

Author

David J Corliss, PhD

David J Corliss is the founder and Director of Peace-Work, an all-volunteer cooperative of statisticians, data scientists and other researchers applying analytics to issues in poverty, education and social justice. He is active in the American Statistical Association, serving as vice-chair of the Conference on Statistical Practice and writing a monthly column on Data for Good for Amstat News. He holds a PhD in statistical astrophysics from the University of Toledo and has served as part-time faculty at Wayne State University



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American Statistical Association
Section on Statistics and Data Science Education

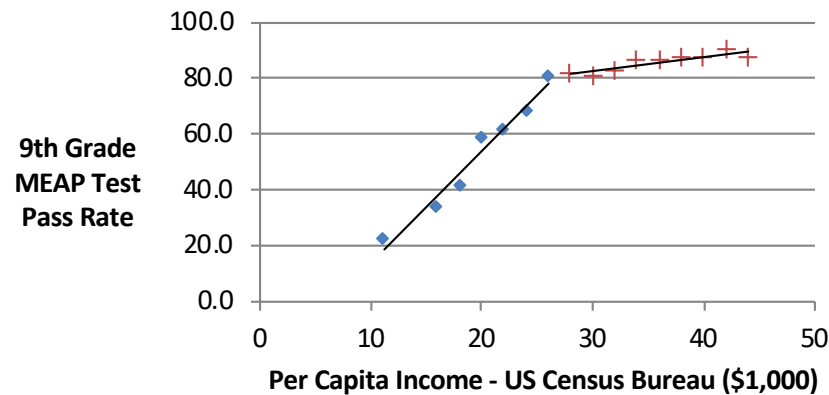
Data Science in Action in Response to the Outbreak of COVID-19

COVID-19: Analytic studies and opportunities outside of epidemiology

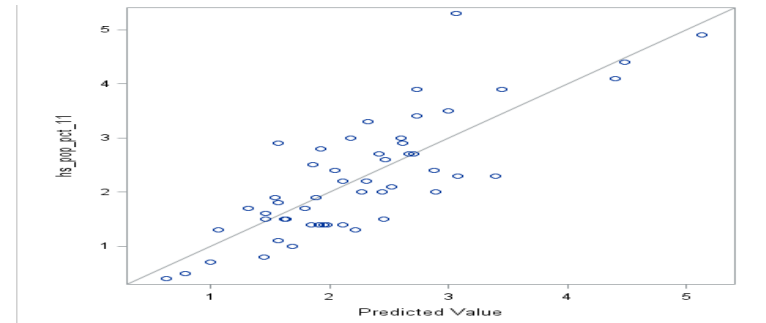
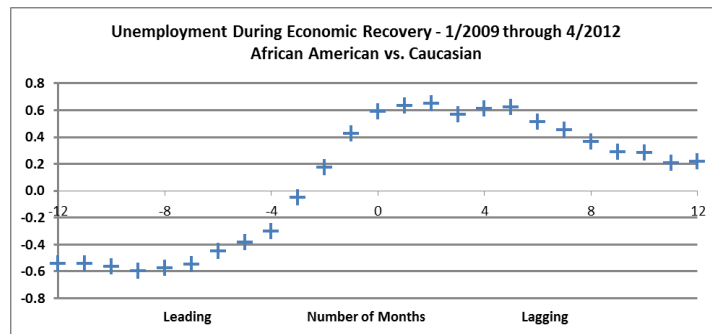
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May 15, 2020

Peace-Work: Statistical Volunteers For A Cause

Poverty and Education



Impact of Racial Bias



Homeless K-12 Students

	Riga	Blissfield
Population	1,439	3,340
% under 18	27.2%	34.2%
Population under 18	391	1,142
% in poverty	5.2%	8.4%
Population in poverty	75	281
% under 18 in poverty	3.3%	10.0%
# under 18 in poverty	13	114
% over 65	14.0%	15.5%
Population over 65	201	518
% over 65 in poverty	6.3%	9.4%
# over 65 in poverty	13	49

Research and Fact-Checking



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Economics: IMF Growth Projections Sharply Down

	2019	2020	2021
World Output	2.9	-3.0	5.8
Advanced Economies	1.7	-6.1	4.5
United States	2.3	-5.9	4.7
Euro Area	1.2	-7.5	4.7
Germany	0.6	-7.0	5.2
France	1.3	-7.2	4.5
Italy	0.3	-9.1	4.8
Spain	2.0	-8.0	4.3
Japan	0.7	-5.2	3.0
United Kingdom	1.4	-6.5	4.0
Canada	1.6	-6.2	4.2
Other Advanced Economies	1.7	-4.6	4.5
Emerging Markets and Developing Economies	3.7	-1.0	6.6
Emerging and Developing Asia	5.5	1.0	8.5

