PRECISION value & health
shift the trajectory

The Future and Evolution of Advanced Modeling Techniques to Support the Development of COVID-19 Mitigation and Prevention Policies

Virtual ISPOR 2021

May 17-20, 2021

PRECISIONheor

Panelists

Jacki Chou, MPP, MPL

Ms. Jacki Chou is a Vice President at PRECISIONheor. She has extensive experience in policy-facing research in a diversity of therapeutic areas including rare diseases, oncology, infectious diseases, and psychiatry. Ms. Chou has expertise in literature-based economic and epidemiological models demonstrating the benefit of innovative treatments to society.

Lance Waller, PhD

Professor Lance Waller is Professor in the Department of Biostatistics and Bioinformatics, Rollins School of Public Health, Emory University. He is currently a member of the National Academy of Science Committee on Applied and Theoretical Statistics. His research involves the development and application of statistical methods for spatially referenced data including applications in environmental justice, neurology, epidemiology, disease surveillance, conservation biology, and disease ecology.

Pinar Karaca Mandic, PhD

Professor Pinar Karaca Mandic is the C. Arthur Williams Jr. Professor in Healthcare Risk Management, and the Academic Director of the Medical Industry Leadership Institute (MILI) in the Department of Finance at the University of Minnesota. She is a Research Associate at the National Bureau of Economic Research (NBER), in Health Economics and Healthcare programs. She also serves as a Project Lead for the COVID-19 Hospitalization Tracking Project.

Romilla Batra, MD, MBA

Dr. Romilla Batra serves as the Chief Medical Officer of SCAN Health Plan where she is responsible for providing the strategic direction and leading key organizational initiatives that improve health outcomes, enhance member experience and reduce total cost of care. In her role, Dr Batra provides oversight of healthcare services, pharmacy, medical policy, provider integration, government affairs and SCAN's community benefit organization, Independence at Home. Dr. Batra is a board-certified internist with more than 20 years of experience as a medical director, clinician and educator. She also holds an appointment as a Professor at UCI school of medicine and Paul Merage School of Business.

Disclosures and Acknowledgements

- Jacki Chou is an employee of PRECISIONheor, which provides health economics and outcomes research consulting services to life sciences companies. She also hold stock in PRECISIONheor's parent company, Precision Medicine Group.
- Thank you to Anuj Mubayi for his assistance and support in conceptualizing the issue panel.

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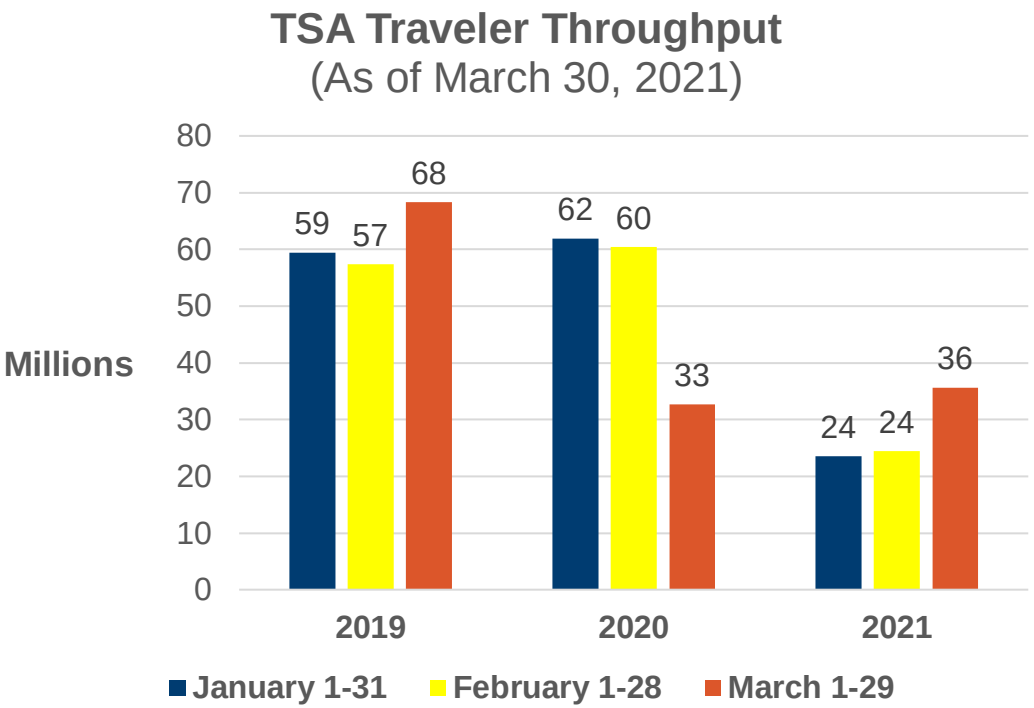
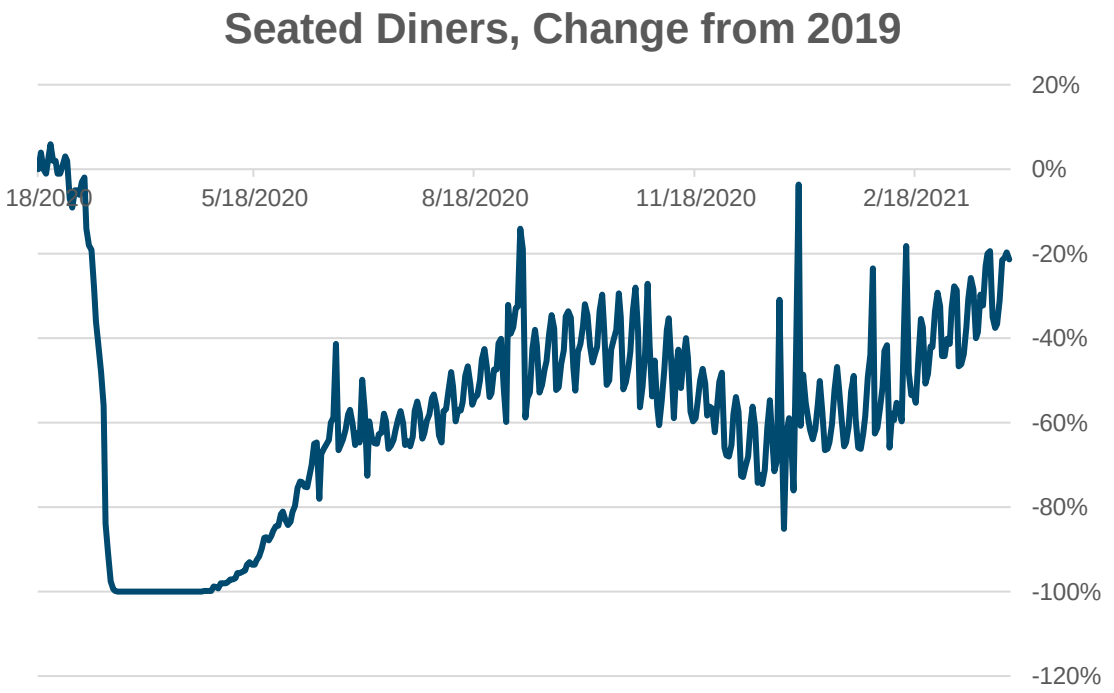
Policy Context

The social and economic impact of the COVID-19 pandemic has been historic





TSA. 2021. TSA checkpoint travel numbers (current year(s) versus prior year/same weekday). https://www.tsa.gov/coronavirus/passenger-throughput

OpenTable. 2021. State of the Industry. https://www.opentable.com/state-of-industry

As the pandemic has evolved, data and modeling efforts have played center stage

PRECISIONheor

KVUE abc

CORONAVIRUS

Austin could enter Stage 2 COVID-19 guidelines by April 13, UT modeling suggests

Austin Health Authority Dr. Mark Escott gave the UT model projection to Travis County commissioners on Tuesday morning.

K5

CORONAVIRUS

How accurate were UW's COVID-19 predictions?

At the beginning of the COVID-19 pandemic, we looked at data models to predict trends. We look at how accurate the predictions were.

