage of people with Positive Covid Test were hospitalized?



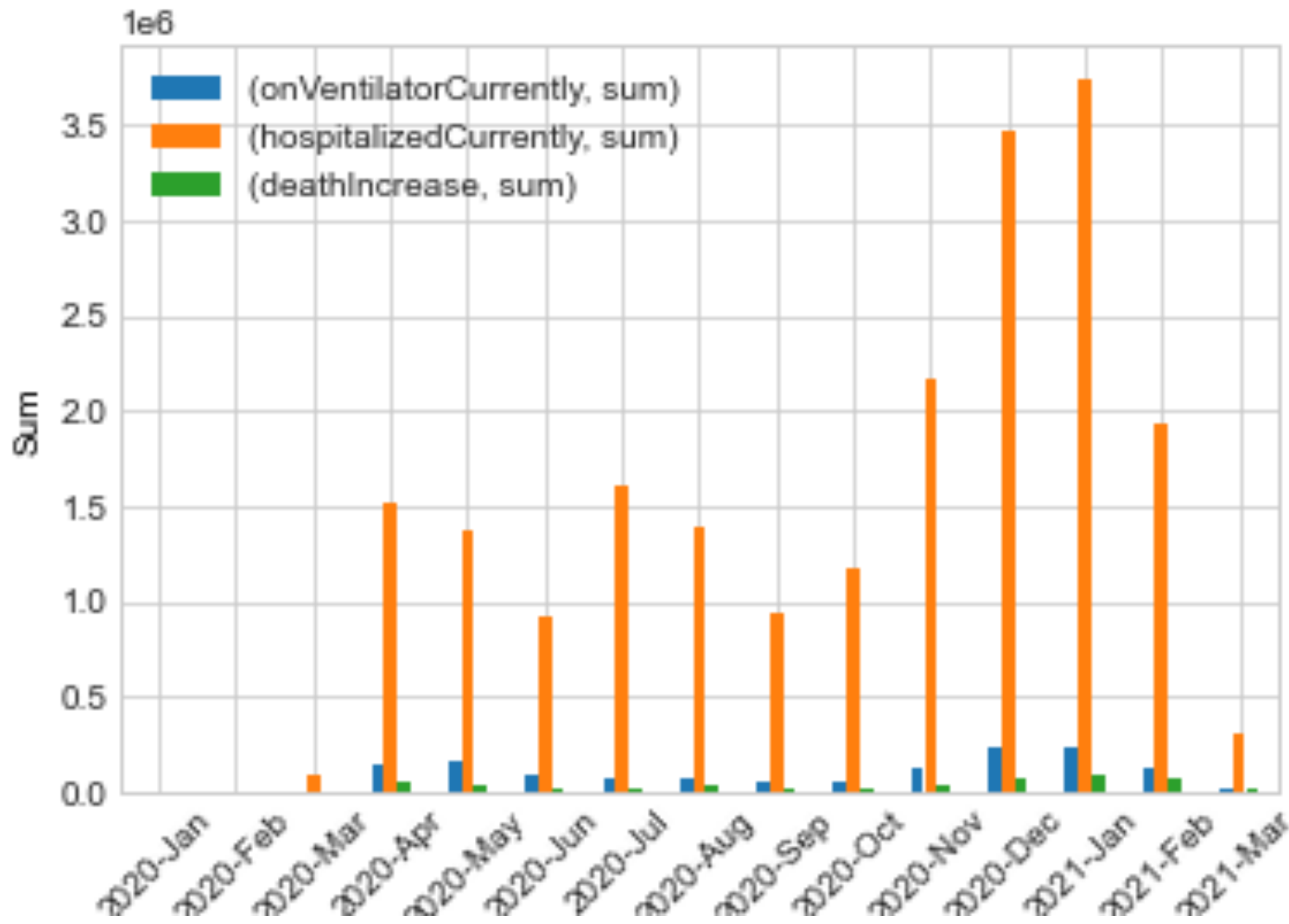
- **May 2020:**
Maximum percentage of positive-tested people in hospital
- **Jan 2021:**
No increase in percentage of hospitalized people though the number of death is maximum.

Total Number of Ventilator, and Death per Month



July & August 2020, Jan 2021:
Decrease of ventilator and increase of death. Did we have shortage of ventilators that time?

