COVID-19: A REVIEW OF THE RESEARCH II

HEALTHY ADVENTURES FOUNDATION'S BACKGROUND AND MISSION

- Non-profit, specializing in health and wellness programming and development for communities, organizations, groups, and individuals for seniors, adults, employees, and children
- We seek to improve quality of life, while seeking balance in healthy behaviors.
- We manage the employee wellness programs for school districts, non-profits, and for profit organizations.
- We offer community-based programming through the libraries, senior centers and programs, low-income housing units, and youth-focused centers.
- We also run the recreational youth wellness programs for Polinsky Childrens Center, high-risk after school programs and school-based and library based after-school programs.

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WENDY HILEMAN'S BACKGROUND

- CEO / CFO Healthy Adventures Foundation
- Education
  - Ph.D. Organizational Psychology
  - MPH Public Health
  - MSW Social Work
  - MS Organizational Psychology
  - BS Physical Education, Athletic Training
  - AS Intelligence Collections
- Part-time professor and adjunct lecturer at colleges/universities
- US Air Force Veteran

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AGENDA

- COVID-19: the basics
- Variants
- Current trends
- Health disparity trends
- Prevention: Vaccinations
- Vaccine Mandates
- Overcoming vaccine hesitancy
- COVID Complications
- Promising treatments

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The Basics

COVID-19

WHAT IS COVID-19?

- Coronavirus disease 2019 (COVID-19), caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a serious disease that has resulted in widespread global morbidity and mortality (Dan, et al 2020).
- COVID-19 spreads more easily than flu and can cause more serious illnesses in some people (CDC, 2020). It has about double the mortality rates as a normal flu virus.
- Origin is still unknown.

References:

CDC (May 2020). Symptoms of Corona Virus. Retrieved from: https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

Dan. JM, Mateus, J. Kato, Y, Hastie, KM, Faliti, CE, Ramirez, SI, Frazier, A, Yu, ED, Grifoni, A, Rawlings, SA, Peters, B, Krammer, F, Simon, V, Saphire, EO, Smith, DM, Weiskopf, D, Sette, A, Crotty, S (2020). Immunological memory to SARS-CoV-2 assessed for greater than six months after infection. Retrieved from: https://www.biorxiv.org/content/10.1101/2020.11.15.383323v1.full.pdf

THE RANGE OF CORONAVIRUSES

- Human coronaviruses were first identified in the mid-1960s.
- So far, there are seven coronaviruses that can infect people, including the common cold.
- A few can also be spread from animals to humans and vice versa.

Reference:

National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases (February 15, 2020)

RE-INFECTION RATES

- Common colds can be from a human corona virus. Immunity generally lasts about 6 months (NCIRD, 2020; Weintraub, 2020).
- 35 year study found that immunity for Corona Virus' is short-lived (Edridge, Kaczorowska, Hoste, *et al.* 2020). Re-infection rates range from 6 months – 8 years and 9 months. The most common reinfection is within 1 year.

Reference:

National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases (February 15, 2020)

Karen Weintraub (November 10, 2020). There may be a COVID-19 vaccine by the end of the year, but 'normality' may not come until end of 2021. USA TODAY – Health. Retrieved from: https://www.usatoday.com/story/news/health/2020/11/10/covid-19-vaccine-willingness-needed-to-end-pandemic/3516649001/

Edridge, A.W.D., Kaczorowska, J., Hoste, A.C.R. *et al.* Seasonal coronavirus protective immunity is short-lasting. *Nat Med* **26,** 1691–1693 (2020). https://doi.org/10.1038/s41591-020-1083-1

SLOWER RECOVERY

- With COVID-19, 65% of the cases are back to usual health within 2-3 weeks (Tenforde, et al 2020).
- With the flu, it is 90% within 2 weeks (Petrie, Cheng, Malosh, et al, 2016).

Reference:

Tenforde, MW, Kim, SS, Lindsell, CJ, Rose, DB, Shapiro, NI, Files, DC, Gibbs, KW, Erickson, HL, Steingrub, JS, Smithline, HA, Gong, MN, Aboodi, MS, Exline, MCm Henning, DJ, Wilson, JG, Khan, A, Qadir, N, Brown, SM, Peltan, ID, Rice, TW, Hager, DN, Ginde, AA, Stubblefield, WB, Patel, MM, Self, WH, Feldstein, LR, IVY Network Investigators, CDC COVID-19 Response Team (July 31, 2020). Morbidity and Mortality Weekly Report - Symptom Duration and Risk Factors for Delayed Return to Usual Health Among Outpatients with COVID-19 in a Multistate Health Care Systems Network — United States, March–June 2020. US Department of Health and Human Services/Centers for Disease Control and Prevention, 69, 30.

Petrie JG, Cheng C, Malosh RE, et al. (2016). Illness severity and work productivity loss among working adults with medically attended acute respiratory illnesses: US Influenza Vaccine Effectiveness Network 2012–2013. Clin Infect Disease, 62:448–55

VARIANTS

COVID-19 VARIANTS

- The variant classifications defines four classes of SARS-CoV-2 variants:
  - Variant Being Monitored (VBM)
  - Variant of Interest (VOI)
  - Variant of Concern (VOC)
  - Variant of High Consequence (VOHC)

References:

CDC (Oct. 4, 2021). SARS-CoV-2 Variant Classifications and Definitions. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/variants/variant-info.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcases-updates%2Fvariant-surveillance%2Fvariant-info.html.

COVID-19 VARIANTS

- Variant Being Monitored (VBM)
  - Alpha (B.1.1.7 and Q lineages) – this is the original variant in the US
  - Beta (B.1.351 and descendent lineages)
  - Gamma (P.1 and descendent lineages)
  - Epsilon (B.1.427 and B.1.429)
  - Eta (B.1.525)
  - Iota (B.1.526)
  - Kappa (B.1.617.1)
  - 1.617.3
  - Mu (B.1.621, B.1.621.1)
  - Zeta (P.2)

References:

CDC (Oct. 4, 2021). SARS-CoV-2 Variant Classifications and Definitions. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/variants/variant-info.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcases-updates%2Fvariant-surveillance%2Fvariant-info.html.

COVID-19 VARIANTS: MU

- Los Angeles Public Health has identified 167 Mu variants in L.A. County between June 19 and Augusts 21, with the majority of Mu specimens sequenced in July.
- Mu was first identified in Colombia in January 2021 and has since been reported in 39 countries. The World Health Organization labelled variant Mu, lineage B.1.621, as a variant of interest on August 30, 2021. The Mu variant is found to have key mutations linked to greater transmissibility and the potential to evade antibodies.

References:

Public Health – LA County (September 03, 2021). Public Health Continues Monitoring COVID-19 Variants - 37 New Deaths and 2,673 New Confirmed Cases of COVID-19 in Los Angeles County. Retreived from http://publichealth.lacounty.gov/phcommon/public/media/mediapubhpdetail.cfm?prid=3359.