ANCHORAGE DAILY NEWS

Alaska News

Tracking COVID-19 in Alaska: 649 cases and no deaths reported Saturday through Tuesday

Author: Anchorage Daily News Updated: 4 hours ago Published 6 hours ago

CNBC

TECH

Five charts that show how Covid-19 stopped the U.S. economy in its tracks

PUBLISHED THU, MAR 11 2021·8:00 AM EST | UPDATED THU, MAR 11 2021·8:00 AM EST

Alex Sherman
@SHERMAN4949

SHARE

AXIOS

"Fludemic" model accurately maps where COVID hotspots will crop up a week out

Ina Fried, author of Login

Agenda

1	**Introductions and Overview**	Ms. Jacki Chou
2	**Spatial Statistics, Environmental Justice, And Equity In Access**	Prof. Lance Waller
3	**University of Minnesota COVID-19 Hospitalization Tracking Project**	Prof. Pinar Karaca Mandic
4	**Leaving No Seniors Behind: Ensuring Equitable Access to COVID-19 Vaccination**	Dr. Romilla Batra
5	**Moderated Discussion**	*Moderated by Ms. Jacki Chou*

Spatial statistics, environmental justice, and equity in access

Lance A. Waller, PhD

Department of Biostatistics and Bioinformatics

Rollins School of Public Health

Emory University

ISPOR 2021

Equity in access to COVID-19 testing?

- COVID-19
  - Racial differences well-documented.
  - "Testing deserts"?
- FiveThirtyEight
  - **Which Cities Have The Biggest Racial Gaps In COVID-19 Testing Access?**
    - SR Kim, M Vann, L Bronner, G Manthey
    - https://fivethirtyeight.com/features/white-neighborhoods-have-more-access-to-covid-19-testing-sites/
- Testing demand/access/impact dynamic in space and time

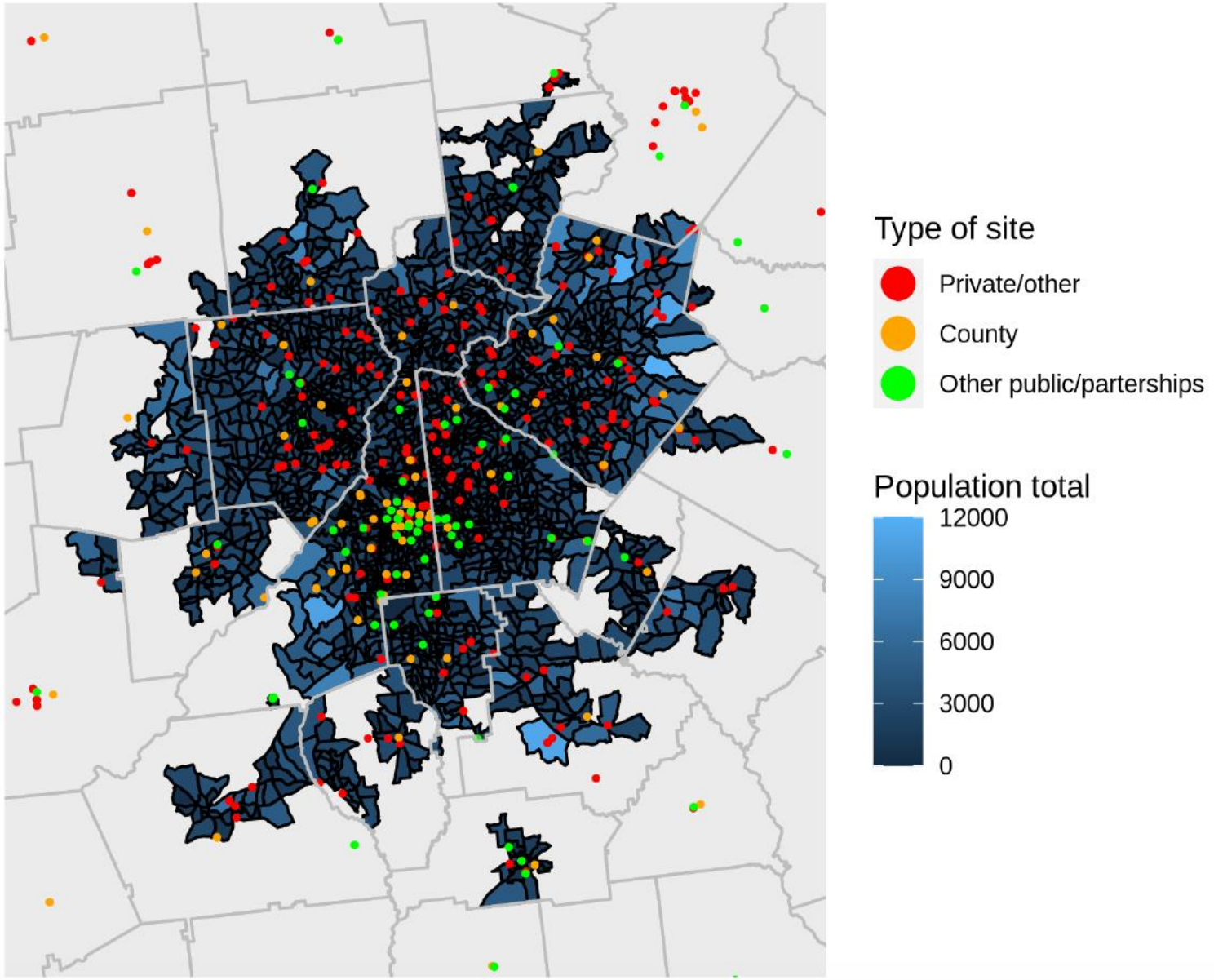
What about Atlanta?

- Behzad Kianian, PhD, Biostatistics and Bioinformatics, Dissertation Fall 2020
- Compare access distributions between Black, White, Hispanic Communities to COVID testing sites.
- Where/how many sites to add?
  - Kamran Paynabar, Georgia Tech
  - Optimize coverage and reduce inequities.

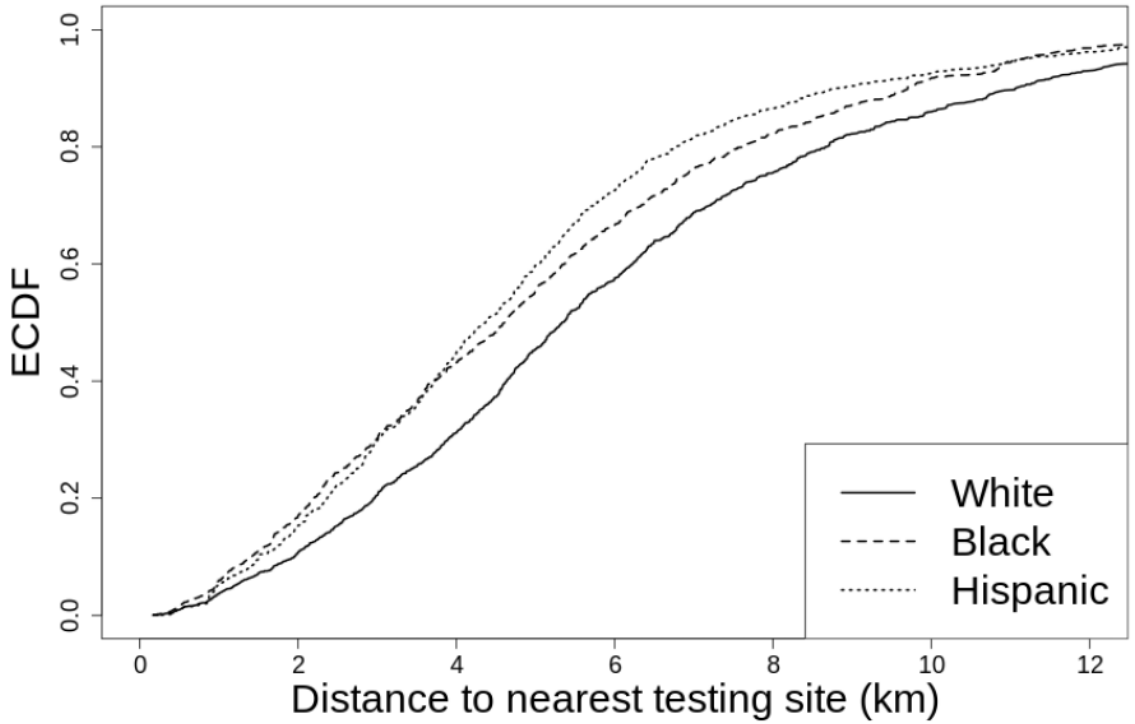
What data can we get?

