



**Public Health and COVID-19:
Addressing Vaccine Hesitancy
and Concerns**

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 **FOOTHILL COLLEGE**

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Imagine...

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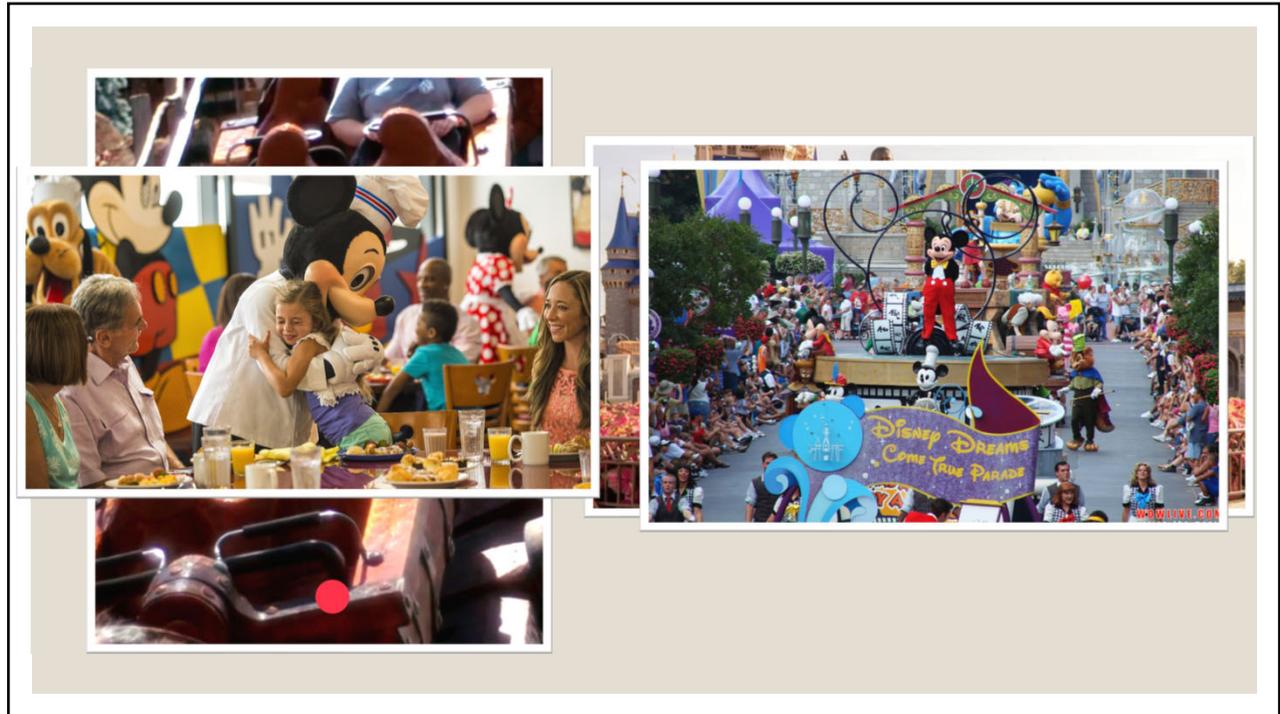
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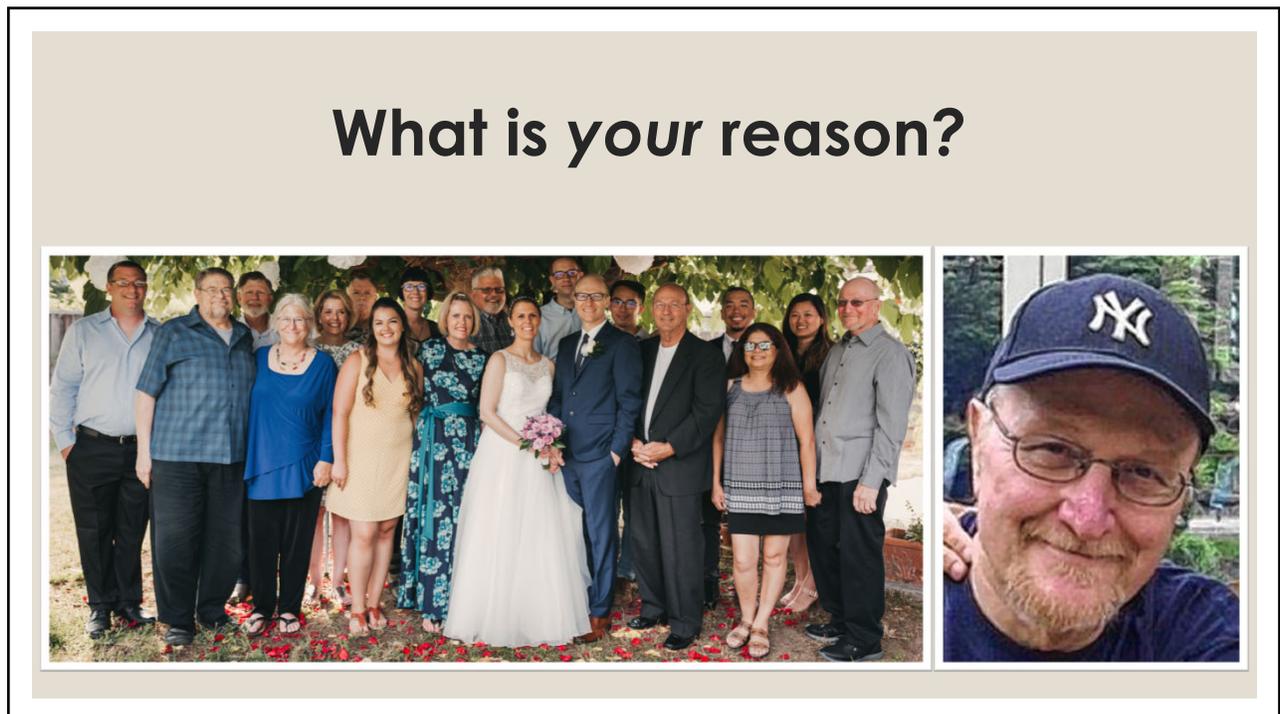
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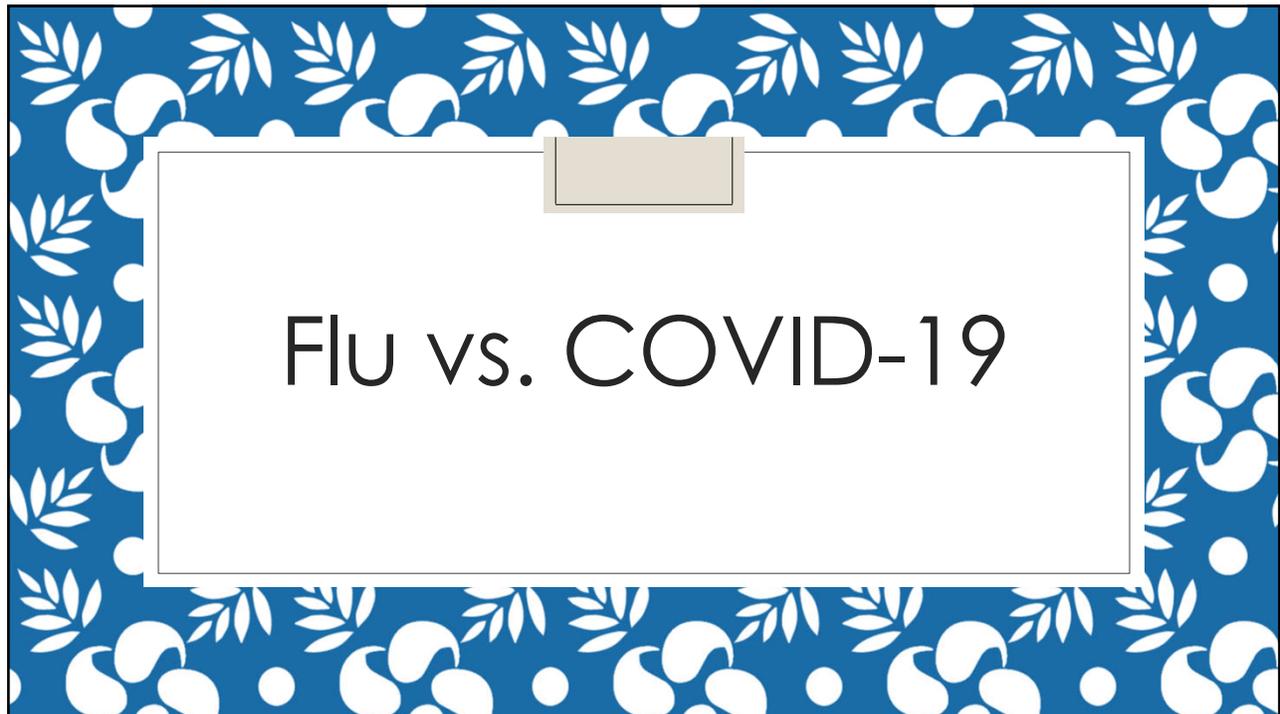