COVID-19 VARIANTS

- Variant of Interest (VOI)
  - To date, no variants of interest identified in the United States.
- Variant of Concern (VOC)
  - Delta (B.1.617.2 and AY lineages)
- Variant of High Consequence (VOHC)
  - To date, no variants of high consequence have been identified in the United States.

References:

CDC (Oct. 4, 2021). SARS-CoV-2 Variant Classifications and Definitions. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/variants/variant-info.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcases-updates%2Fvariant-surveillance%2Fvariant-info.html.

COVID-19 VARIANTS: DELTA

- The Delta variant causes more infections and spreads faster than early forms of SARS-CoV-2.
- The Delta variant is highly contagious, more than 2x as contagious as previous variants.
- Some data suggest the Delta variant might cause more severe illness than previous variants in unvaccinated people. In two different studies from Canada and Scotland, patients infected with the Delta variant were more likely to be hospitalized than patients infected with Alpha (original virus that causes COVID-19).

References:

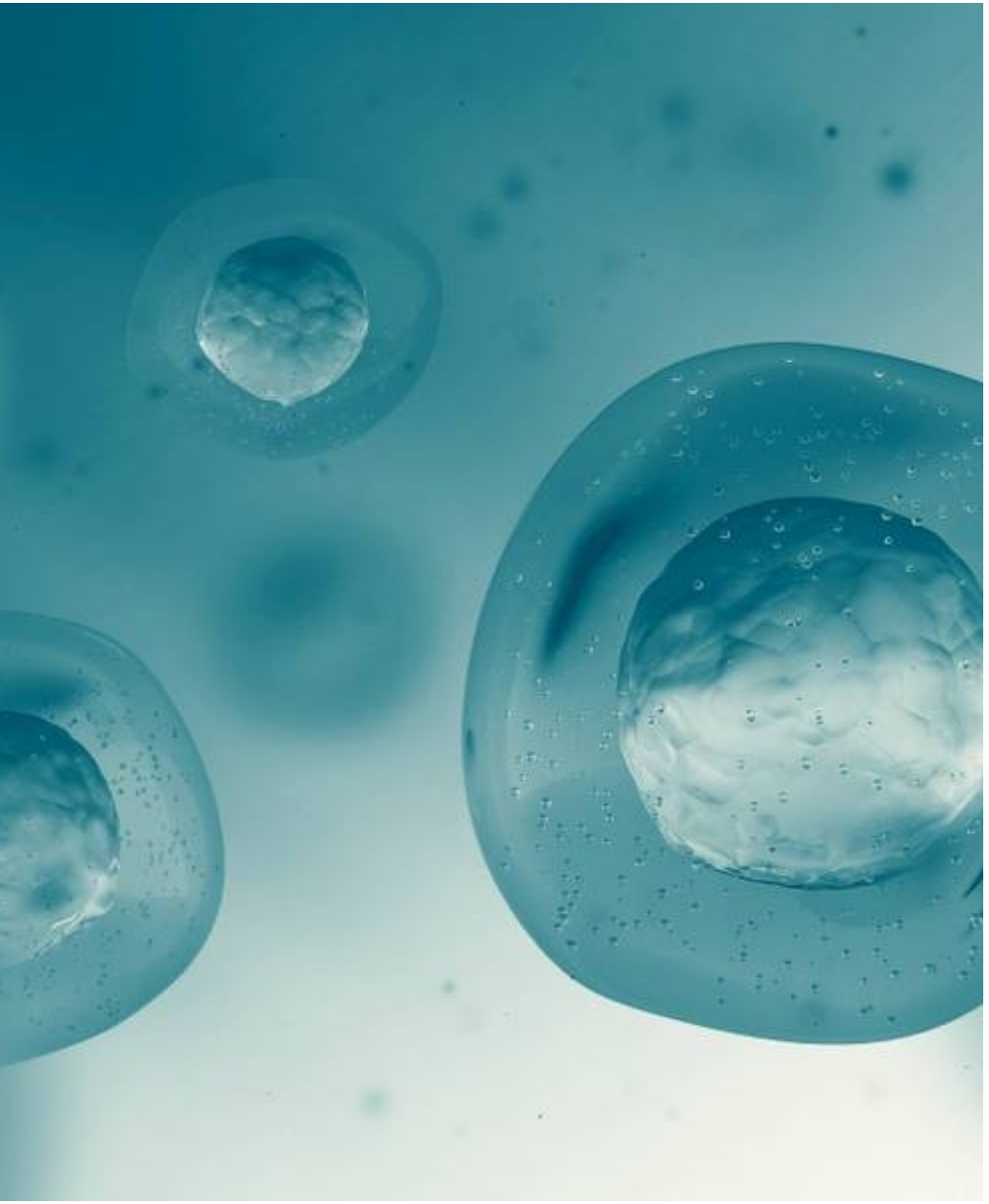
- CDC (August 26, 2021). Delta Variant: What We Know About the Science. Retrieved from cdc.gov/coronavirus/2019-ncov/variants/delta-variant.html?s_cid=11512:delta%20variant:sem.ga:p:RG:GM:gen:PTN:FY21.

COVID-19 VARIANTS: DELTA

- For prior variants, lower amounts of viral genetic material were found in samples taken from fully vaccinated people who had breakthrough infections than from unvaccinated people with COVID-19. For people infected with the Delta variant, similar amounts of viral genetic material have been found among both unvaccinated and fully vaccinated people. However, like prior variants, the amount of viral genetic material may go down faster in fully vaccinated people when compared to unvaccinated people. This means fully vaccinated people will likely spread the virus for less time than unvaccinated people.
- DELTA variant is now 99% of the cases in the US.

References:

- CDC (August 26, 2021). Delta Variant: What We Know About the Science. Retrieved from cdc.gov/coronavirus/2019-ncov/variants/delta-variant.html?s_cid=11512:delta%20variant:sem.ga:p:RG:GM:gen:PTN:FY21.
- CDC (October 30, 2021), Variant Proportions. Retreived from https://covid.cdc.gov/covid-data-tracker/#variant-proportions.