- Consolidated testing site data very hard to come by.
  - MANY types of testing sites
  - Positive testing results reported/tracked, but not all tests
  - Crowdsourced testing site data (GISCorps)
- Maps: Private, county, public partnerships testing sites.
  - NOT primary care, VA clinic, employee screening sites.
  - Metropolitan Atlanta area
  - Preliminary results from Behzad Kianian

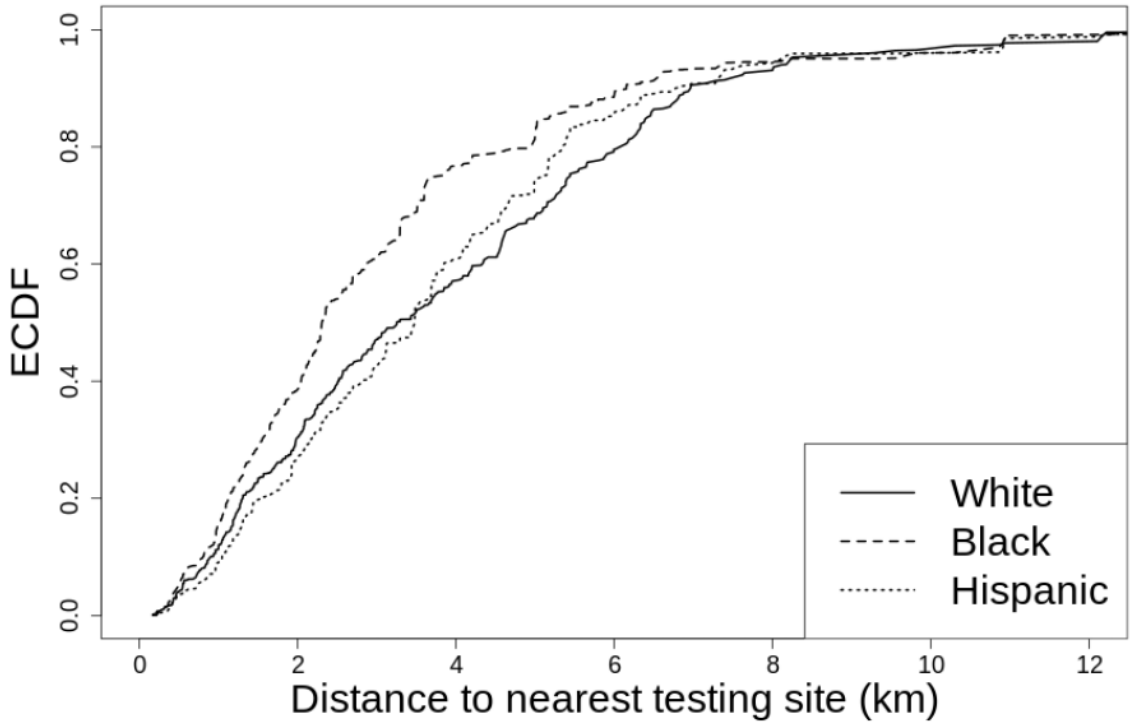
Block Group Populations and Testing Sites in Atlanta Urban Area Summer 2020



Cumulative distribution of distance to nearest county site



(a) Atlanta UA, county sites only



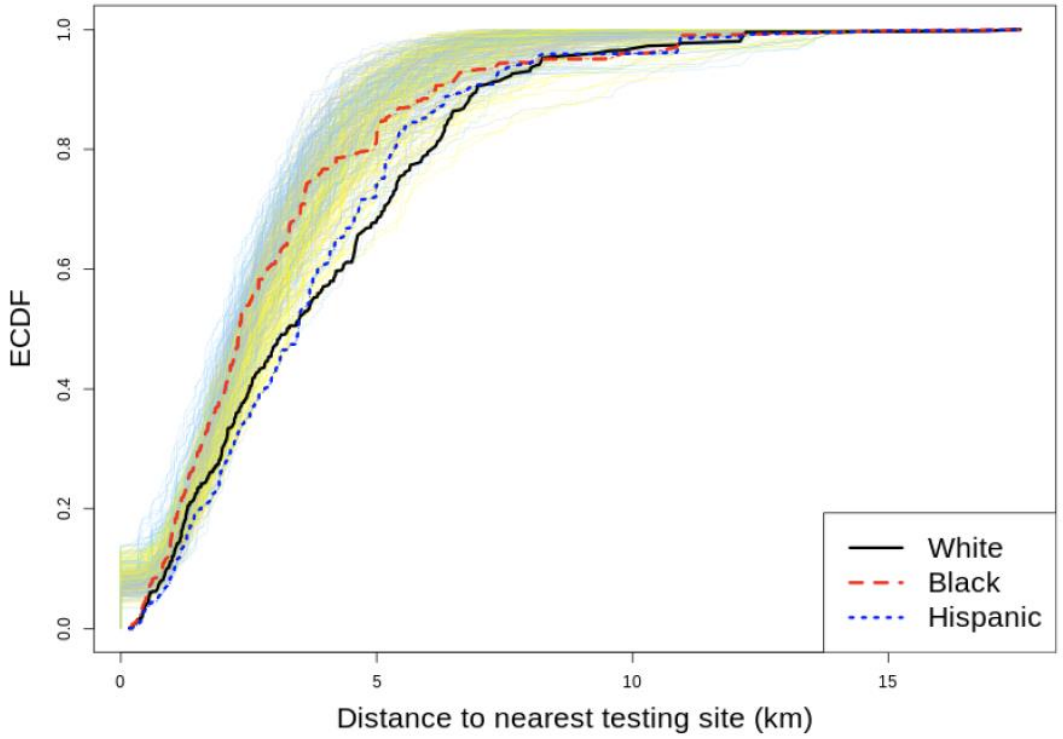
(b) Fulton County, county sites only

- Waller, Louis, and Carlin. Bayes methods for combining disease and exposure data in assessing environmental justice. *Environmental and Ecological Statistics*, 4(4):267-281, 1997.
- Waller, Louis, and Carlin. Environmental justice and statistical summaries of differences in exposure distributions. *Journal of Exposure Science & Environmental Epidemiology*, 9(1):56-65, 1999.