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Objectives

1. Difference between Influenza and COVID-19
2. Vaccines: Benefits for a Preventive Approach
3. Address Vaccine Concerns
4. In-depth: The Johnson and Johnson “Pause”
5. Challenge to our Audience: Finding your Reason and Being an Advocate

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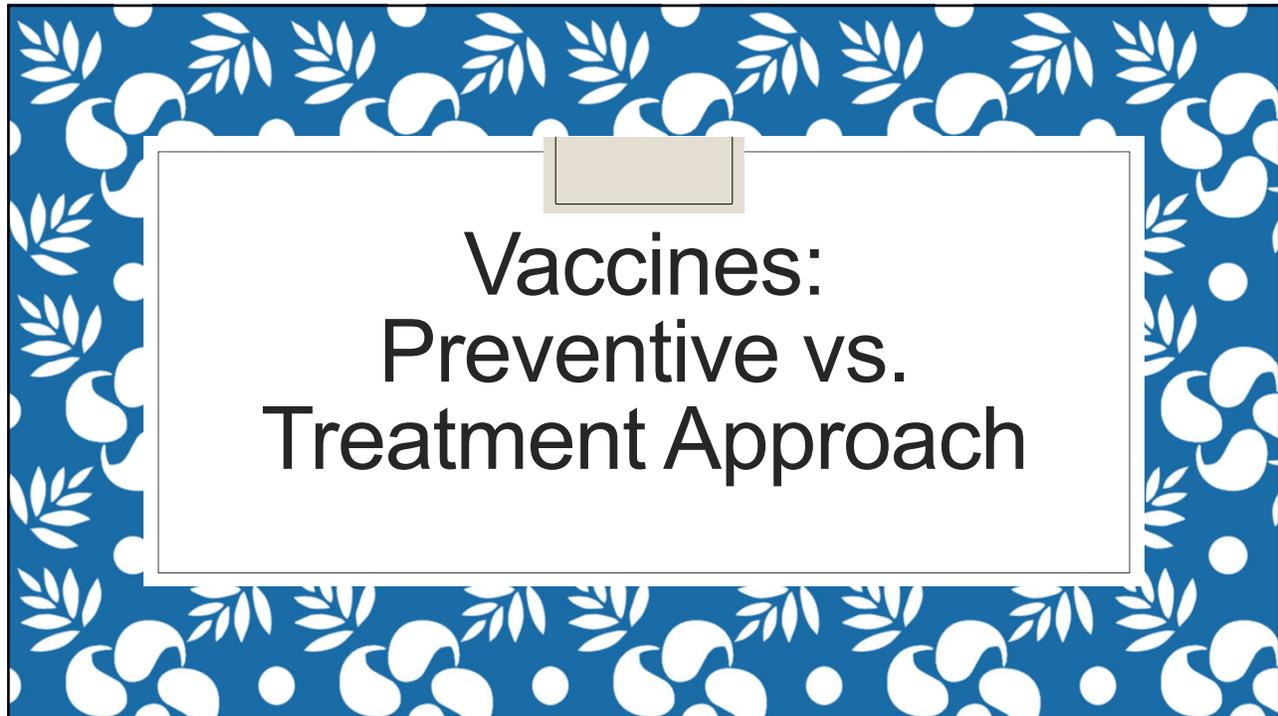
COVID vs. Influenza: How are they *different*?