CURRENT TRENDS

COVID-19 MORBIDITY AND MORTALITY TOTALS

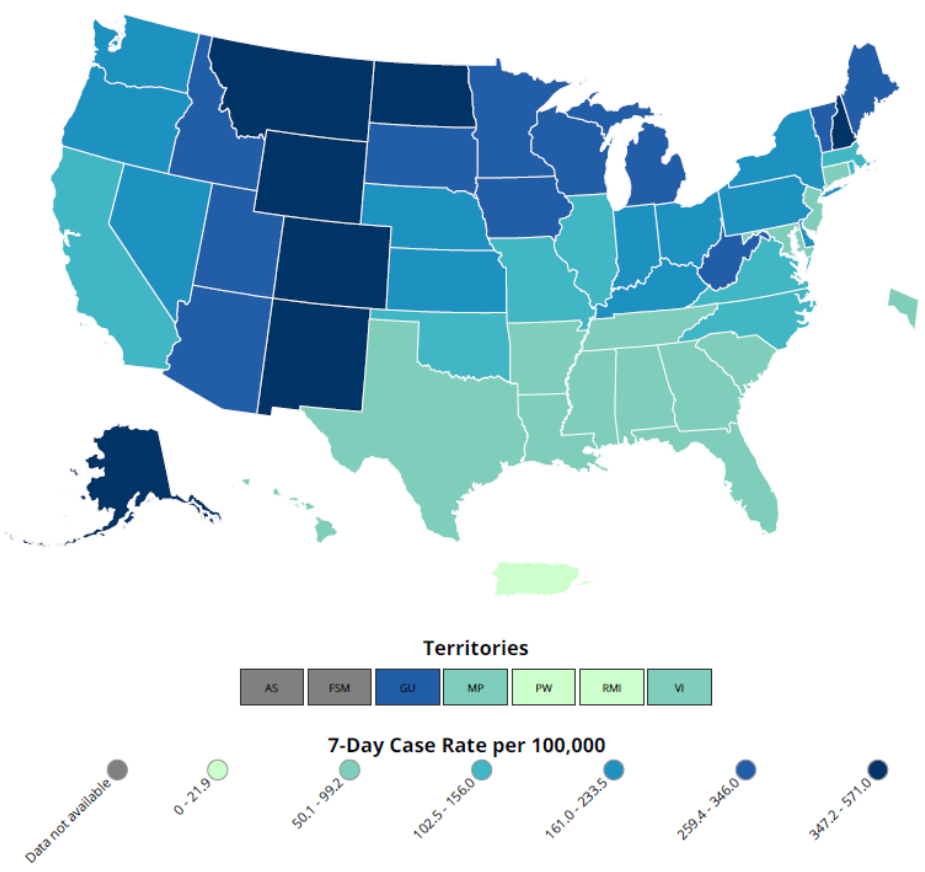
- California has confirmed a total of 4,688,285 COVID-19 cases and 71,852 deaths. **2.6%** test positivity in California, as of November 7, 2021.
- The United States has confirmed a total of 47,336,577 COVID-19 cases and 775,218 deaths. 14.5% test positivity in the US, as of November (OurWorldinData.org, November 1, 2021).
- The world has confirmed a total of 250,750,780 COVID-19 cases and 5,067,615 deaths.

Worldmeter COVID Cases (November 7, 2021). Retrieved from: https://www.worldometers.info/coronavirus/usa/california/
Worldmeter COVID Cases (November 7, 2021). Retrieved from: https://www.worldometers.info/coronavirus
OurWorldinData (November 1, 2021). Retrieved from https://ourworldindata.org/coronavirus-testing

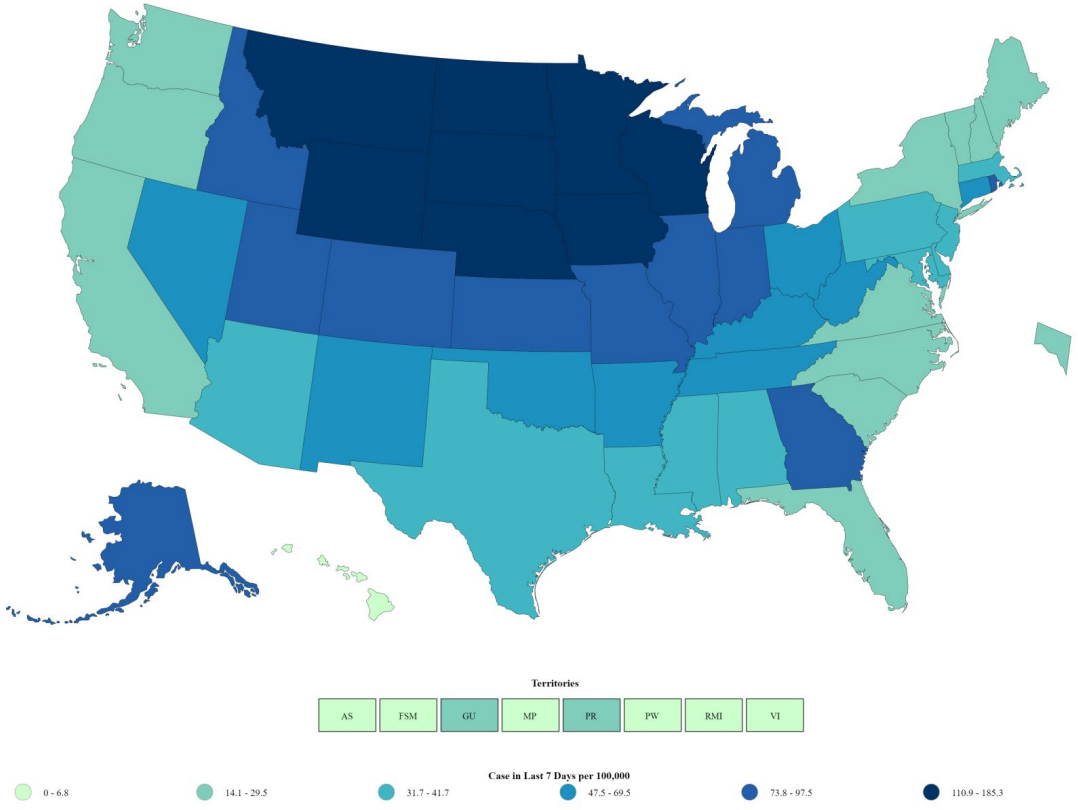
US 7-DAY TRENDS NOW FROM LAST YEAR

CDC COVID Tracker (November 8, 2021). Retrieved from: https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days
Worldmeter COVID Cases (November 7, 2021). Retrieved from: https://www.worldometers.info/coronavirus/usa/california/

