

COVID-19: What Have We Learned?

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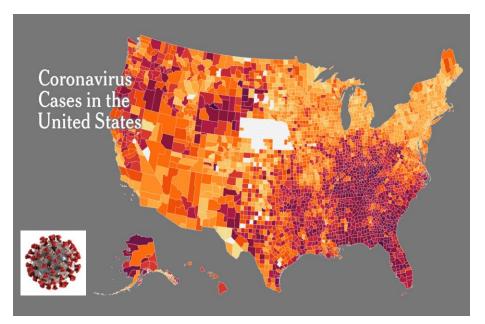
Speaker Bureau: Gilead Sciences, Clinical Area-HCV

Speaker Bureau: Intercept, Clinical Area-PBC

Consultant: Intercept Pharmaceuticals, Clinical Area- PBC Consultant: AbbVie, Clinical Area- HCV

COVID Is Real

- Global
 - Infections: 271,558,771
 - Deaths: 4,517,240
- United States
 - Infections: 38,923,013
 - Deaths: 634,320



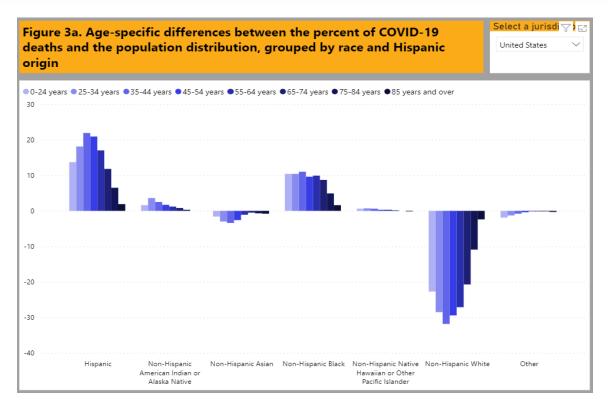
https://covid19.who.int/region/amro/country/us accessed 9/02/2021. Photo credit: New York Times, accessed 9/02/2021

COVID Care Costs

- Projected \$202.6 billion lost revenue to US hospitals and health systems
- Projected global growth will shrink by 8%
- UN projects global economic cost of \$2 trillion

Kaye, Alan D, et al. *Clinical Anaesthesiology.* 17 Nov. 2020; Satiani, Bhagwan, and Carolyn A Davis, *Journal of vascular surgery.* vol. 72,6 (2020): 1856-1863; Colenda, Christopher C et al. *Academic medicine: journal of the Association of American Medical Colleges.* vol. 95,8 (2020): 1143-1145.

COVID Highlights Healthcare Disparities



https://www.cdc.gov/nchs/nvss/vsrr/covid19/health_disparities.htm#RaceHispanicOriginAge.

COVID Disproportionately Impacts BIPOC

Rate ratios compared to White, Non- Hispanic persons	American Indian or Alaska Native, Non-Hispanic persons	Asian, Non- Hispanic persons	Black or African American, Non- Hispanic persons	Hispanic or Latino persons
Cases	1.7x	0.7x	1.1x	1.9x
Hospitalization	3.4x	1.0x	2.8x	2.8x
Death	2.4x	1.0x	2.0x	2.3x

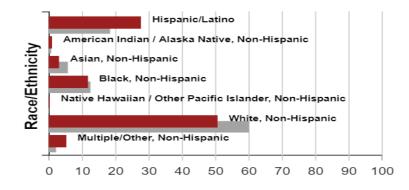
BIPOC: Black, Indigenous People of Color

https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html.

COVID-19 Cases and Deaths by Race/Ethnicity

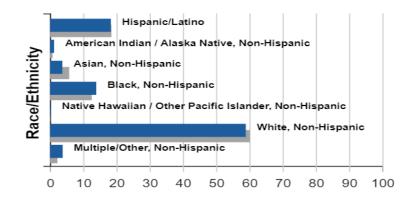
Cases by Race/Ethnicity:

Data from 31,349,273 cases. Race/Ethnicity was available for 20,193,105 (64%) cases.