- Among hospitalized patients, COVID-19 was associated with:
 - An increased need for ventilators
 - More admissions into intensive care units (ICUs)
 - Longer hospital stays, and
 - **Nearly 5x the risk of death** than influenza
- COVID-19 is associated with a higher risk of complications including:
 - Acute kidney and liver damage
 - Heart disorders
 - Stroke
 - Severe septic shock
 - Low blood pressure
 - Excessive blood clotting, and
 - New-onset diabetes
- **Influenza:** 290,000-650,000 deaths annually
- **COVID-19:** 3,100,000 deaths (March 2020 to April 2021)⁶²

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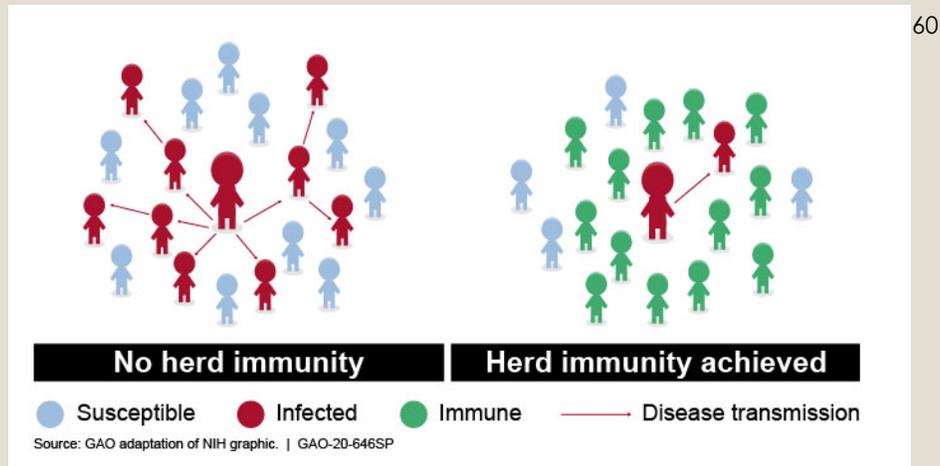
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What is *herd immunity* and why is it important?

- Transmission is reduced when more of the population has immunity because the virus cannot travel as easily⁵⁵
- When the population does *not* have immunity or protection, viruses travel easily⁵⁵
- Herd protection: Doesn't provide **immunity** to everyone. Rather, protects vulnerable members like those who are immunocompromised^{57,59}
- Estimates range from 60-80% (herd immunity for COVID-19); large outbreaks are expected in areas where vaccination is low⁵⁸⁻⁶⁰
- Herd immunity successes through vaccination:
 - Measles, mumps, rubella, pertussis, chickenpox, polio, etc.^{56,61}
 - **Skipping vaccination and relying on herd immunity "naturally"** is dangerous and has never successfully been accomplished^{49,59}
 - Leads to loss of life; disability

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Vaccines create immunity *without* causing illness or resulting complications⁶¹



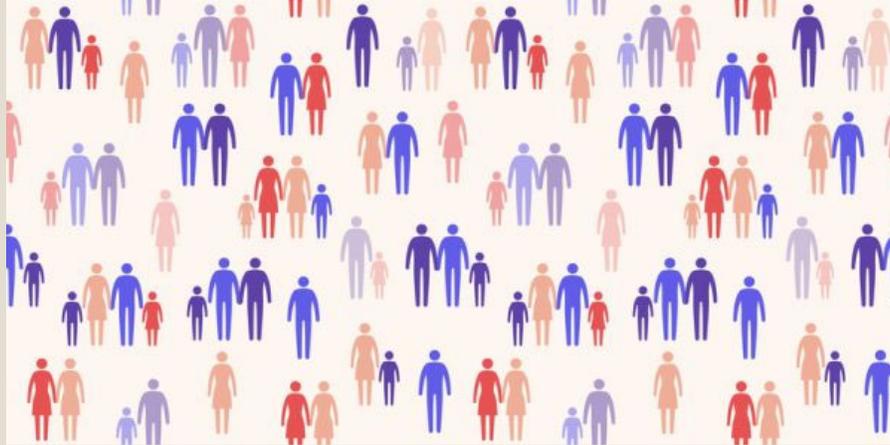
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Why are vaccines important for young people who may *not* have serious COVID outcomes themselves?

- Vaccines have been proven to reduce *infectiousness*
 - Reduce how many days somebody is infectious
 - Reduce viral load
 - When *infectiousness* is reduced, transmission is reduced
 - Research is still being conducted on how well COVID vaccines can reduce transmission⁷⁰
- Reduces the opportunity for *viruses to mutate* and create *variants* that are more difficult to treat, more contagious, more deadly (55-61%!), etc.⁴⁴
- Vaccines prime the immune systems to prevent symptoms *despite* infections which:
 - Reduces serious illness
 - Reduces hospitalizations
 - Reduces poor health outcomes including death^{36,37}
- This is why it's so vital that people get vaccinated. Which one? ANY vaccine you can get!
- **Note: IF the virus could stay in young people, it may not be as big of a deal. Viruses travel from young to older, healthy to sick...we're so connected!**

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Vaccines work **best** at a population level based on individuals *collectively* choosing to getting vaccinated



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foothill.edu/sis/events/covid-series.html

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The Biology of COVID-19: The Virus and the Vaccines

Monday, April 19, 2021, 4 - 5pm
with Dr. Sara Cooper, Biology Instructor, Foothill College

COVID-19 has changed the world we live in. Vaccines will help us change it back. Join us as we explore how a tiny virus wreaks such havoc and the biology behind the vaccines that can protect us from it. Ample time will be provided to address your questions and concerns about COVID-19 and the vaccines.