CDC COVID Data Tracker



November 8, 2021



November 18, 2020

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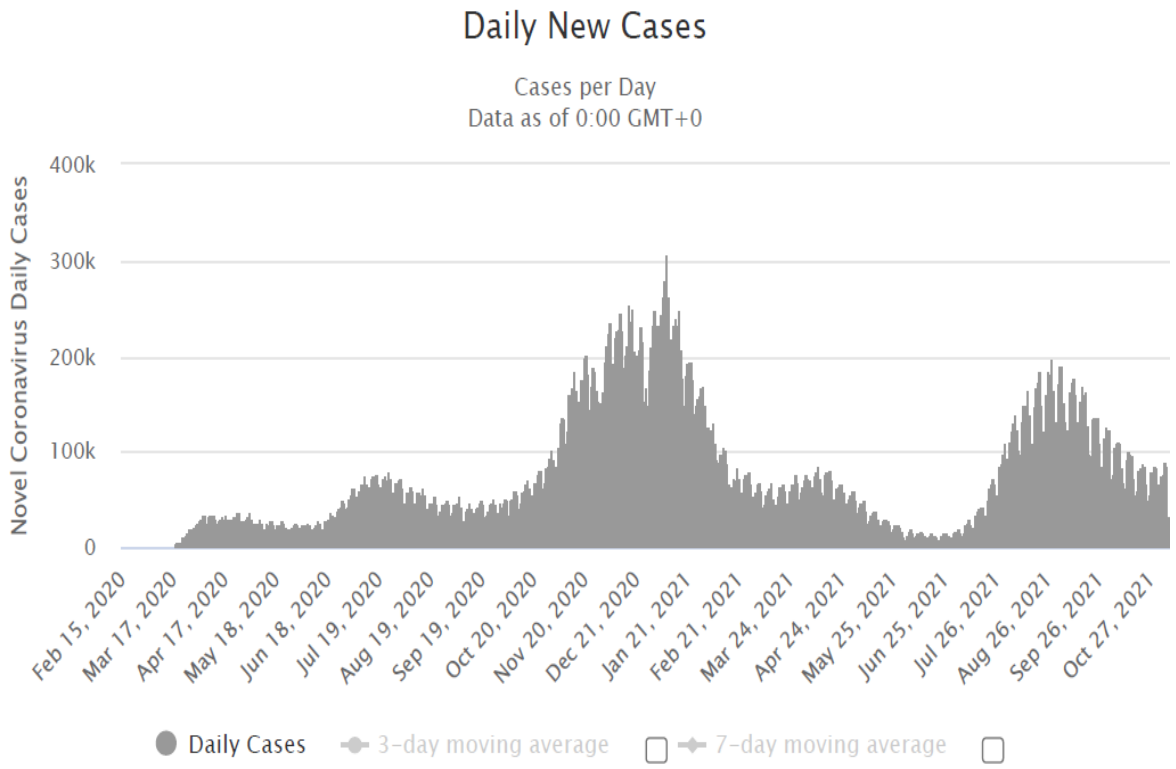
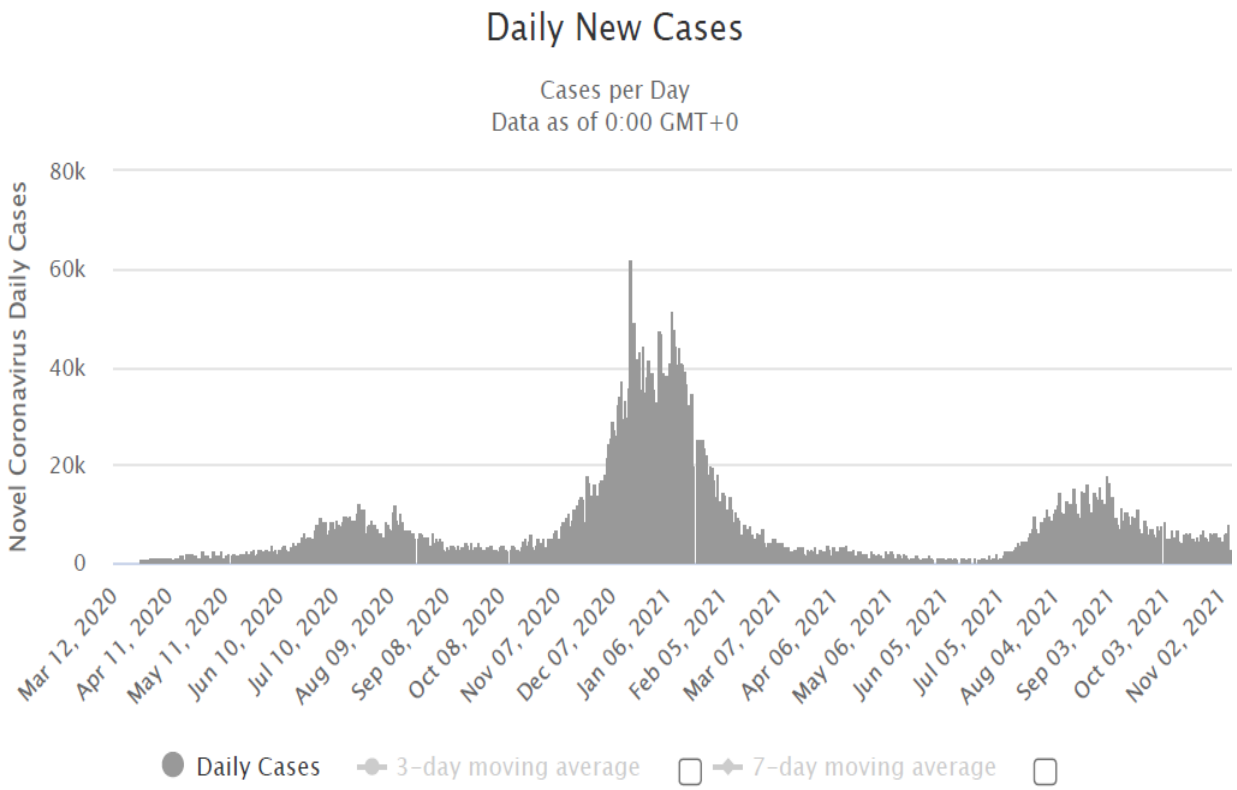
DAILY NEW CASES: US VS CA CASES DROPPING OVERALL

Daily New Cases in the United States



Daily New Cases in California



Worldmeter COVID Cases (November 7, 2021). Retrieved from: https://www.worldometers.info/coronavirus/usa/california/

CA OUTBREAKS IN 2021 (AS OF OCTOBER 18, 2021)

- Among outbreaks that began in 2021, the most common outbreak settings were:
  - Residential care facilities (20.2%)
  - Elementary and secondary schools (12.3%)
  - Skilled nursing facilities (9.9%)
  - Restaurants (5.5%)
  - Child day care services (4.0%)
  - Public safety, including police, fire, and correctional institutions (3.4%)
  - Community services, including homeless shelters (2.8%)
  - Construction (2.7%)
  - Hospitals (2.4%)
  - Grocery stores (2.1%)

References:

- California Department of Public Health (October 27, 2021). COVID-19 Outbreak Data. Retrieved from https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/COVID-19/COVID-19-Outbreak-Data.aspx.

COVID-19 CASES IN CHILDREN

- Between February 2020 and March 2021, CDC estimates 27 million infections occurred in U.S. children under 18 years of age — ten times higher than the cumulative reported case incidence.
- Approximately 20% of all U.S. COVID-19 cases diagnosed in spring and summer 2021 have been in children, a percentage similar to their proportion of the overall population, according to a report by the Children's Hospital Association and the American Academy of Pediatrics.
- The report also notes that after the early summer of 2021 saw a decline in U.S. pediatric case rates, there was a 20-fold rise in pediatric cases between June and August, reaching over 180,000 new cases per week.