Deaths by Race/Ethnicity:

Data from 530,922 deaths. Race/Ethnicity was available for 443,938 (83%) deaths.



Percentage of Deaths, All Age Groups

Percentage of the US Population , All Age Groups

https://covid.cdc.gov/covid-data-tracker/#demographics, accessed 9/4/2021

Percentage of Cases, All Age Groups

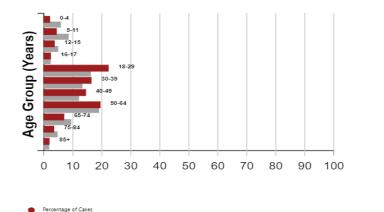
Percentage of the US Population . All Age Groups

COVID-19 Cases and Death by Age Group

Cases by Age Group:

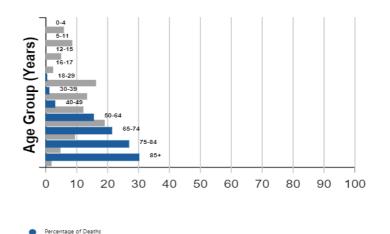
Percentage of the US Population

Data from 31,349,273 cases. Age group was available for 31,017,756 (98%) cases.



Deaths by Age Group:

Data from 530,922 deaths. Age group was available for 530,871 (99%) deaths.



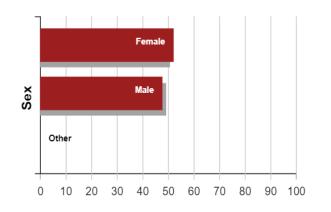
https://covid.cdc.gov/covid-data-tracker/#demographics, accessed 9/4/2021

Percentage of the US Population

COVID-19 Cases and Death by Sex

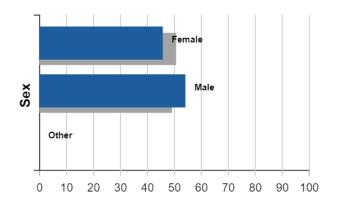
Cases by Sex:

Data from 31,349,273 cases. Sex was available for 30,992,193 (98%) cases.



Deaths by Sex:

Data from 530,922 deaths. Sex was available for 529,722 (99%) deaths.



Percentage of Deaths, All Age Groups

Percentage of the US Population , All Age Groups

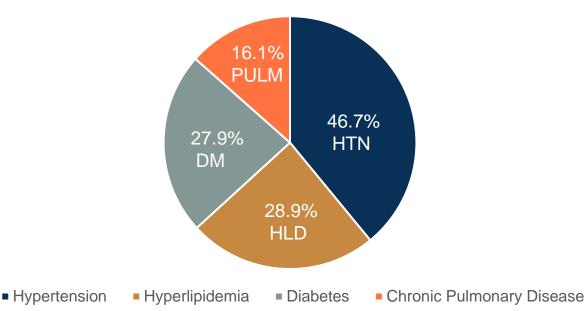
Percentage of Cases, All Age Groups

Percentage of the US Population , All Age Groups

https://covid.cdc.gov/covid-data-tracker/#demographics, accessed 9/4/2021

Underlying Medical Conditions Associated with High Risk for Severe COVID-19

Most Common Comorbidities

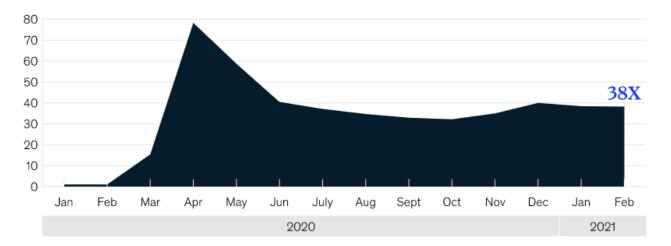


https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/underlyingconditions.html

Telehealth to the Rescue?

• CMS eliminated restrictions and enhanced reimbursement for telehealth March 6, 2020

Telehealth claims volumes, compared to pre-Covid-19 levels (February 2020 = 1)¹



https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality#.