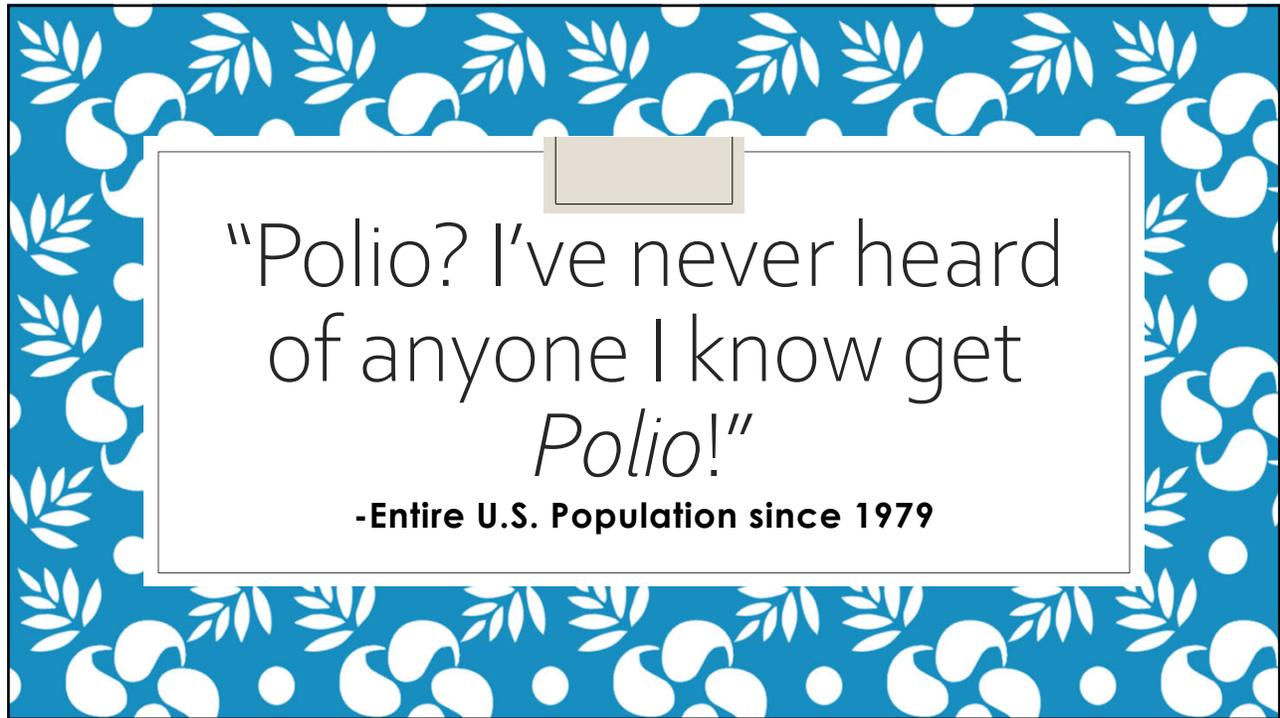
Sara Cooper has been a microbiology instructor at Foothill College since 2014. She earned her Ph.D. in Cellular and Molecular Biology from Stanford University and did her undergraduate studies in Molecular, Cellular and Developmental Biology at the University of Colorado, Boulder.

[LINK FOR RECORDING](#)
[Link for PDF of Presentation Slides](#)

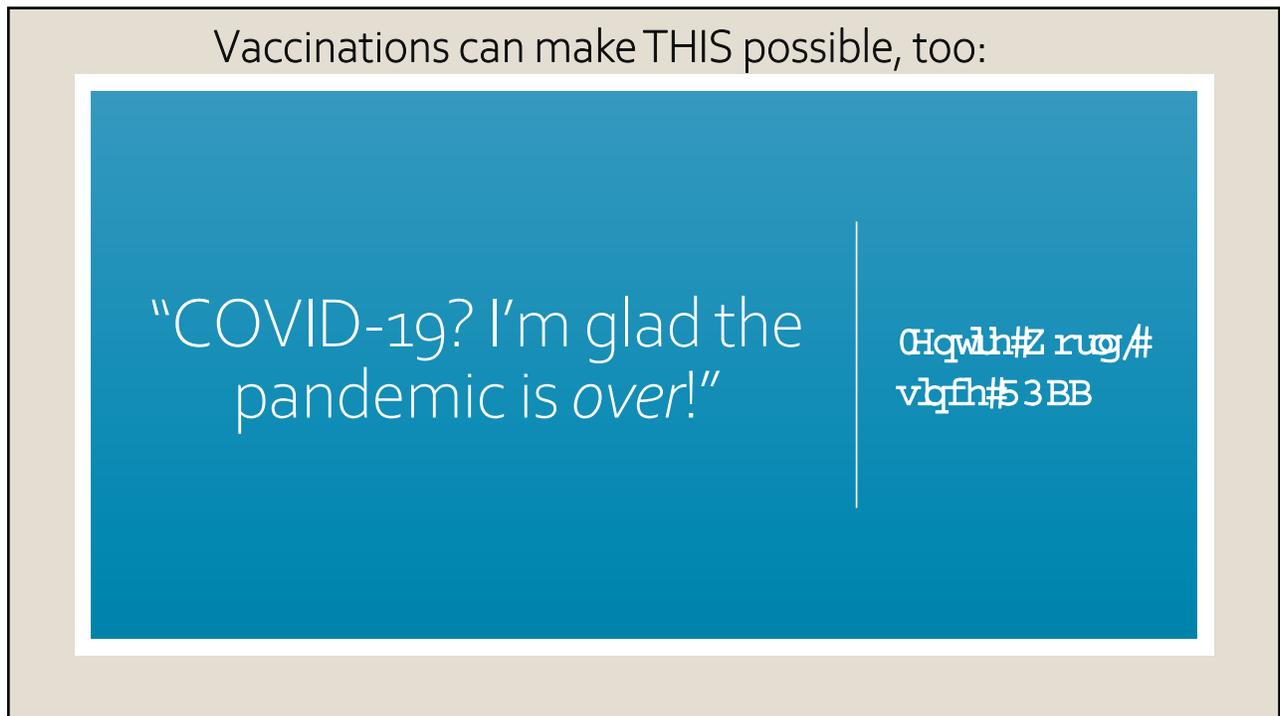
- [Public Health Context of COVID-19](#)
- [Debunking Vaccine Myths](#)
- [Taking Action to Protect Myself and Others](#)

For Further Reading
If you cannot attend any of these events, we will provide links to the recordings, and here are some suggested readings from Foothill College faculty:
Science-Based Resources on COVID-19 Vaccine