	2019	2020	2021
China	6.1	1.2	9.2
India	4.2	1.9	7.4
ASEAN-5	4.8	-0.6	7.8
Emerging and Developing Europe	2.1	-5.2	4.2
Russia	1.3	-5.5	3.5
Latin America and the Caribbean	0.1	-5.2	3.4
Brazil	1.1	-5.3	2.9
Mexico	-0.1	-6.6	3.0
Middle East and Central Asia	1.2	-2.8	4.0
Saudi Arabia	0.3	-2.3	2.9
Sub-Saharan Africa	3.1	-1.6	4.1
Nigeria	2.2	-3.4	2.4
South Africa	0.2	-5.8	4.0
Low-Income Developing Countries	5.1	0.4	5.6

“The COVID-19 Pandemic will severely impact growth across all regions”

IMF, World Economic Outlook, April 2020



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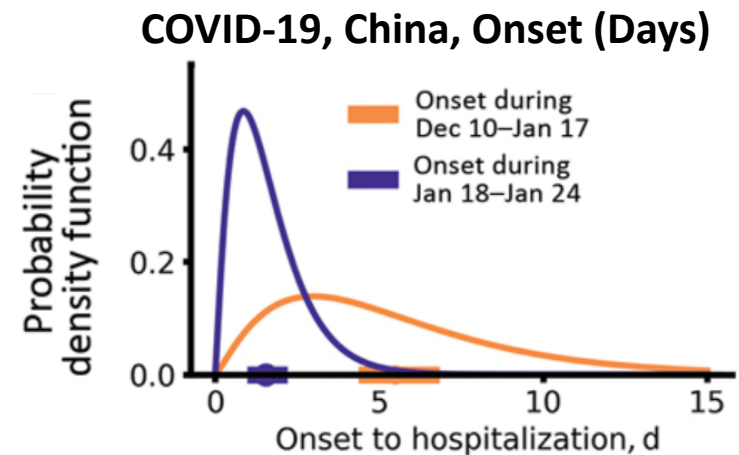
Public Policy Research and Recommendations

“Our results suggest that a combination of control measures, including early and active surveillance, quarantine, and especially strong social distancing efforts, are needed to slow down or stop the spread of the virus.”

“If these measures are not implemented early and strongly, the virus has the potential to spread rapidly and infect a large fraction of the population, overwhelming healthcare systems.”



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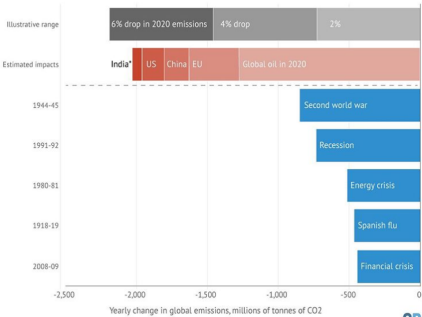
US Center for Disease Control

Sanche S. et al., Los Alamos National

Laboratory, 4/6/2020

Environmental Research

Coronavirus could trigger the **largest ever annual fall** in CO2 emissions
Pre-crisis GDP estimates suggested CO2 would rise by more than 1% in 2020 (470MtCO2)



COVID-19

WWII

1991 Recession

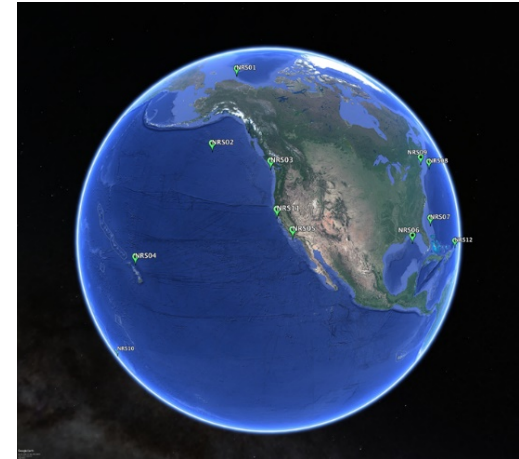
1980 Energy Crisis

1918 Flu Pandemic

Great Recession

Greater Reduction in CO2 than previous economic events (Simon Evans, CarbonBrief)

Ocean Noise During COVID-19
(NOAA/NPS)



Coral Reefs: less travel means less support from divers
(Coral Reef Alliance, www.coral.org)



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Human Rights Analytics: Disproportionate Impact