Total Number of Hospitalized, Ventilator, and Death per Month

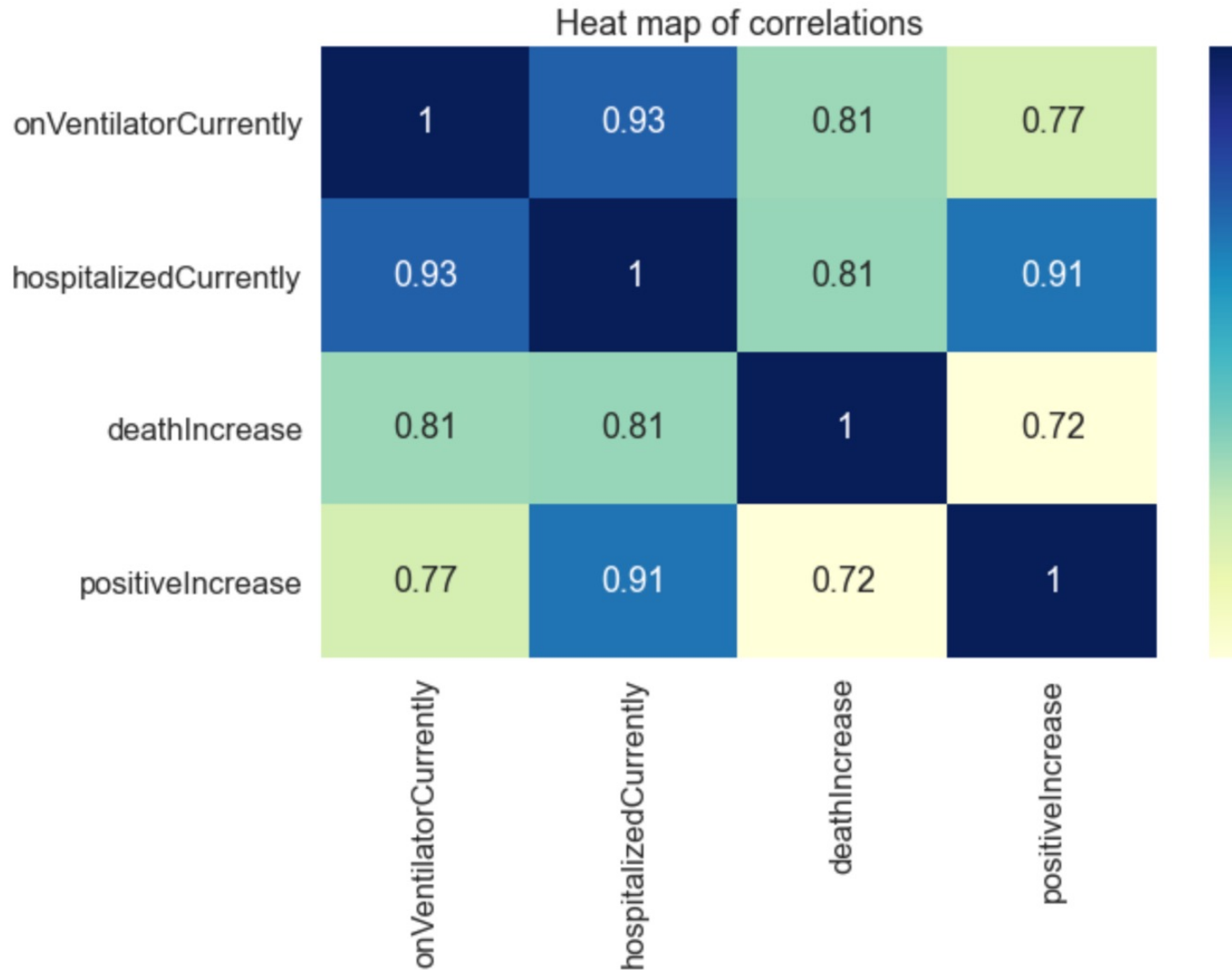


July 2020 & Jan 2021:

Increase in hospitalization

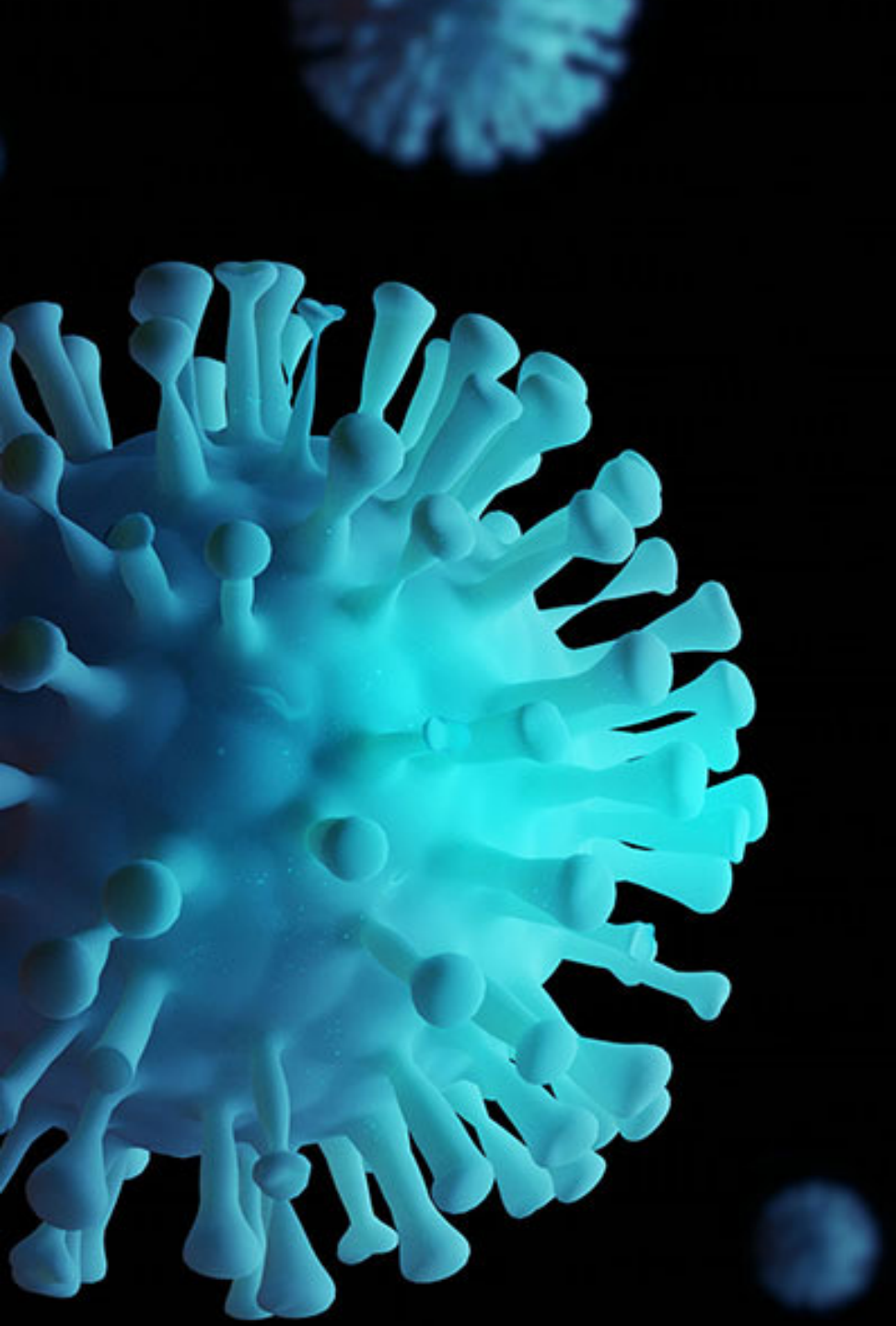
Feb 2021:

Sudden reduction of death, ventilators, and hospitalized.



Are deaths,
ventilator usage,
hospitalization,
and positive
cases related?

- Strong positive relationship between all the variables
- Strongest relationship between
 - currently in hospital & on ventilator



Findings and Discussion

- Around the time of the emergence of vaccination, the numbers of hospitalizations, ventilators, and deaths were the highest.
- More people were being tested around Jan 2021 compared to the beginning of the pandemic
- Shortage of ventilators happened around July 2020 and Jan 2021
- Although the pandemic is an ongoing issue and not enough seasons' data is available, our results show that cold seasons result in an increase in the number of deaths.



Shortcomings of the Data Set

- Metadata and definitions did not match the column names in the datafile
 - Not all columns were well explained
 - Lack of clarity regarding states and territories considered
- Total Test Results column did NOT equal Positive + Negative Test Results columns
 - Possibly inconclusive tests are counted in the total making it higher?
 - Not mentioned in metadata
- Testing shortages at the beginning meaning unreliable case data
- Data stops in early March 2021, but the pandemic is ongoing
- Two daily values in Negative Tests were erroneously negative
- Confirmed underreporting of cases

Questions?



Works Cited

- The Atlantic Monthly Group. (n.d.). *Totals for the US*. The COVID Tracking Project. Retrieved September 28, 2021, from <https://covidtracking.com/data/national/>
- Yale University. (2021, February 2). *Lack of ICU beds tied to thousands of excess COVID-19 deaths, study finds*. ScienceDaily. Retrieved October 9, 2021, from <https://www.sciencedaily.com/releases/2021/02/210202164502.htm>
- Noh, J. S., Danuser, G., & Lyda Hill Philanthropies. (2021, February 8). *COVID-19 infections in the U.S. nearly three times greater than reported, model estimates*. UT Southwestern Medical Center. Retrieved October 9, 2021, from <https://www.utsouthwestern.edu/newsroom/articles/year-2021/covid-19-infections-in-the-us-nearly-three-times-greater-than-reported.html>
- Caliendo, A. M., & Hanson, K. E. (2021, August 16). *COVID-19: Diagnosis*. UpToDate. Retrieved October 9, 2021, from <https://www.uptodate.com/contents/covid-19-diagnosis#H3384281277>.
- *How well do face masks protect against coronavirus?* (2021, August 24). Mayo Clinic. Retrieved October 9, 2021, from <https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/coronavirus-mask/art-20485449>