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	Polio	Hepatitis B	HPV (Human Papilloma Virus)	COVID
Released	1955 ¹⁷	1981 ¹⁹	2006 ²²	2021, clinical trials began 2020 ²⁹
Efficacy	99-100% (completion of series) ¹⁸	80-100% (declines with advanced age) ¹⁹	99-100% ^{15,20}	Pfizer: 95% Moderna: 94% J&J: 66-67% ^{16,34}
Prevents	Paralysis; death ¹⁷	Liver disease; death ¹⁹	HPV-caused cancers including cervical, penile, anal cancers; genital warts; death ²⁰	Symptomatic COVID disease including serious illness, hospitalizations, death ^{30,35}
Age	Infanthood ²³	Birth and infanthood; Note: Incidence was <i>unchanged</i> until universal vaccination of babies/children took place (series of 3 shots) ²¹	Childhood starting at age 11-12 (early as age 9) ²³ Important to start <i>before</i> sexual debut but ASAP if already sexually active	16 and over (Moderna); 18 and over (Pfizer, J&J) ²⁶ ; Clinical trials ongoing for children ²⁷
Noteworthy	United States has been <i>Polio-free</i> since 1979 because of vaccines ³¹	Required for school entry in most states including California (amongst many other vaccines) ²⁴	Avoidance of HPV vaccines linked with concerns somewhat similar to COVID including: believes the vaccine is unnecessary (lack of perceived susceptibility/seriousness) ; hesitancy also linked to concern about instigating sexual behavior; low uptake results in low population effect/still circulates/spreads/causes disease ^{26,32}	Many do not believe they are susceptible to serious outcomes of COVID nor believe they will transmit (even asymptotically) to others leading to serious illness in vulnerable populations

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What does vaccine efficacy mean?

- Vaccine efficacy is a measure of the *proportionate reduction* in disease among *vaccinated people*³³

If a vaccine is 95% effective, what does that mean?

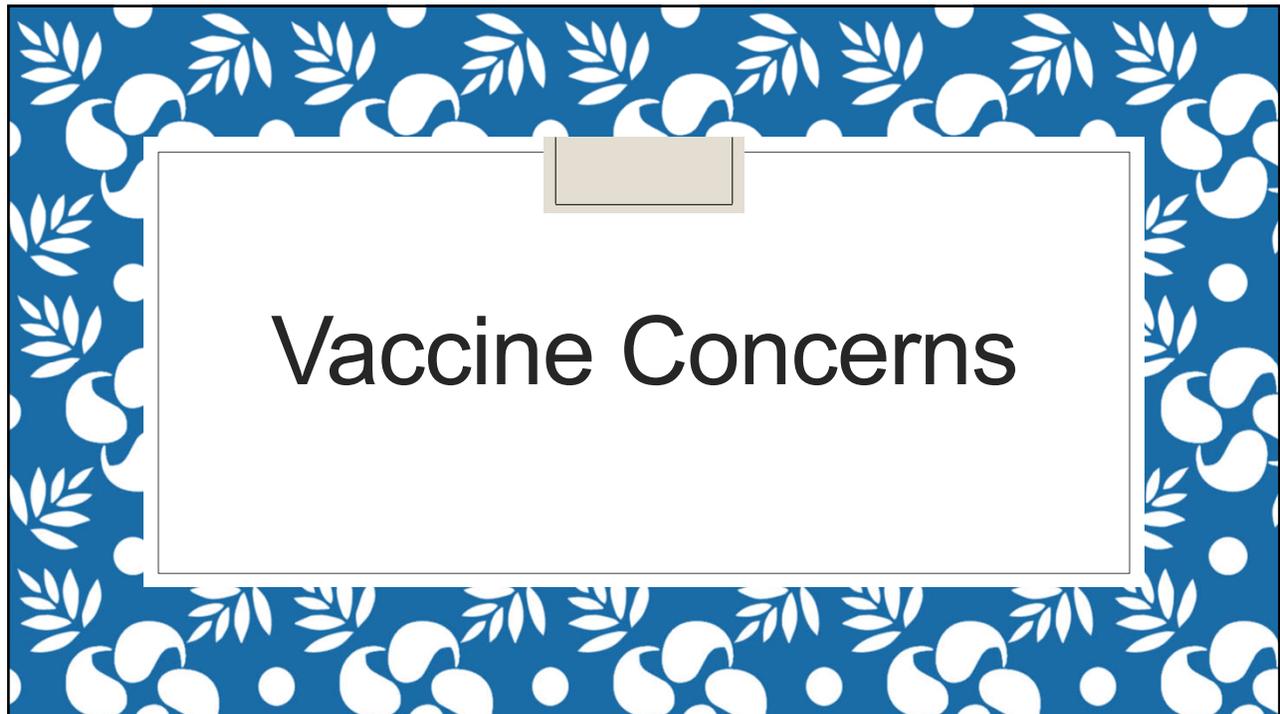
- Let's use the Pfizer's vaccine as an example with 95% effectiveness
- 95% effective does *NOT* mean that it is effective for only 95% of people and 5% will get sick.
- Instead, it means that vaccinated people (in clinical trials) had a *95% lower risk (or 20x LOWER risk)* of getting COVID-19 compared with *unvaccinated* people.³⁴
- Important to avoid comparing Johnson and Johnson's efficacy (67%) with Pfizer and Moderna because "there were more people who had the B.117 [U.K. variant] or other types of variants during the time of the Johnson & Johnson trial than" other trials.³⁴
- Also important, efficacy "numbers are protection from having *symptoms*, not protection from being infected." No symptoms = great!³⁴
- Critically important: Pfizer, Moderna, and J&J vaccines are effective in preventing serious cases of COVID requiring hospitalization including death.

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Will I *HAVE* to have a COVID vaccine?

- **Once vaccines are fully approved, they may be required at locations including:**
 - School entry
 - CSU/UC's starting Fall 2021²⁵
 - Employment
 - Travel (example: Europe may open for vaccinated Americans starting *this* Summer)⁴²
 - Sporting events⁴³
- **Other benefits for vaccinated people⁶⁹:**
 - Visit inside a home or private setting without a mask with other fully vaccinated people of any age
 - Visit inside a home or private setting without a mask with one household of unvaccinated people of any age who are not at risk for severe illness
 - Travel domestically without a pre- or post-travel test
 - Travel domestically without quarantining after travel
 - Travel internationally without a pre-travel test depending on destination
 - Travel internationally without quarantining after travel

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Concerns over pain of injection; side effects

- **Smaller needles used**
 - Many injections and vaccines cause anxiety and pain
 - COVID vaccines use smaller needles (**smaller** than a pencil point!)⁵¹
 - Many who have been vaccinated have been surprised at the *lack of pain* with injection
- **Side effects vary**
 - More common in younger populations (but not a guarantee)
 - Some report no symptoms and others report flu-like symptoms
 - 10-12 hours after second injection is common
 - Although it feels icky, much less painful than COVID especially hospitalization, ventilation, etc.
 - Symptoms resolve quickly
 - Some worry that a *lack* of side effects means it didn't work. This is false! They vary for everyone!^{52,53}

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Concerns over breakthrough cases

- Breakthrough cases occur when someone was diagnosed with COVID-19 *after* vaccination
- Vaccines are not 100% effective in preventing a person from getting COVID-19; they are effective in preventing *most serious cases* of COVID^{38,39}
- SO important to avoid contact with others until after *two weeks* from your final COVID vaccination (to allow the body to build the strongest immunity)
- Incredibly important to vaccinate the population (those that can) as variants are a cause of breakthrough cases³⁹

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0.008% of all vaccinations

COVID-19 vaccine breakthrough infections reported to CDC as of April 20

As of April 20, 2021, [more than 87 million people](#) in the United States had been fully vaccinated against COVID-19.