Resources:

COVID-19 Realtime Learning Network (September 10, 2021). Pediatrics. Retrieved from https://www.idsociety.org/covid-19-real-time-learning-network/special-populations/pediatrics/

The Basics

HEALTH DISPARITY TRENDS

COVID-19 CASES BY RACE AND ETHNICITY IN CALIFORNIA – ALL AGES

All Cases and Deaths associated with COVID-19 by Race and Ethnicity

Race/Ethnicity	No. Cases	Percent Cases	No. Deaths	Percent Deaths	Percent CA population
Latino	2,009,025	52.9	32,194	45.6	38.9
White	883,621	23.3	22,783	32.3	36.6
Asian	258,711	6.8	8,062	11.4	15.4
African American	191,338	5.0	4,816	6.8	6.0
Multi-Race	61,865	1.6	1,061	1.5	2.2
American Indian or Alaska Native	15,739	0.4	311	0.4	0.5
Native Hawaiian and other Pacific Islander	22,682	0.6	432	0.6	0.3
Other	356,926	9.4	899	1.3	0.0
Total with data	3,799,907	100.0	70,558	100.0	100.0

References:
California Department of Public Health (November 3, 2021). COVID-19 Race and Ethnicity Data. Retrieved from https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/COVID-19/Race-Ethnicity.aspx.

Health Equity Dashboard on www.covid19.ca.gov

COVID-19 CASES BY RACE AND ETHNICITY IN CALIFORNIA – 0-17 YEARS

Proportions of Cases and Deaths by Race and Ethnicity Among Ages 0–17

Race/Ethnicity	No. Cases	Percent Cases	No. Deaths	Percent Deaths	Percent CA Population
Latino	350,518	60.4	18	48.6	47.9
White	98,083	16.9	6	16.2	29.2
Asian	28,413	4.9	4	10.8	12.7
African American	27,002	4.7	5	13.5	5.4
Multi-Race	10,039	1.7	2	5.4	4.0
American Indian	2,576	0.4	0	0.0	0.4
Native Hawaiian and other Pacific Islander	2,773	0.5	1	2.7	0.3
Other	60,977	10.5	1	2.7	0.0
Total	580,381	100.0	37	100.0	100.0

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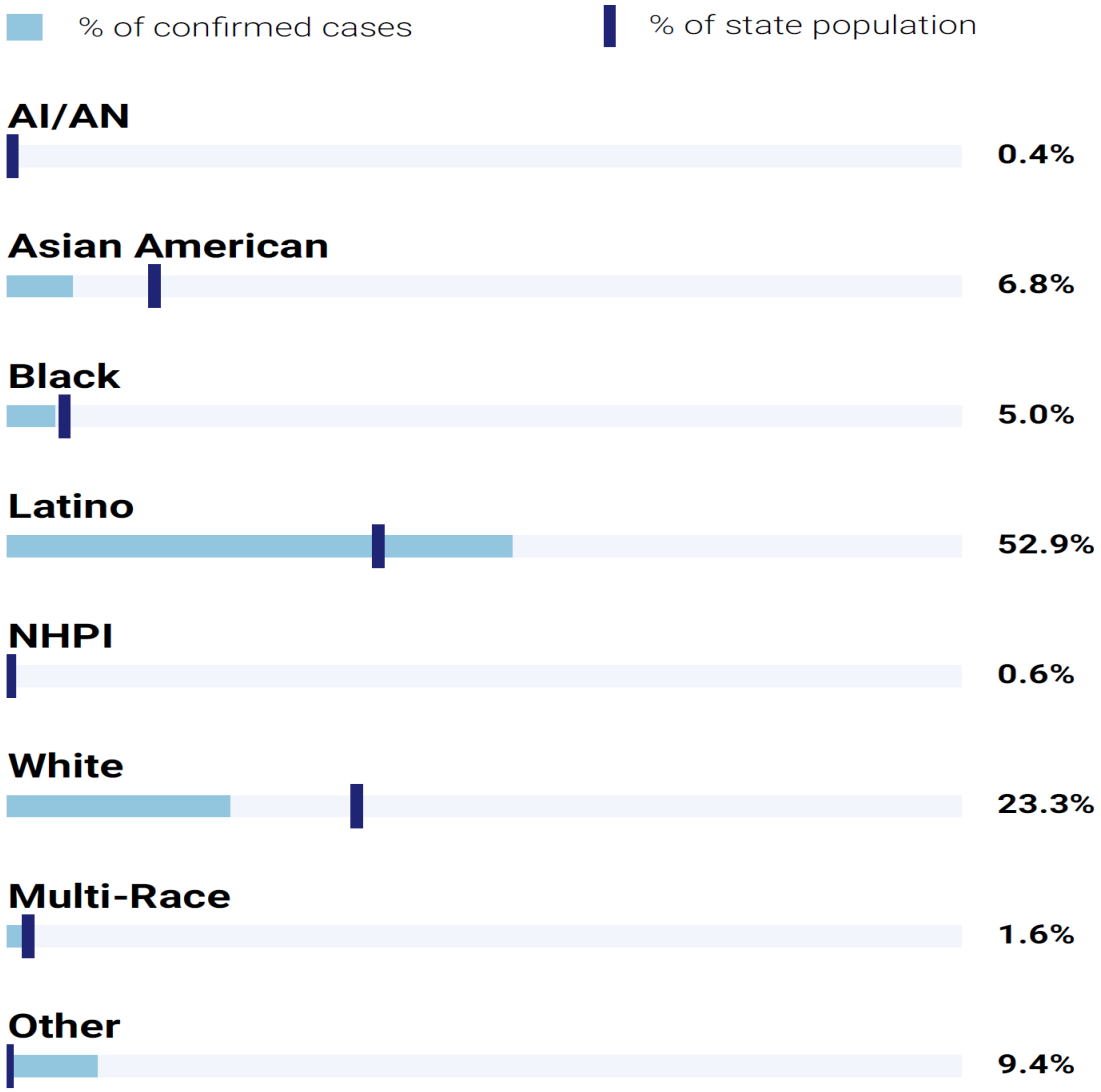
CONFIRMED CASES BY RACE AND ETHNICITY – CALIFORNIA



References:
California All (November 7, 2021). Tracking COVID-19 in California. Retrieved from https://covid19.ca.gov/state-dashboard/#postvax.