Telehealth Disparities

- 4/10 adults without internet in their home
- 3/10 adults earning \$30,000 or less do not own smartphone
- Adults over 65 owning smart phone or home broadband= 55-60%
- Rural broadband access= 63%
- BIPOC broadband access= 61-66%
- Approximately 14.5 million in US without internet access

https://www.pewresearch.org/fact-tank/2021/06/22/digital-divide-persists-even-as-americans-with-lower-incomes-make-gains-in-tech-adoption/;

https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0123; https://healthpolicy.duke.edu/covid-19-and-rise-telehealth.

COVID Vaccination

- Emergency authorization US:
 - December 11, 2020 Pfizer-BioNTech COVID-19 Vaccine
 - December 18, 2020 Moderna COVID-19 Vaccine
 - February 27, 2021 Janssen COVID-19 Vaccine



https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines.

Vaccine Efficacy

- Pfizer: 93.7% alpha
- Moderna: 94%
- Johnson & Johnson: 64% infection prevention
- Nearly 100% prevention of severe illness and hospitalization



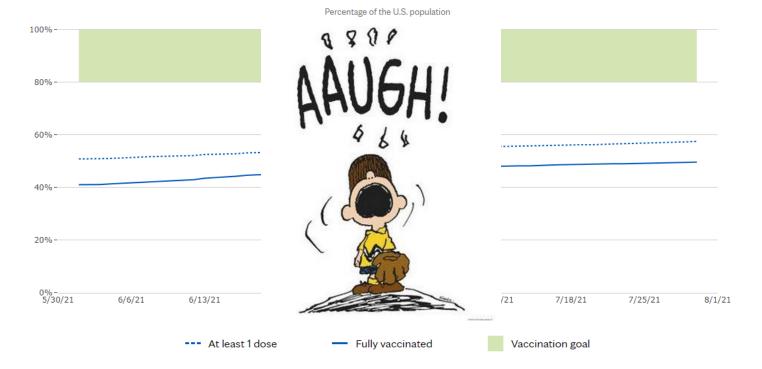
Lopez Bernal et al. N Engl J Med. 2021 Jul 21. doi: 10.1056/NEJMoa2108891. Epub ahead of print. PMID: 34289274.

Vaccine Efficacy-Delta Variant

- Vaccine efficacy is maintained against symptomatic disease caused by Delta
- Observational data suggests there may be reduced efficacy against all infection with Delta, as low as 50-67%
 - Short timeframes
 - Difficult to control for confounding
 - Positive PCR without clinical symptoms may not be meaningful

Fowlkes, MMWR, 2021; Nanduri, MMWR, 2021

Vaccine Uptake Lags



https://www.mayoclinic.org/coronavirus-covid-19/vaccine-tracker accessed 7/31/2021.

Vaccine Safety

- Anaphylaxis: 2-5/1,000,000
- Thrombosis with thrombocytopenia syndrome (TTS)
 - J&J
 - 44 confirmed/14.2 million doses
- Guillain-Barre: J & J, preliminary report of 176
- Myocarditis/pericarditis: mRNA vaccines; 1377 cases reported, 798 confirmed by CDC and FDA
- Deaths: 7218 reports via VAERS over 340 million doses = 0.0020%

https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety/adverse-events.html accessed 9/2/2021.

Recommended Therapies for COVID-19

Out-Patient

- Monoclonal antibodies
 - Casirivimab-Imdevimab
 - Sotrovimab

Not Recommended:

Hydroxychloroquine Azithromycin Ivermectin Vitamin D Convalescent plasma

Beigal, NEJM, 2020; Kalil, NEJM, 2021; Marconi, Lancet Respir Med, 2021; RECOVERY, NEJM, 2021; RECOVERY, Lancet, 2021

In-Patient

- Remdesivir
 - Antiviral, inhibits replication
- Dexamethasone
 - Corticosteroid, reduces imflammatory response
- Tocilizumab (alt. Baricitinib)
 - Anti-IL6 monoclonal antibody with additive antiinflammatory activity

COVID Lessons

- COVID is real
- COVID is costly
- COVID vaccines are safe and effective
- COVID vaccine uptake needs to improve
- Telehealth can happen
- COVID highlights disparities