Total number of vaccine breakthrough infections reported to CDC	7,157
Females	4,580 (64%)
People aged ≥60 years	3,265 (46%)
Asymptomatic infections	2,078 (31%)
Hospitalizations*	498 (7%)
Deaths†	88 (1%)

*167 (34%) of the 498 hospitalizations were reported as asymptomatic or not related to COVID-19.

†11 (13%) of the 88 fatal cases were reported as asymptomatic or not related to COVID-19.

*Data may be underreported due to asymptomatic infection

1% deaths are associated with the number of *breakthrough* reports, not 1% of death from of *all* vaccinations.

Death risk associated with breakthrough infection = 88 / 87,000,000 = 0.0001%

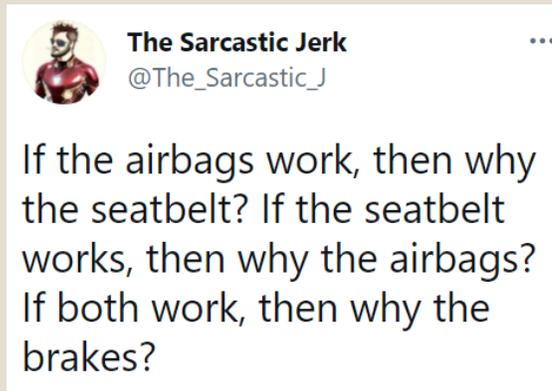
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How to prevent breakthroughs?

- Keep using masks!
- Keep up hygienic practices including handwashing and sanitizer
- Social distance measures are key especially with unvaccinated people
- Encourage vaccinations!
- Example in Oregon: Entering another wave. Many new infections are in the unvaccinated groups and are caused by the UK variant, *which is 55-61% deadlier*⁴⁴.
- Remember: Vaccinations *decrease* the amount of virus being transmitted which *reduces* the opportunity for mutation/new variants to form and breakthrough cases to occur.

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Why masks and social distancing if vaccinations are effective?



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Concerns over the vaccines being *too new*

- **mRNA (Moderna, Pfizer)**
 - mRNA vaccines against HIV, rabies, Zika and flu have been tested in phase 1 and phase 2 trials in people.
 - The technology has also been used in clinical trials as a way to treat some cancers.
 - Even though these products have not been licensed for use in people, these efforts provided important information about mRNA technology and its safety.⁴⁷
- **Adenovirus (Johnson & Johnson)**
 - This type of vaccine has been studied in people before, and another adenovirus-based vaccine was approved for use in Europe in those 1 year of age and older starting in the summer of 2020. That vaccine is one of two doses of an Ebola vaccine, and it uses the same type of adenovirus as the Johnson & Johnson vaccine.^{47,50, 71}

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Concern over long-term effects of a vaccine?

- Historical data can help us understand long-term issues with vaccines
- Long-term effects of prior vaccines including MMR, Polio, etc. were not really long-term issues
- Adverse events with previous vaccines occurred within 8 weeks
- Because of the knowledge gained with other vaccines, the FDA required companies making COVID-19 vaccines to follow trial participants for a minimum of eight weeks before they could submit their data for approval⁴⁷
- Scientists and public health officials carefully analyze and continually monitor the data related to every vaccine before, during and after it becomes available
- Example: Pfizer
 - Began July 27, 2020 - enrolled 43,661 participants to date, 41,135 of whom have received a second dose of the vaccine candidate as of November 13, 2020
 - Five months since last injection with no new adverse conditions reported
 - Pfizer clinical trials will follow participants for two years and report any adverse outcome⁴⁸

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Concern over 5G and COVID-19/Vaccines?

- Many publications and agencies have analyzed the conspiracy claims and provide evidence against them⁶³⁻⁶⁷
- Be wary of conspiracy theories and the sources that are disseminated. Many are not based on any scientific principles and are intended to frighten/dissuade people from getting vaccinated
- Systemic racism and mistreatment of BIPOC and LGBTQ+ communities have led to a mistrust in public health and medicine: this is understandable.

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Concern over *cost* of getting vaccinated?