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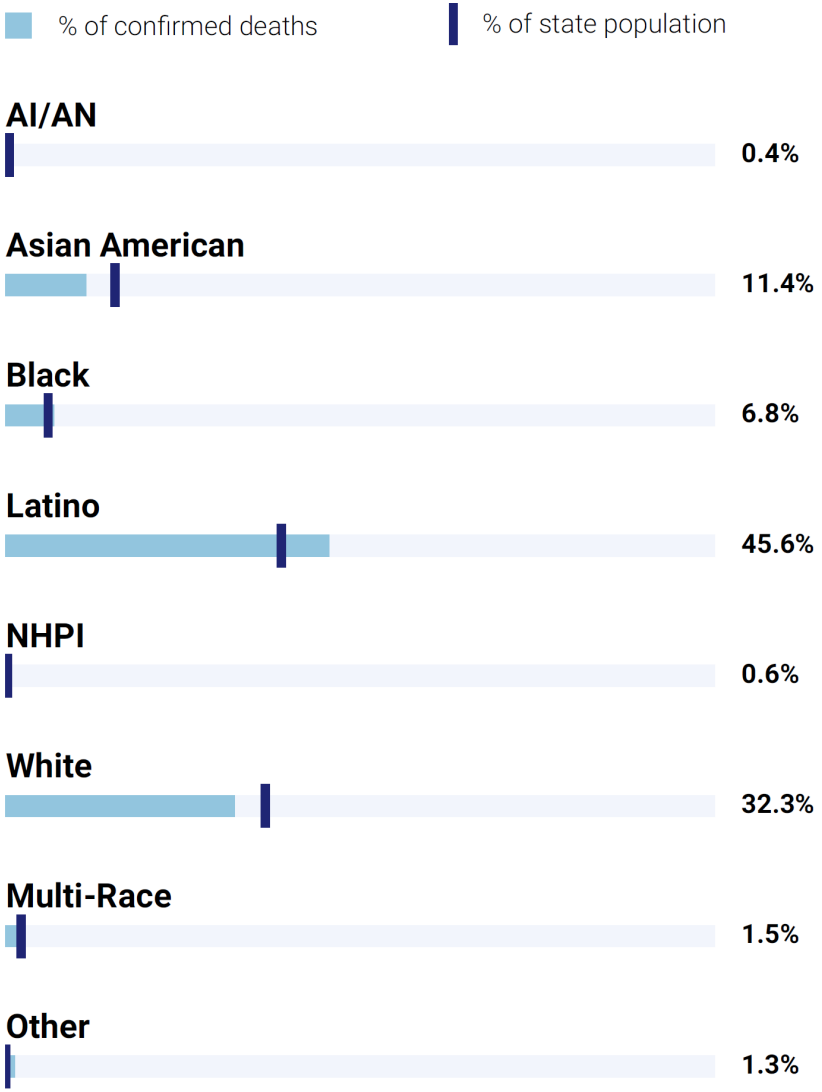
CONFIRMED DEATHS BY RACE AND ETHNICITY – CALIFORNIA



References:
California All (November 7, 2021). Tracking COVID-19 in California. Retrieved from https://covid19.ca.gov/state-dashboard/#postvax.

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PREVENTION: VACCINATIONS

FDA UPDATES ON VACCINES

- On August 12, 2021, the U.S. Food and Drug Administration (FDA) expanded the emergency use authorization for both mRNA vaccines, Pfizer-BioNTech and Moderna, for immunocompromised individuals. This authorization covers people ages 12 and up receiving treatments associated with moderate to severe immune compromise (FDA, August 12, 2021).

References:

California Department of Public Health (November 3, 2021). Get the Facts on COVID-19 Vaccines, Boosters, and Additional Doses

US Food and Drug Administration (November 23, 2021). FDA NEWS RELEASE: FDA Authorizes Booster Dose of Pfizer-BioNTech COVID-19 Vaccine for Certain Populations, Retrieved from https://www.fda.gov/news-events/press-announcements/fda-approves-first-covid-19-vaccine

FDA UPDATES ON VACCINES

- On August 23, 2021, the U.S. Food and Drug Administration (FDA) provides full FDA approval for Pfizer-BioNTech (FDA, August 23, 2021).
- On September 22, 2021, FDA Authorizes Booster Dose of Pfizer-BioNTech COVID-19 Vaccine for Certain Populations
- On September 22, 2021, the U.S. Food and Drug Administration (FDA) provides full FDA approval for Pfizer-BioNTech (FDA, August 23, 2021).

References:

California Department of Public Health (November 3, 2021). Get the Facts on COVID-19 Vaccines, Boosters, and Additional Doses

US Food and Drug Administration (November 23, 2021). FDA NEWS RELEASE: FDA Authorizes Booster Dose of Pfizer-BioNTech COVID-19 Vaccine for Certain Populations, Retrieved from https://www.fda.gov/news-events/press-announcements/fda-approves-first-covid-19-vaccine

FDA UPDATES ON VACCINES

- October 26, 2021, the FDA discussed the agency's actions to expand the use of a single booster dose for COVID-19 vaccines in eligible populations. In addition, the FDA authorized the 11th over-the-counter (OTC) COVID-19 test and is investigating certain imported medical gloves that appear to have been reprocessed, cleaned or recycled and sold as new.
- On October 29, 2021, FDA Authorizes Pfizer-BioNTech COVID-19 Vaccine for Emergency Use in Children 5 through 11 Years of Age.

References:

California Department of Public Health (November 3, 2021). Get the Facts on COVID-19 Vaccines, Boosters, and Additional Doses

US Food and Drug Administration (November 23, 2021). FDA NEWS RELEASE: FDA Approves First COVID-19 Vaccine. Approval Signifies Key Achievement for Public Healthhttps://www.fda.gov/news-events/press-announcements/fda-approves-first-covid-19-vaccine

UPDATES ON VACCINES

- A variety of companies are still developing COVID-19 vaccines and in-process of the approval process.

VACCINATION RATES

- United States – 67.4% of the eligible population (12+) has been vaccinated with at least one dose, 58.4% fully vaccinated, 12.4% booster (CDC, 2021).
- California - 81.1% of the eligible population (12+) has been vaccinated with at least one dose.
- San Diego – 82% of the eligible population (12+) has been vaccinated with at least one dose (HHSA, November 3, 2021).

Reference:

CDC (November 7, 2021). COVID Data Tracker. COVID-19 Vaccinations in the United States. Retreived from https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total.

HHSA – County of San Diego (November 3, 2021). Epidemiology and Immunization Services Branch (EISB) COVID-19 Vaccinations Report - San Diego County Residents Who Received at Least One Dose of COVID-19 Vaccine. Data through 11/2/2021, updated 11/3/2021 8:00 AMRetrieved from https://www.sandiegocounty.gov/content/dam/sdc/hhsa/programs/phs/Epidemiology/COVID-19%20Vaccinations%20Demographics.pdf.

UNVACCINATED RISKS

- Unvaccinated people were 6.8 times more likely to get COVID-19 (data from October 18 to October 24, 2021).
- Unvaccinated people were 9.5 times more likely to be hospitalized with COVID-19 (data from October 11, 2021 to October 17, 2021).
- Unvaccinated people were 18.2 times more likely to die from COVID-19 (data from October 4, 2021 to October 10, 2021).

References:

Tracking COVID-19 in California (November 7, 2021 at 10:00 AM).

MASKS

- Masks still are a deterrent to transmitting and getting the virus.
- Indoor mask usage is still recommended.
- Indoor mask usage is required for health care facilities.

VACCINE MANDATES

CALIFORNA VACCINE MANDATES FOR HEALTH CARE WORKERS

- California required all of its roughly 2.2 million health care and long term care workers to be fully vaccinated against the coronavirus by September 30, 2021.