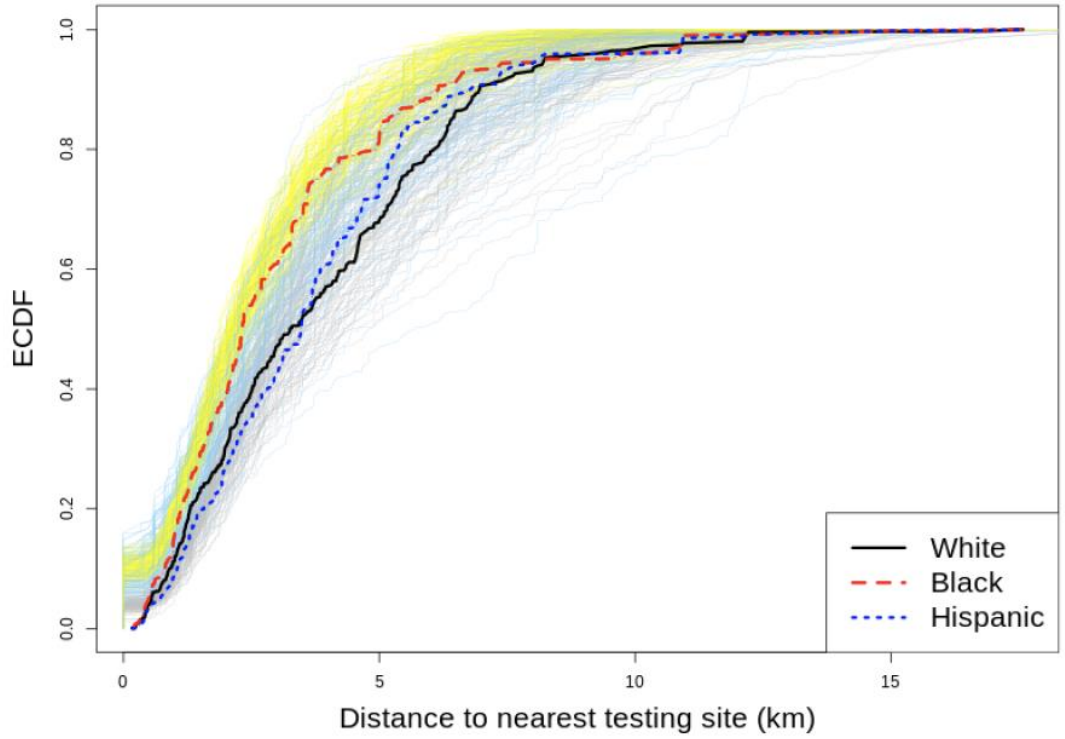
What other questions could we answer?

- What might be driving these patterns?
- Compare what the figures would look like if the county sites were:
  - Assigned based on number of residents
  - Assigned based on percent of residents with income below poverty line
- Use Monte Carlo simulation.
  - Same number of sites each time
  - Select locations, calculate curves many times.
  - Plot results….

Random assignment or assignment proportional to % below poverty



(a) Population-based placement of testing sites



(b) Poverty-based placement of testing sites

MEDICAL INDUSTRY LEADERSHIP INSTITUTE

University of Minnesota COVID-19 Hospitalization Tracking Project

Pinar Karaca-Mandic, PhD
Professor, Finance Department
Academic Director, Medical Industry Leadership Institute (MILI)

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CARLSON SCHOOL OF MANAGEMENT
UNIVERSITY OF MINNESOTA

COVID-19 Hospitalizations by State

Data collected by the UMN COVID-19 Hospitalization Tracking Project team from state websites.

Home | Current Hospitalizations | Hospitalizations to Date | Currently in ICU | Currently on Ventilator | In ICU to Date | Sub-State Data | Total Deaths

University of Minnesota COVID-19 Hospitalization Tracking

Current Hospitalizations
(aggregated across reporting states)

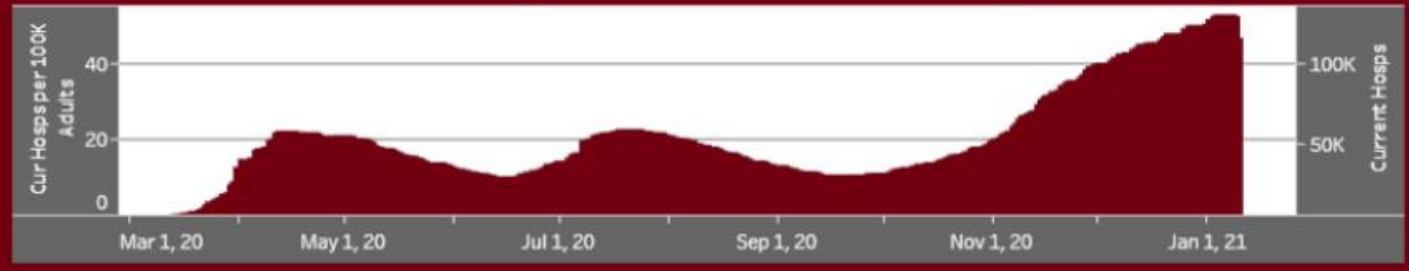
130,559

States reporting: N = 50

CA	21,936
TX	13,921
NY	8,665
FL	7,405
PA	5,684
GA	5,515
AZ	4,920
OH	4,446
NC	3,960
IL	3,928
NJ	3,711
TN	3,351

Last updated at:
January 9, 2021

Current Hospitalizations Trend Across the Country



Notes: This site reflects state-reported data. As some states report more data than others, the current and total hospitalizations data should NOT be compared to each other.
- Current Hospitalizations data indicates the number of COVID -19 patients currently admitted to hospitals.
- When a state differentiates between confirmed and suspected (probable) hospitalizations, we report only the confirmed hospitalizations.
- Hospitalization, ICU and Death data are collected daily from the Department of Health of each state.
- This dashboard is updated at 12:00 pm CST every day. Data displayed on the dashboard reflect reported data by states by 10 pm the previous day.

Project Team

TEAM LEADS

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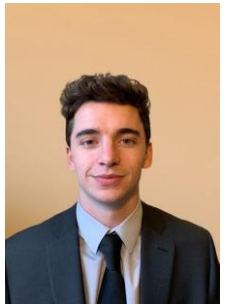
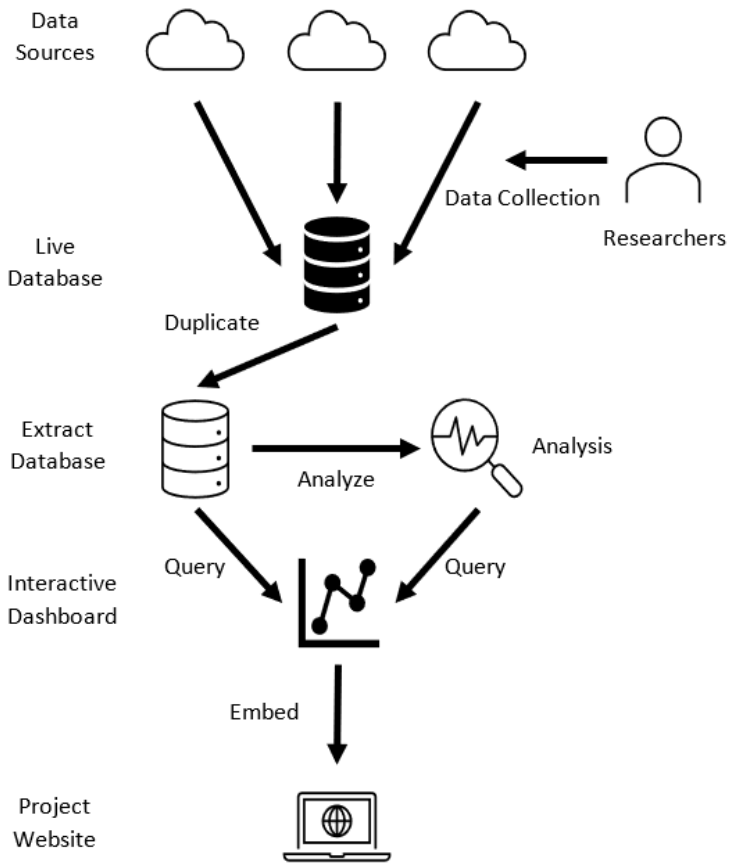


Wesley Asprey

Carter Sellner

Aavni Varadhan

System Design



HEALTH AFFAIRS BLOG

RELATED TOPICS:
COVID-19 | PUBLIC HEALTH | PANDEMICS | INTENSIVE CARE UNITS | DECISION MAKING

Calling All States To Report Standardized Information On COVID-19 Hospitalizations

Pinar Karaca-Mandic, Archelle Georgiou, Soumya Sen

APRIL 7, 2020 10.1377/hblog20

Improvement of data availability

- State:
  - Mar 26, 2020:
    - Only 23 states were reporting any metrics of data.
  - Mar 26, 2021:
    - Current Hospitalizations: 49
    - Cumulative Hospitalizations : 37
    - Current in ICU: 33
    - Cumulative ICU: 13
- County:
  - Mar 26, 2020
    - Almost no data
  - Mar 26, 2021
    - 20 States are reporting any metrics of data