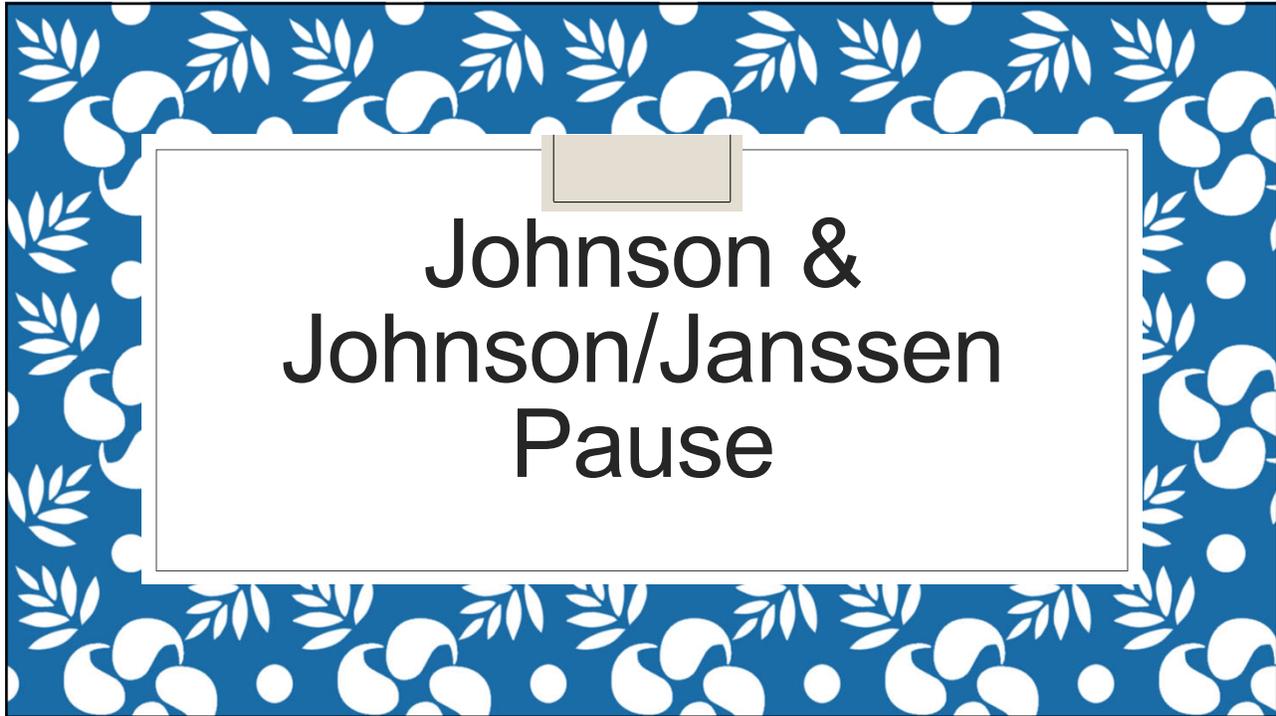
- All people eligible for the vaccination need to know that the vaccine is **FREE!**
 - You may be asked for insurance, but this is *not* to bill you
 - You may be asked for an ID or SSN; you may be able to decline (pharmacies, etc.)
- If you've had COVID previously, you still need to get vaccinated:
 - Although you have antibodies, the amount of protection is unknown
 - Reinfection is possible, but symptoms should be less severe
 - Discuss this with your care provider IF you had any treatment for COVID-19⁶⁸
- Where can you get vaccinated?
 - Santa Clara County has mobile vaccination sites in vulnerable communities
 - Most pharmacies including Walmart, Walgreens, Rite-Aid, CVS, etc.
 - Schedule an appointment when convenient for you:
 - myturn.ca.gov
 - vax.sccgov.org
 - Find a Shot: findashot.org
 - Vaccine Spotter: vaccinespotter.org

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How *will* Americans know if there are safety issues with the vaccine?

- 1. The **Advisory Committee on Immunization Practices** (ACIP)
 - Medical/public health experts who develop recommendations/public health guidance on the safe use of vaccines in the United States.⁴¹
- 2. **Vaccine Adverse Event Reporting System** (VAERS)
 - National early warning system to detect possible safety problems in U.S. licensed vaccines.
 - Co-managed by the CDC and FDA
 - VAERS accepts and analyzes reports of adverse events *after* a person has received a vaccination
 - **Anyone** can report an adverse event to VAERS
 - Healthcare professionals are required to report certain adverse events and vaccine manufacturers are required to report **all** adverse events that come to their attention.
 - Not every adverse event is *because* of the vaccine itself

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What exactly happened?

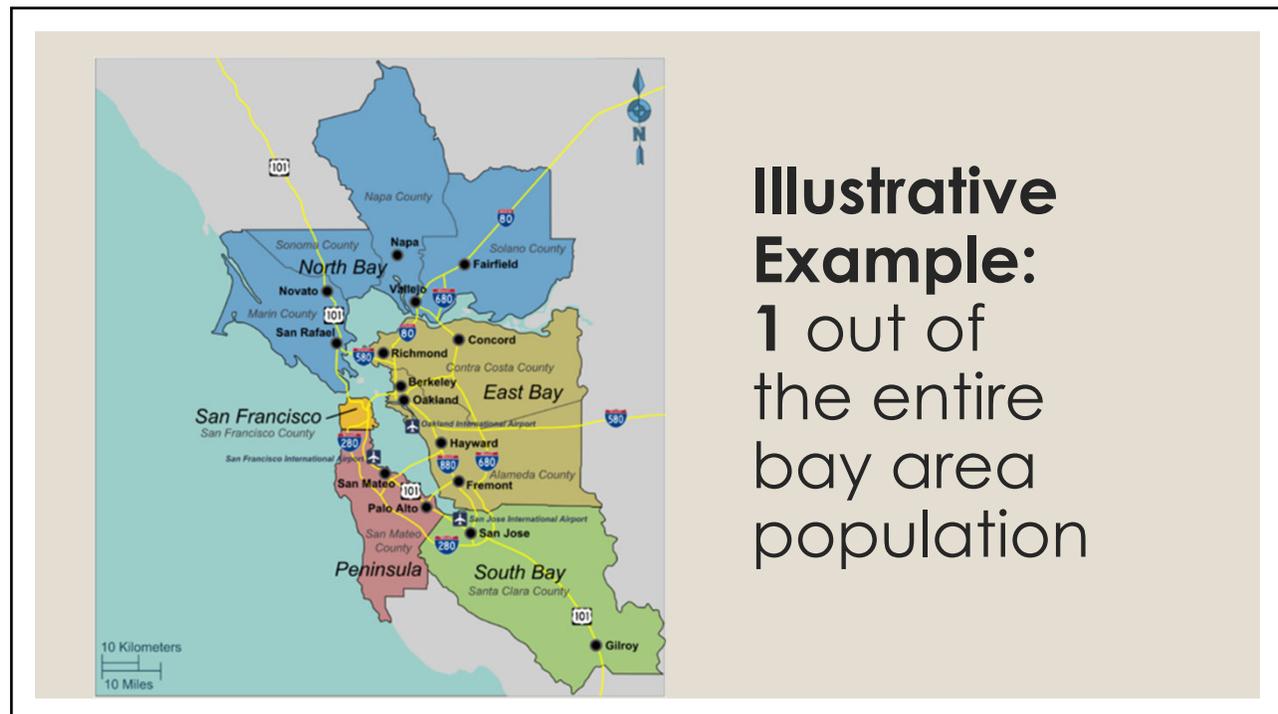
- Rare *autoimmune* response to J&J/Janssen Vaccine (*CVST*: clot in the brain plus *thrombocytopenia*: low levels of blood platelets)⁴
- Out of 6.8 million doses, 6 rare/severe of a stroke-like illness occurred⁶
- Outcome: 1 fatal case, 5 treated/monitored
- **Any specific subpopulations of women?**
 - Too few cases to make that determination in this case with this particular vaccine. IF there are more, they will look further into it. Not able to single out subgroup/make generalizations (common in small sample sizes)
 - AT THIS TIME there is no clear association with oral contraceptives and these individuals with blood clots⁶

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How common is CVST?