References:

Associated Press (August 5, 2021). California to mandate COVID-19 vaccines for health workers. Retrieved from https://www.msn.com/en-us/news/us/california-to-mandate-covid-19-vaccines-for-health-workers/ar-AAMZsON?ocid=msedgntp.

State of California—Health and Human Services Agency (August 5, 2021). California Department of Public Health - State Public Health Officer Order of August 5, 2021. Retrieved from https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/COVID-19/Order-of-the-State-Public-Health-Officer-Health-Care-Worker-Vaccine-Requirement.aspx.

CALIFORNA VACCINE MANDATES FOR SCHOOLS

- California was the first-in-the-nation school masking and staff vaccination measures.
- California was the first state to announce plans to require student vaccinations – adding the COVID-19 vaccine to list of vaccinations required for school, such as the vaccines for measles, mumps, and rubella
- Students will be required to be vaccinated for in person learning starting the term following FDA full approval of the vaccine for their grade span (7-12 and K-6).

References:

Office of Governor Gavin Newsom (October 1, 2021). California Becomes First State in Nation to Announce COVID-19 Vaccine Requirements for Schools. Retrieved from https://www.gov.ca.gov/2021/10/01/california-becomes-first-state-in-nation-to-announce-covid-19-vaccine-requirements-for-schools/.

FEDERAL MANDATES

- Occupational Safety and Health Administration, OSHA issued a rule requiring employers with 100 or more employees to ensure each of their workers to be fully vaccinated or tests negative for COVID at least once a week. This rule covers 84 million employees.
- Centers for Medicare & Medicaid Services issued a rule requiring healthcare workers at facilities participating in Medicare and Medicaid to be fully vaccinated. This rule covers more than 17 million workers at approximately 76,000 healthcare facilities around the country.
- Aligning the deadline for the previously announced requirement for employees of federal contractors to be fully vaccinated with these new OSHA and CMS rules. This single, consistent deadline across all three requirements is January 4th, 2022.

References:

The White House (NOVEMBER 04, 2021). Press Call on OSHA and CMS Rules for Vaccination in the Workplace. Retreived from https://www.whitehouse.gov/briefing-room/press-briefings/2021/11/04/background-press-call-on-osha-and-cms-rules-for-vaccination-in-the-workplac

FEDERAL MANDATES

- Within the day, states and employers had filed at least a half-dozen legal challenges to the mandate.
- On Saturday, November 6, 2021, a federal appeals court temporarily suspended the Biden administration's vaccine mandate.

References:

Miranda Yaver (November 9, 2021). The Fifth Circuit halted Biden's vaccine mandate. Here's what the lawsuits are arguing. The Washington Post. Retreived from The Fifth Circuit halted Biden's vaccine mandate. Here's what the lawsuits are arguing. (msn.com).

SUPREME COURT DECISION PRECEDENT

- Jacobs vs. Massachusetts
  - 1905
  - $5 fine for not getting fine
  - Supreme Court determined that public health took priority over individual liberties. However, they would not force vaccinations, they could fine those
  - Mandates have not historically worked well in US and EU.

Reference:

Harvard Chan Events Webinar (November 17, 2020). Vaccine Hesitancy: The Greatest Challenge to COVID-19? Jaap Goudsmit, Wayne Koff, Julia Wu, and Barry Bloom.

OVERCOMING VACCINE HESITANCY

OVERCOMING VACCINE HESITANCY

- Key to overcoming vaccine hesitancy is educational opportunities from the primary care provider
- PSAs
- Grassroots educational efforts – promotora models

FIVE WAYS TO BUILD PUBLIC SUPPORT

- Physicians to spread the word personally and top scientists and physicians to spread the word publicly (Wu & Williams, 2020).
- We need the right message; a specific outreach strategy to connect with each constituency, identify their specific fears, and alleviate them (Harvard, 2020).
- We need to emphasize what's at stake. What is it we have to lose if we don't? Shift to framing the COVID-19 vaccination as every American's responsibility to their loved ones is a powerful motivator (Wu & Williams, 2020).
- Eliminate all barriers to accessing the vaccine (Harvard, 2020)

Reference:

Harvard Chan Events Webinar (November 17, 2020). Vaccine Hesitancy: The Greatest Challenge to COVID-19? Jaap Goudsmit, Wayne Koff, Julia Wu, and Barry Bloom.

Julia W. Wu and Michelle A. Williams (November 12, 2020). An effective COVID-19 vaccine is on the horizon. We need to support vaccine advocacy. Public health experts can reduce fear and build public support. Boston Globe. Retrieved from: https://www.bostonglobe.com/2020/11/12/opinion/an-effective-covid-19-vaccine-is-horizon-we-need-support-vaccine-advocacy/

COMPLICATIONS OF COVID

LONG COVID

- Post-COVID conditions are a wide range of new, returning, or ongoing health problems people can experience four or more weeks after first being infected with the virus that causes COVID-19. This can occur in asymptomatic COVID cases as well.
- These conditions can present as different types and combinations of health problems for different lengths of time.
- These post-COVID conditions may also be known as long COVID, long-haul COVID, post-acute COVID-19, long-term effects of COVID, or chronic COVID.
- CDC and experts around the world are working to learn more about short- and long-term health effects associated with COVID-19, who gets them, and why.
- As of July 2021, “long COVID,” also known as post-COVID conditions, can be considered a disability under the Americans with Disabilities Act (ADA).

References:

CDC (Sept. 16, 2021). Post-COVID Conditions. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html.

LONG COVID SYMPTOMS

- Difficulty breathing or shortness of breath
- Tiredness or fatigue
- Symptoms that get worse after physical or mental activities (also known as post-exertional malaise)
- Difficulty thinking or concentrating (sometimes referred to as “brain fog”)
- Cough
- Chest or stomach pain
- Headache
- Fast-beating or pounding heart (also known as heart palpitations)
- Joint or muscle pain
- Pins-and-needles feeling
- Diarrhea
- Sleep problems
- Fever
- Dizziness on standing (lightheadedness)
- Rash
- Mood changes
- Change in smell or taste
- Changes in menstrual period cycles

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CDC (Sept. 16, 2021). Post-COVID Conditions. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html

LONG COVID IN CHILDREN

- Post-COVID conditions appear to be less common in children and adolescents than in adults, long-term effects after COVID-19 do occur in children and adolescents.
- Studies have reported long-term symptoms in children with both mild and severe COVID-19, including children who previously had multisystem inflammatory syndrome in children.
- Similar to the symptoms seen in adults, the most common symptoms reported have been tiredness or fatigue, headache, trouble sleeping (insomnia), trouble concentrating, muscle and joint pain, and cough.

References:
CDC (Sept. 16, 2021). Post-COVID Conditions. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html

LONG COVID

- COVID-19 vaccination lowers the severity and life impact of long COVID at 120 days among patients with persistent symptoms.
- The odds of having symptoms for 28 days or more after post-vaccination infection were approximately halved by having two vaccine doses.