Select Team Publications

A complete list of team publications and media mentions can be found on the Hospitalization Tracking Project website - https://carlsonschool.umn.edu/mili-misrc-covid19-tracking-project/press

"Assessment of COVID-19 Hospitalizations by Race/Ethnicity in 12 States", *JAMA, May 27'20*

"Association of Stay-at-Home Orders with COVID-19 Hospitalizations in 4 States", *JAMA Internal Medicine, Aug 17'20*

"Association of COVID-19 Related Hospital Use and Overall COVID-19 Mortality in the USA" *Journal of General Internal Medicine, August 19'20*

***"Trends in* in Pediatric Hospitalizations for Coronavirus Disease 2019",** *JAMA Pediatrics, Jan 11'21*

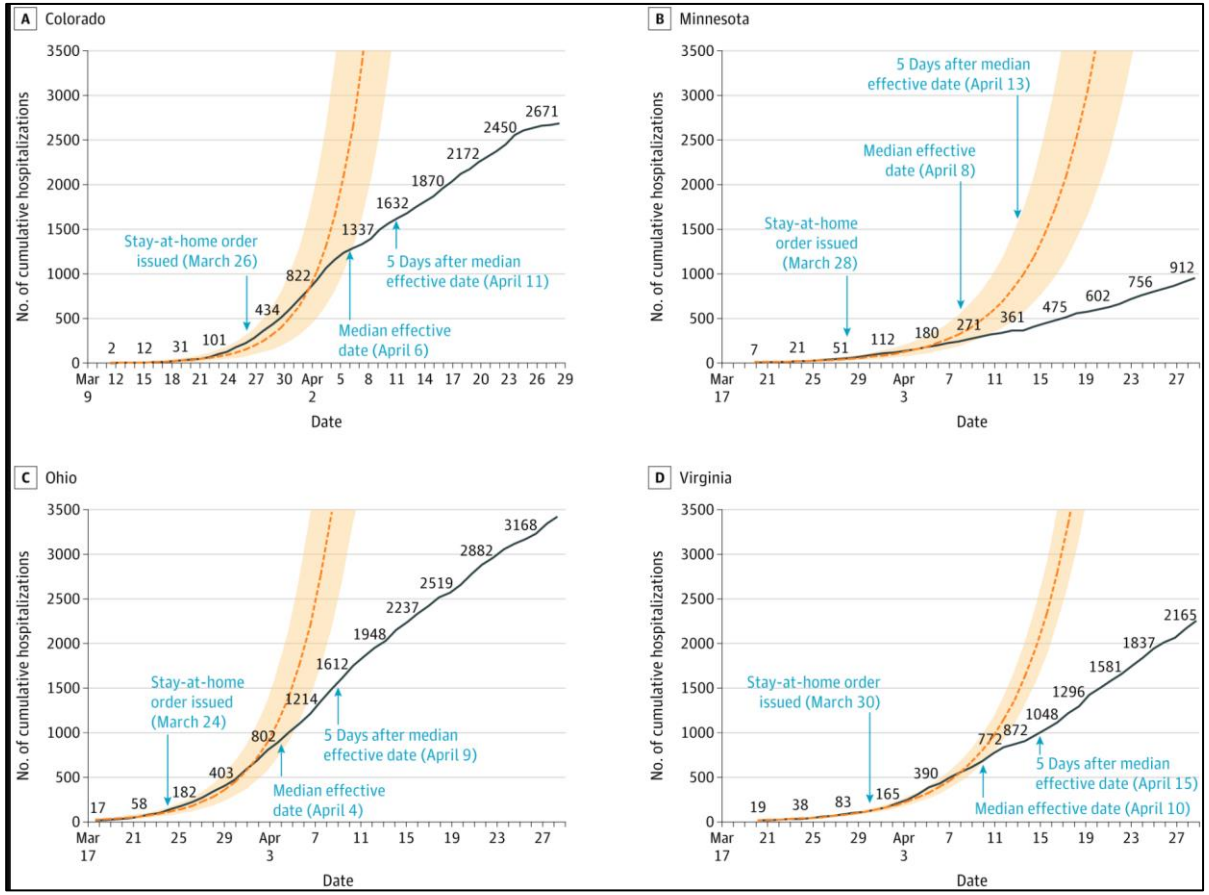
7 journal articles; 40+ briefs/reports, 150+ media mentions, weekly data feed to NPR

Select Media Mentions

JAMA The Journal of the American Medical Association

"Association of Stay At Home Orders With COVID-19 Hospitalizations in 4 States May 27, 2020

- 4 States: CO, MN, OH, VA
- Method:
  - Pre-SAH hospitalization trend
  - Projected Post-SAH trend
  - Compared to Actual trend
- Conclusion: SAH contribute to decreasing hospitalization rates



JAMA Internal Medicine "Assessment of COVID-19 Hospitalizations by Race/Ethnicity in 12 States
August 17, 2020

- 12 States: AZ, IN, KS, MA, MN, NH, OH, OR, RI, UT, VA, WA

- Method: Compare
  - Proportion of COVID-19 hospitalizations by race/ethnicity
  - Compare to proportion of population by race ethnicity

→ Integrated external data source: US Census

- Conclusion:
  - Significant disparities!
  - Cause: cannot infer. Beyond scope of analysis

→ Must stay objective and evidence-based

JAMA Internal Medicine "Assessment of COVID-19 Hospitalizations by Race/Ethnicity in 12 States
August 17, 2020

Table. Racial and Ethnic Composition of Cumulative COVID-19 Hospitalizations in 12 States

State (study observation period)	Cumulative No. of hosp on first d vs last d of study period[a]	Unknown race/ethnicity, %	Ethnicity, %[b]			Race, %[b]											
			Hispanic			White			Black			AIAN			Asian		
			Hosp	State[c]	Diff	Hosp	State[c]	Diff	Hosp	State[c]	Diff	Hosp	State[c]	Diff	Hosp	State[c]	Diff
Arizona (April 30-June 24, 2020)	1169 vs 4313	10.2	31.3	31.6	−0.3	42.6	54.4	−11.8	5.8	4.4	1.4	15.7	4.0	11.8	2.1	3.4	−1.3
Indiana (April 27-June 24, 2020)	2844 vs 6883	0.0	NA	NA	NA	61.6	85.1	−23.5	28.1	9.8	18.3	0.5	0.4	0.1	1.4	2.5	−1.1
Kansas (May 7-June 24, 2020	587 vs 1082	6.1	26.1	12.1	14.0	71.6	86.4	−14.8	22.0	6.1	15.8	0.7	1.2	−0.5	4.1	3.1	1.0
Massachusetts (April 20-June 24, 2020)[d]	3790 vs 11 219	29.1	17.8	12.3	5.5	55.5	71.4	−15.9	14.3	7.2	7.0	NA	NA	NA	4.0	7.0	−3.0
Minnesota (May 14-June 18, 2020)[e]	1915 vs 3718	17.5	15.5	5.5	10.0	52.9	84.1	−31.2	24.9	6.8	18.1	2.7	1.4	1.4	9.8	5.1	4.7
New Hampshire (April 27-June 24, 2020)	246-558	10.4	10.0	3.9	6.1	78.9	90.0	−11.1	5.3	1.4	3.9	NA	NA	NA	2.9	2.9	0.0
Ohio (April 21-June 24, 2020)	2779 vs 7447	4.4	6.2	3.9	2.2	58.4	81.9	−23.5	31.8	13.0	18.8	0.1	0.3	−0.2	2.0	2.5	−0.4
Oregon (May 27-June 24, 2020)	759 vs 1006	5.1	25.8	13.3	12.5	61.9	86.8	−24.9	4.0	2.2	1.8	1.6	1.8	−0.2	4.8	4.8	0.0
Rhode Island (April 22-June 24)	585 vs 1677	0.0	33.0	15.9	17.1	48.8	72.0	−23.2	12.5	6.0	6.5	NA	NA	NA	NA	NA	NA
Utah (May 7-June 24, 2020)	476 vs 1256	2.9	35.3	14.2	21.1	42.5	78.0	−35.6	3.1	1.1	1.9	5.0	0.9	4.1	1.9	2.6	−0.7
Virginia (April 19-June 14, 2020)[f]	1422 vs 5536	9.0	36.2	9.6	26.5	44.1	69.5	−25.4	27.7	19.9	7.8	NA	NA	NA	NA	NA	NA
Washington (May 6-June 24, 2020)	2632 vs 4093	26.0	25.1	12.9	12.2	53.9	68.0	−14.1	6.0	3.9	2.1	1.3	1.3	0.0	8.7	9.1	−0.4