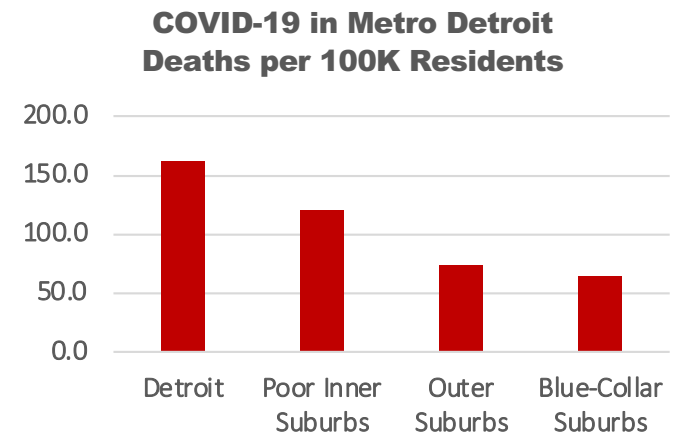
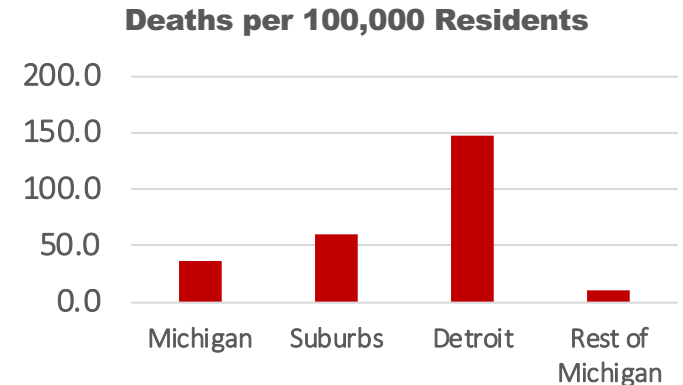
- Marginalized communities hit very hard (Again)
- Fatalities correlated to % below poverty line (0.876) and % non-white population (0.879)

Persons of Color are more likely to

- Be poor
- Work in “Essential” jobs
- Can’t work from home
- Lack health insurance, less on-going care
- Live and work in polluted environments
- Poor diet, live in Food Deserts

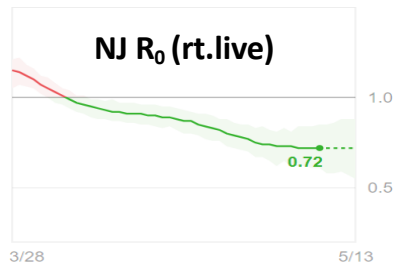


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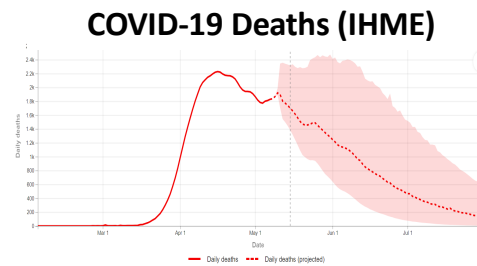


COVID-19 Impact on Statistics Education

Evolution of the COVID-19 Pandemic



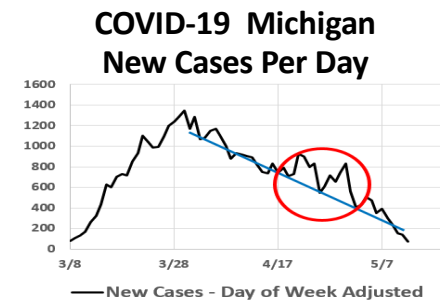
Replication Rate: R_0



Prediction Interval



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Surge

New Technology Development During COVID-19 Pandemic

COVID-19 Pneumonia Detection

<https://www.news-medical.net/news/20200409/Ai-used-to-detect-COVID-19-pneumonia.aspx>

AI Impact on Call Center Operations

<https://www.technologyreview.com/2020/05/14/1001716/ai-chatbots-take-call-center-jobs-during-coronavirus-pandemic/>

Evaluating the effects of countermeasures to epidemics before deployment

<https://www.sciencedaily.com/releases/2020/03/200325110855.htm>

AI detection of COVID-19 from self-reported data without virus testing

<https://www.nature.com/articles/s41591-020-0916-2>



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Summary

Research in response to COVID-19 is much more than medical:

- Economic analysis of global, regional, local, and industry-specific impacts
- Environmental impacts, for both short- and long-term changes
- Policy analysis for data-driven decision making
- Sociological research on the effects on society and how we live
- Human Rights – disproportional impact on marginalized populations
- Survey design and analysis, especially small populations and local studies
- In education, using the pandemic as a laboratory for teaching statistics



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References

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COVID-19 Deaths, IHME, downloaded 5/14/2020 <https://covid19.healthdata.org/united-states-of-america>

National Education Association, COVID-19 Teaching Resources <http://neatoday.org/2020/04/22/teaching-about-coronavirus/>

D. Vergano, Coronavirus and Black Americans, May 2020, Buzzfeed, Data: Bureau of Labor Statistics

Rt: Effective Reproduction Number, rt.live, downloaded 5/14/2020 <https://rt.live/>

Google Trends, Search Term “COVID-19”, downloaded 5/14/2020 <https://trends.google.com/trends/explore?date=today%203-m&geo=US&q=COVID-19>

Michigan DHHS, COVID-19 Data https://www.michigan.gov/coronavirus/0,9753,7-406-98163_98173---,00.html

Coral Reef Alliance, Coral Conservation in a COVID-19 World <https://coral.org/blog/coral-meeting-challenges-of-a-covid-world/>

Simon Evans, Analysis: Coronavirus, Carbonbrief, April 2020

Covid-19 Crisis Illustrates Need for Solid AI/ML Strategy, G. Drenik & J. Robinson, Forbes, 4/15/2020



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Questions



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