Reference:

Tran, Viet-Thi and Perrodeau, Elodie and Saldanha, Julia and Pane, Isabelle and Ravaud, Philippe, Efficacy of COVID-19 Vaccination on the Symptoms of Patients With Long COVID: A Target Trial Emulation Using Data From the ComPaRe e-Cohort in France. Available at SSRN: https://ssrn.com/abstract=3932953 or http://dx.doi.org/10.2139/ssrn.3932953

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SYSTEMATIC REVIEW OF LONG-TERM EFFECTS OF COVID-19

- Systematic review of 15 studies.
- The prevalence of 55 long-term effects was estimated, 21 meta-analyses were performed, and 47,910 patients were included (age 17–87 years) with long-COVID as ranging from 14 to 110 days post-viral infection.
- It was estimated that 80% of the infected patients with SARS-CoV-2 developed one or more long-term symptoms. The five most common symptoms were fatigue (58%), headache (44%), attention disorder (27%), hair loss (25%), and dyspnea (24%).

Reference:

Lopez-Leon, S., Wegman-Ostrosky, T., Perelman, C. *et al.* More than 50 long-term effects of COVID-19: a systematic review and meta-analysis. *Sci Rep* **11,** 16144 (2021). https://doi.org/10.1038/s41598-021-95565-8.

PROMISING TREATMENTS

The trends

MOLNUPIRAVIR - EMERGENCY USE AUTHORIZATION

- Merck has submitted an Emergency Use Authorization (EUA) application to the U.S. Food and Drug Administration (FDA) for Molnupiravir, an investigational oral antiviral medicine, for the treatment of mild-to-moderate COVID-19 in adults who are at risk for progressing to severe COVID-19 and/or hospitalization.
- Molnupiravir was invented at Drug Innovations at Emory (DRIVE), LLC, a not-for-profit biotechnology company wholly owned by Emory University; Emory/DRIVE received some research funding from the U.S. Department of Defense and the National Institutes of Health. Merck is developing the drug for market use.

Reference:

Merck (October 11, 2021). Merck and Ridgeback Announce Submission of Emergency Use Authorization Application to the U.S. FDA for Molnupiravir, an Investigational Oral Antiviral Medicine, for the Treatment of Mild-to-Moderate COVID-19 in At Risk Adults Retrieved from https://www.merck.com/news/merck-and-ridgeback-announce-submission-of-emergency-use-authorization-application-to-the-u-s-fda-for-molnupiravir-an-investigational-oral-antiviral-medicine-for-the-treatment-of-mild-to-moderate-c/.

Harvard Medical School (November 5, 2021). Treatments for COVID-19: What helps, what doesn't, and what's in the pipeline. Harvard Health Publising. Retrieved from https://www.health.harvard.edu/diseases-and-conditions/treatments-for-covid-19.

MOLNUPIRAVIR: PRELIMINARY OUTCOME DATA

- At the interim analysis, Molnupiravir reduced the risk of hospitalization or death by approximately 50%; 7.3% of patients who received Molnupiravir were either hospitalized or died through Day 29 following randomization (28/385), compared with 14.1% of placebo-treated patients (53/377); p=0.0012.
- Through Day 29, no deaths were reported in patients who received Molnupiravir, as compared to 8 deaths in patients who received placebo.
- The incidence of any adverse event was comparable in the Molnupiravir and placebo groups (35% and 40%, respectively).
- The incidence of drug-related adverse events was also comparable (12% and 11%, respectively), and fewer subjects in the molnupiravir group discontinued therapy due to an adverse event compared to the placebo group (1.3% and 3.4%, respectively).

Reference:

Merck (October 11, 2021). Merck and Ridgeback Announce Submission of Emergency Use Authorization Application to the U.S. FDA for Molnupiravir, an Investigational Oral Antiviral Medicine, for the Treatment of Mild-to-Moderate COVID-19 in At Risk Adults Retrieved from https://www.merck.com/news/merck-and-ridgeback-announce-submission-of-emergency-use-authorization-application-to-the-u-s-fda-for-molnupiravir-an-investigational-oral-antiviral-medicine-for-the-treatment-of-mild-to-moderate-c/.

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TREATMENTS FOR COVID-19: PAXLOVID

- Interim study results released by Pfizer in a press release in November 2021 showed that its oral antiviral treatment, called Paxlovid, significantly reduced the risk of COVID-related hospitalization and death compared to a placebo. The company plans to ask the FDA to authorize the treatment.
- Randomized, double-blind, and placebo controlled - study participants had symptomatic, confirmed early COVID-19, were at increased risk for severe illness due to age or an underlying medical condition, and were not hospitalized. They took either a placebo or the Paxlovid treatment twice a day for five days.
- By 28 days after treatment, those who had taken Paxlovid within three days of symptom onset had an 89% reduced risk of COVID-related hospitalization or death compared to those who took a placebo. Study participants who started Paxlovid within five days of the start of symptoms had an 85% reduced risk compared to placebo. Side effects of Paxlovid and placebo were comparable, and generally mild. In consultation with the FDA, an independent committee recommended that the study be stopped early because of the apparent benefit of the treatment.
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TREATMENTS FOR COVID-19: FLUOXAMINE

- A large study published in *Lancet Global Health* in October 2021 found that the antidepressant fluvoxamine (Luvox), which may be taken by mouth at home, significantly reduces the risk of hospitalization in some COVID-19 patients at serious risk for severe illness.
- The *Lancet* study enrolled nearly 1,500 adults in Brazil. Most study participants were unvaccinated, had symptomatic, early, confirmed COVID-19, and were at increased risk of serious illness due to underlying health problems. About half took a placebo while the other half were told to take one 100-mg fluvoxamine pill, twice a day, for 10 days.
- The fluvoxamine group was significantly less likely than the placebo group (11% versus 16%) to need hospitalization or an extended emergency room stay. The randomized, placebo-controlled trial was conducted by an international team of researchers, and it confirmed preliminary findings published last year in *JAMA*.

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TREATMENTS FOR THOSE AT RISK OF SEVERE COVID-19: MONOCLONAL ANTIBODY TREATMENTS

- In November 2020, the FDA granted emergency use authorization to two monoclonal antibody treatments (bamlanivimab, made by Eli Lilly; and a combination of casirivimab and imdevimab, made by Regeneron).
- Both treatments have been approved for non-hospitalized adults and children over age 12 with mild to moderate COVID-19 symptoms who are at risk for developing severe COVID-19 or being hospitalized for it.
- In these patients, the approved treatments can reduce the risk of hospitalization and emergency room visits.
- These therapies must be given intravenously (by IV) soon after developing symptoms.

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TREATMENTS FOR THOSE HOSPITALIZED WITH COVID-19

- Steroids to reduce inflammation for those needed respiratory support
- Tocilizumab, a monoclonal antibody – to reduce the need of a ventilator
- Remdesivir may modestly speed up recovery time.

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SUMMARY

Much has evolved in a year, surrounding COVID-19.
Vaccinations have demonstrated success with less of a surge than was expected by October 2021.
Treatments are looking promising.

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THANK YOU

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