JGIM
Journal of General Internal Medicine

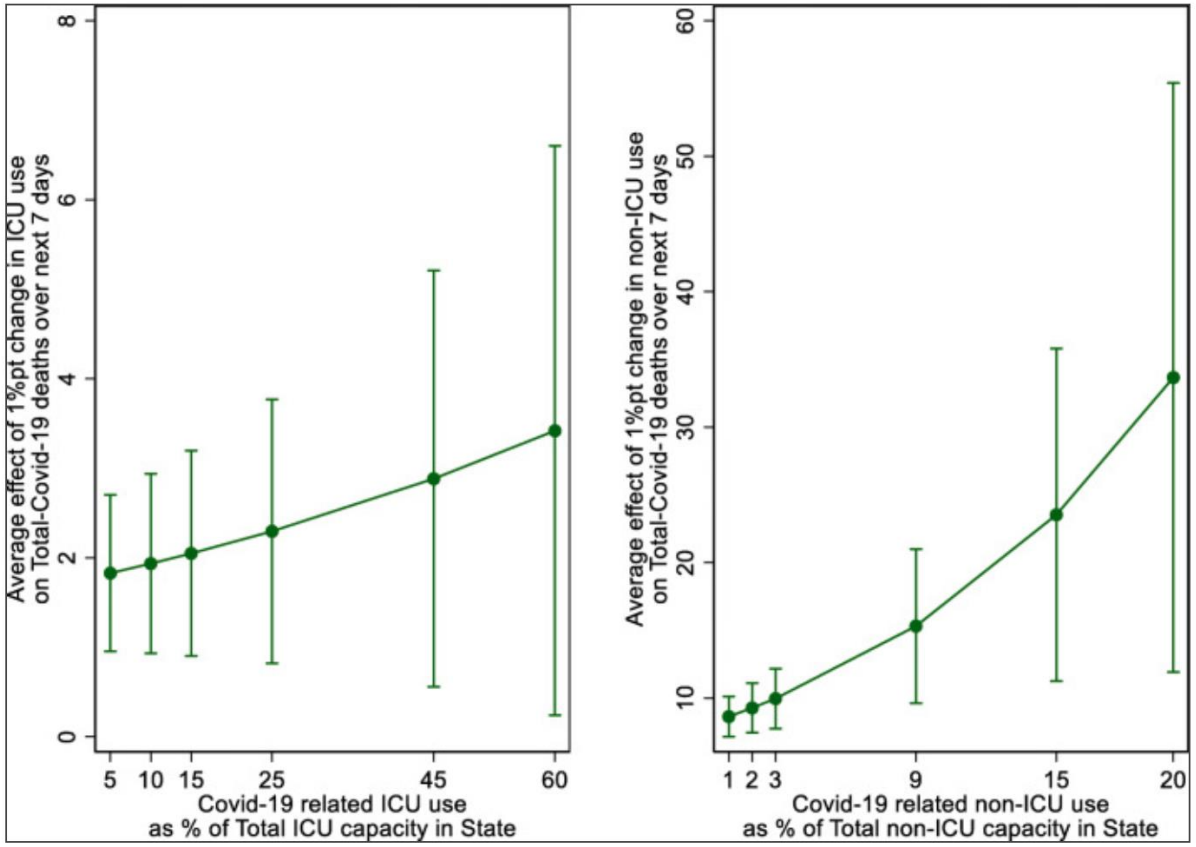
"Association of COVID-19-Related Hospital Use and Overall COVID-19 Mortality in the US
August 19, 2020

23 states; 1056 observation

Findings:

- A 1% increase in ICU-bed use (17 beds on average) was associated with 2.84 more COVID-19 deaths over the next seven days
- A 1% increase in non-ICU bed use (130 beds on average) was associated with 17.84 more COVID-19 deaths.