- CVST (Cerebral Venous Sinus Thrombosis):
 - CVST *alone* occurs annually: 2-14 per 1,000,000 = 0.0002 -0.0014%⁶
 - NOTE: *NOT* annualized for CVST + low platelets⁶
- In Johnson & Johnson/Janssen Vaccine Recipients (CVST + Thrombocytopenia):
 - Occurrence: 6/6,800,000 = 0.00008%⁶
 - Death rate: 1/6,800,000 = 0.00001%⁶
- COVID has killed ~569,000 people. The blood clot from the J&J vaccine killed 1.⁵⁴
 - **Rate of death from COVID depends on age, underlying conditions, etc. but about 1% (higher in different subpopulations)¹³**
 - Compare 1% chance (COVID death) to 0.00001% (death from J&J vaccine)¹³

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Illustrative Example:
1 out of the entire bay area population

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When/how often is this occurring after vaccination?

- Usually about 1 week after, and not longer than 3 weeks after - median 9 days after vaccination⁶
- Note: Flu-like symptoms and headache *are* common after vaccination⁶
- Symptoms for **concern**:
 - Severe headache
 - Pain in legs
 - Pain in abdomen - severe enough for medical attention
 - What a medical provider would determine:
 - Blood clots
 - Low platelets⁶

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Should you be worried if you were vaccinated?

- If you received the Pfizer or Moderna vaccine, this has NOT been reported (different type of vaccine - mRNA vs. Adenovirus)⁶
- For those that received the Johnson & Johnson/Janssen vaccine:
 - If it's been more than 1 month, very low risk
 - Within the last few weeks, monitor yourself for any symptoms:
 - Severe headaches, abdominal pain, leg pain, or shortness of breath,
 - What to do? Contact your healthcare provider and seek medical treatment.
 - Note: These symptoms are different from the mild flu-like symptoms, fever and so forth that many people experience in a couple days after receipt of the vaccine which are *expected* to occur⁶

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Why did these events cause a signal to the FDA/CDC?

- Analysis from CDC and FDA found that the pattern of CVST and low platelets occurred *together* similar to what was seen in Europe with the AstraZeneca vaccine (also an adenovirus vaccine)
- As a precautionary measure, the FDA and CDC paused the vaccine to ensure they understood the complications
- In addition, revising clinical guidelines was necessary to ensure appropriate treatments were provided to prevent dangerous or fatal outcomes with the traditional treatment (Heparin).⁶

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Are PAUSES common in vaccinations? Clinical Trials?

- This is the first **pandemic** in our lifetime
- Previous pauses for COVID-19 vaccinations/meds:
 - 2020: Johnson & Johnson, Eli Lilly/NIH's ACTIV-3, AstraZeneca¹¹
- Varying views; some say it's common, others say it's not (due to safety, phase III)¹¹
- Clinical Trial Phases:
 - **Phase I trials:** Researchers test an experimental drug or treatment in a small group of people for the first time. The researchers evaluate the treatment's safety, determine a safe dosage range, and identify side effects.
 - **Phase II trials:** The experimental drug or treatment is given to a larger group of people to see if it is effective and to further evaluate its safety.
 - **Phase III trials:** The experimental study drug or treatment is given to large groups of people. Researchers confirm its effectiveness, monitor side effects, compare it to commonly used treatments, and collect information that will allow the experimental drug or treatment to be used safely.
 - **Phase IV trials:** Post-marketing studies, which are conducted after a treatment is approved for use by the FDA, provide additional information including the treatment or drug's risks, benefits, and best use.¹⁵

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Why was this a *PAUSE* and not a *STOPPAGE*

- Not a mandate; recommendation out of an abundance of caution
- Individual healthcare provider were still able to administer the vaccine if the provider felt it **WAS beneficial for that individual**.
- Update: April 23: "Following a thorough safety review, including two meetings of the CDC's Advisory Committee on Immunization Practices, the U.S. Food and Drug Administration and the U.S. Centers for Disease Control and Prevention have determined that the recommended pause regarding the use of the Johnson & Johnson (Janssen) COVID-19 Vaccine in the U.S. **should be lifted and use of the vaccine should resume.**"⁷²
- Additionally, the Western States Scientific Safety Review workgroup recommended resuming use of Johnson & Johnson Vaccine. California will resume use of the vaccine.^{73,74}

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Addressing Vaccine Hesitancy: ~~What you can do?~~ What **WE** can do?

- **Get your second dose AND any boosters!** Many who received their first are forgetting to get the second. Remember to do this and help others remember their second! (Not needed for J&J)
- **Educate:** Inform and share resources with people in your social spaces using *reputable* sources such as the CDC, FDA, reputable university sites, etc. Come back for our next two talks!
- **Influence!** Become an influencer for vaccines! Showcase friends and family who received the vaccine, the side effects they may (or may not have had), and reasons why they received the vaccine. Use social media to help you!
- **Share** websites that help people get vaccinated:
 - A. [Santa Clara County's vaccination program](#)
 - B. You can also search for vaccines through [Find a Shot](#) or [Vaccine Spotter](#).
- **Help** those in your social spaces make an appointment, or even with transportation to a vaccination site. If you can go with them, even better!
- **Understand** that adoption of new ideas, technology, even vaccinations is different for everyone. Being empathetic and understanding are key *especially* since many people suffer from hidden illnesses, may be immunocompromised, or just scared. **Fear is powerful! Patience is key!**

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I turn the next part to you, our participants.

- We're getting so much closer to the finish line *because* of vaccines!
- Who in your life do you want to be in the finish line **with** you?
- Who do you want to see around your holiday dinner table without fear?
- Who do you want to go on vacation with?
- What are you looking forward to the most with COVID ending?
 - Mask-free vacations?
 - Dinner with friends?
 - Normalcy?
 - Full reopening?
 -

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Share your reasons...*find new reasons*...educate...*inspire*...create change!



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