Collaboration with University of WA

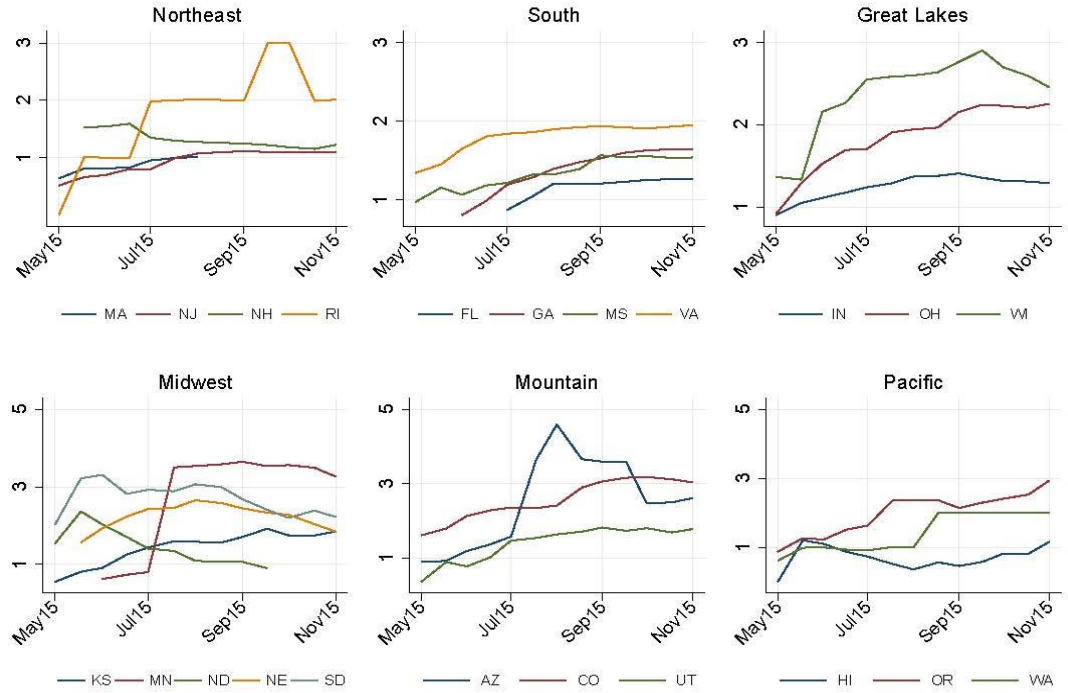


JAMA Pediatrics

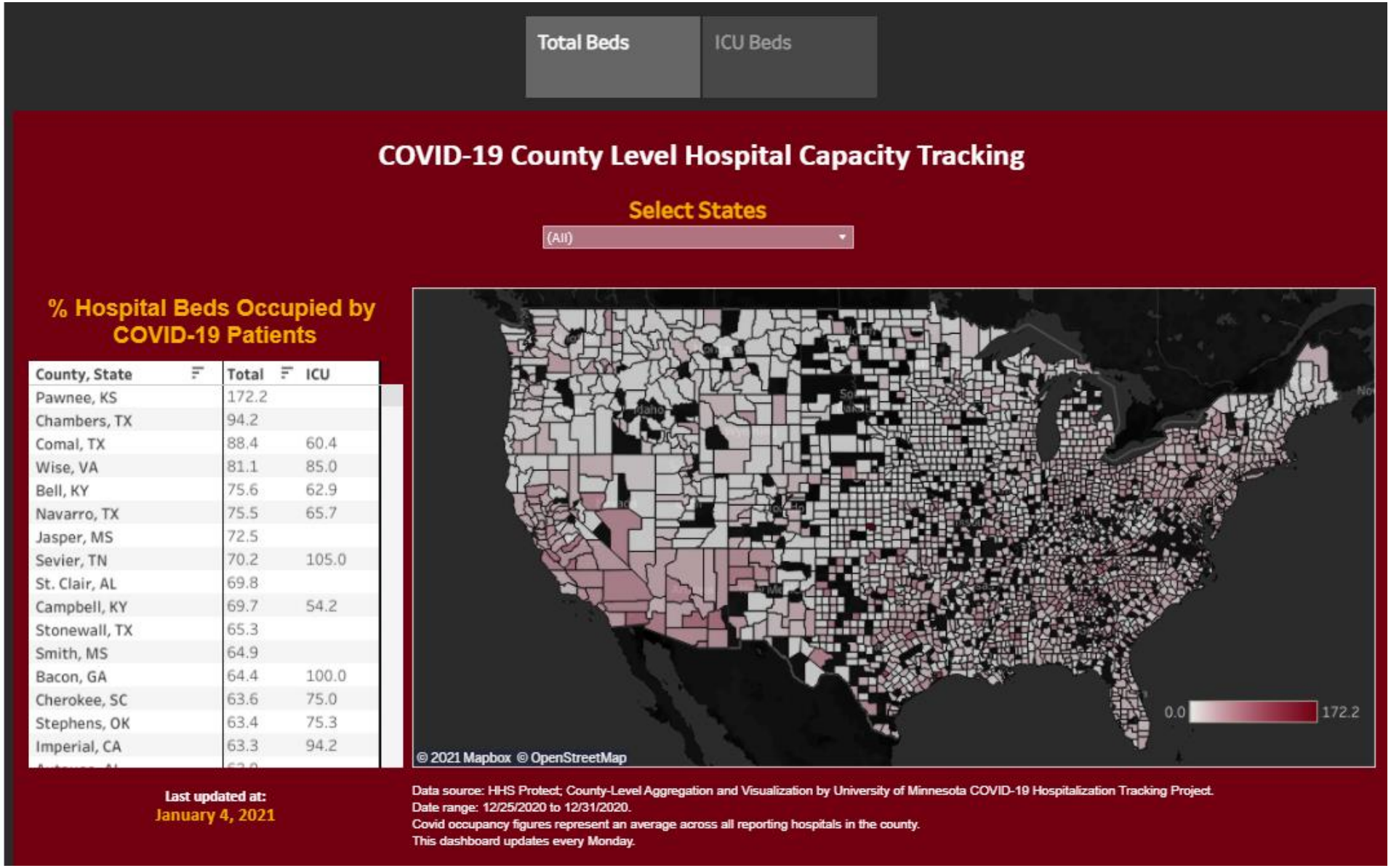
"Trends in Pediatric Hospitalizations for Coronavirus Disease 2019

January 11 2021

- ❑ Data from May 15 to November 15, 22 states
- ❑ Examined pediatric COVID-19 hospitalization trends, growth, comparison to adults
- ❑ While hospitalizations for COVID occur much less frequently for children than for adults, this study demonstrates that COVID-19 has the potential to cause serious illness in children.
- ❑ COVID-19 Hospitalization Rates: May 15: 2 children per 100,000; Nov 15: 17 children per 100,000, 760% growth, 2.5 times that of growth for cumulative adult rate



Trends in Pediatric Percentage of Cumulative Hospitalizations



Since December 2020

Federal Data from the Department of Health and Human Services (HHS)

- Anomaly checks
- County-level interactive visualization
- Facility, County, CBSA, City level roll-ups of key capacity measures
- Weekly key insights on capacity, changes, metro/non-metro breakdown
- Data feed to NPR

Other work in progress, under peer-review

- Changes in hospitalizations as states re-opened their economies
- Rural/urban variations in growth rates of hospitalizations
- Staffing shortages
- Hospital Occupancy differences by social vulnerability of counties

Thank you!

pkmandic@umn.edu

Leaving No Seniors Behind

Ensuring Equitable Access to
COVID-19 Vaccination

Romilla Batra, MD
Chief Medical Office, SCAN Health Plan
ISPOR 2021

scan HEALTH PLAN®

SCAN COVID-19 Vaccination Efforts Underway

Members

- Dedicated COVID Vaccine Line (1-800 number)
- Frequent Website updates
- Weekly Social Media updates
- Member tele talks by County (English/Spanish)
- SCAN listens member survey
- Caregiver survey
- Resources dedicated for health equity based COVID vaccine outreaches

Providers

- Touchbase meetings with selected provider partners
- Share high need member list to support equitable vaccine distribution
- Conduct tele talks and webinars
- Collaboration efforts on scheduling appoints for underserved seniors
- Coordination with Blue Shield
- Coordination with Pharmacies

Employees

- Conducted Employee survey
- Paid time to receive the vaccine
- Lunch & Learn sessions to address hesitancy
- Feel good Friday updates
- Planning for onsite vaccine employee event similar to flu shot

Community

- Support community agencies with resources, education and funding as needed
- Volunteer Time Off (VTO) for staff to volunteer in the community related to COVID
- Address vaccine hesitancy with community leaders in both African-Americans and Latinx communities

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Ensuring Equitable Access to COVID-19 Vaccination

Dashboard to track racial, geography, digital, age disparities and intervene

Efforts with Providers

- Actionable data on seniors w/ high needs
- Coordinating appointments for underserved seniors

Member and Community Racial Efforts (AA & Latinx)

- Community education/addressing hesitancy efforts
- Health Care Services (HCS) member outreach efforts in March
- Teletalks in Spanish and with African American professionals

Vaccine equity based high need criteria:

- ❑ Race/Ethnicity, Language: Spanish Speaking, African American, Hispanic/Latinx
- ❑ Dual Members (Low Income)
- ❑ Multiple Chronic Conditions (4+)
- ❑ Home Zip Code

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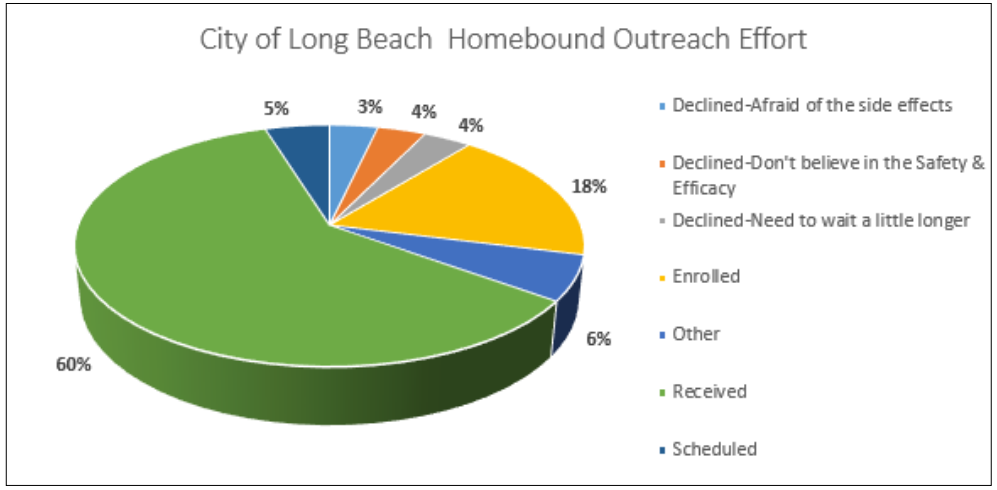
Vaccinating efforts around homebound members

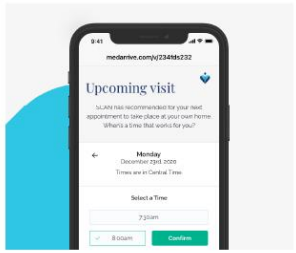
SCAN collaborated with City of Long Beach to enroll homebound members for their in-home vaccination program



Of the members contacted:

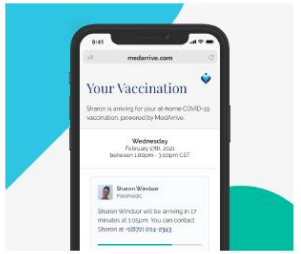
- **60%** of the members have confirmed to have received the vaccine and **6%** of the members have already scheduled to receive the vaccine
- SCAN enrolled **18%** of the members with the program
- **16%** of the members declined or had other reasons

SCAN partnered with Med Arrive and Falck to deliver and administer COVID Vaccine to our homebound members. Tentative project launch date 04/20/2021



Schedule your vaccination.

You can schedule an appointment for yourself or your loved ones. You will answer a few questions, provide contact information, and choose a time slot.



Get vaccinated in your own home.

A licensed and vaccinated EMS professional will arrive at your home to administer the vaccine.

Assistance with next steps.

Depending on the type of vaccine you receive, MedArrive will also help you schedule your second dose to make sure you are fully vaccinated.

MedArrive Falck scan HEALTH PLAN

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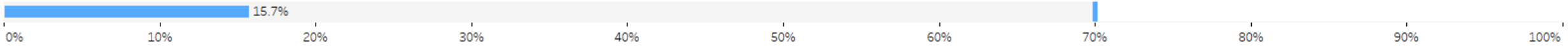
COVID-19 Vaccination Dashboard to Keep an Eye on Equity

SCAN Vaccination Goal: 70% of Members Receiving 1 Dose



Goal = 154,471 members.

Total Doses Administered

53,333

The total number of doses of COVID-19 vaccine administered.

Members Vaccinated

34,691

The total number of members reported to have received at least one dose of the COVID-19 vaccine.

Fully Vaccinated

18,979

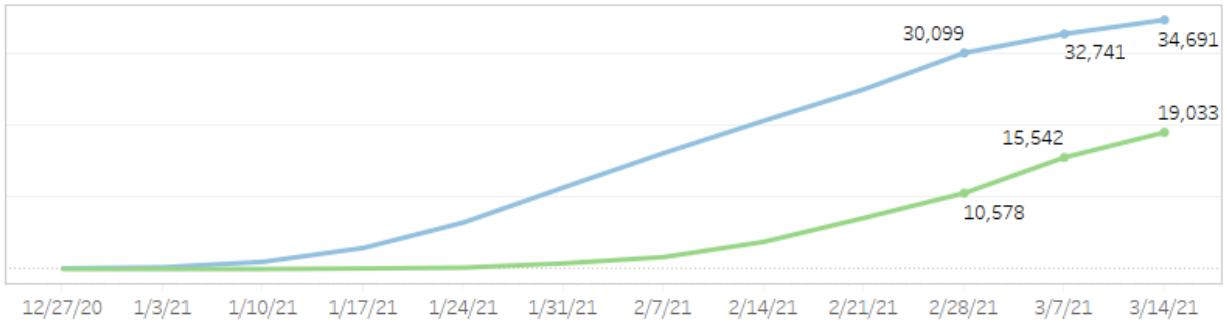
The total number of members reported to be fully vaccinated for COVID-19.

Manufacturer

Pfizer	11,786
Moderna	22,530
Janssen (J&J)	392

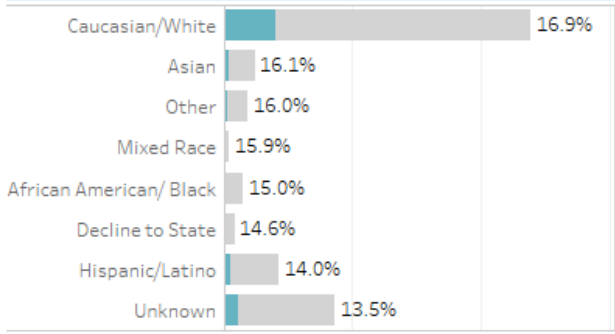
The total number of members to receive the COVID-19 vaccine by manufacturer.

Cumulative Members Vaccinated by Week



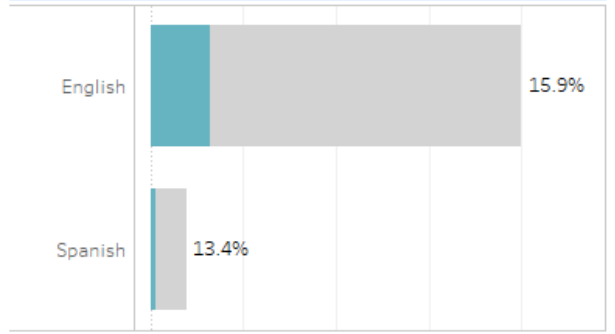
Running total of member vaccinations to date (one dose and fully vaccinated).

% Vaccinated by Race



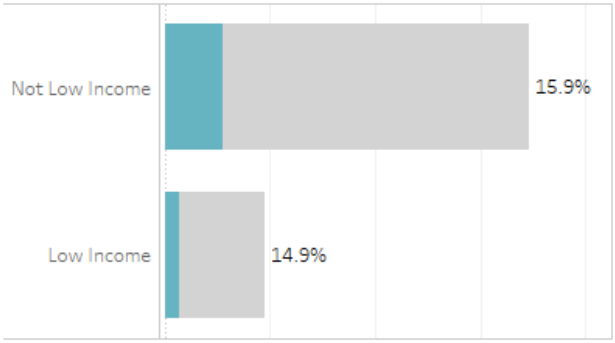
Minimum 500 members in each category.

% Vaccinated by Spoken Language



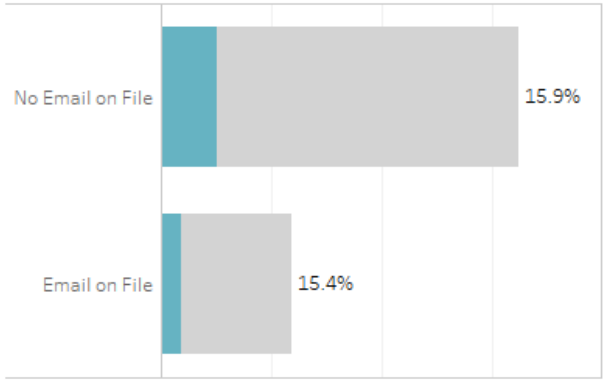
Minimum 500 members in each category.

% Vaccinated by Low Income Status

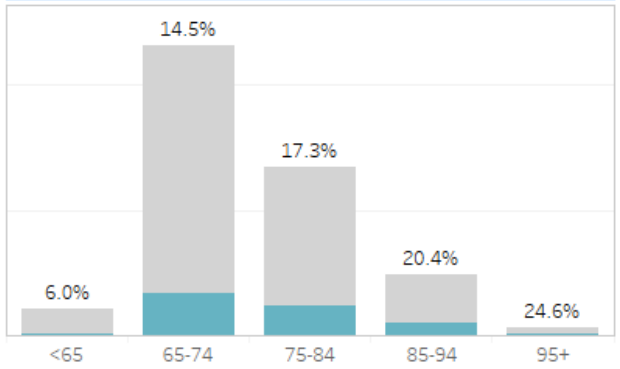


Defined as having a low income cost sharing (LICS) indicator.

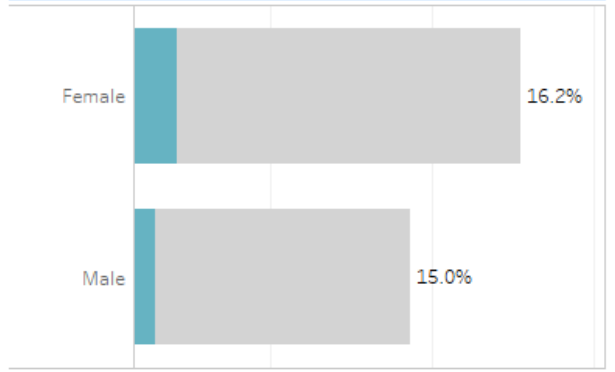
% Vaccinated by Email



% Vaccinated by Age



% Vaccinated by Gender



Moderated Discussion