COVID-19 Vaccination with Confidence

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CDPHE COVID-19 Vaccine Equity, Confidence, and Connection
COVID-19 in USA

More than 62 million infections, over 840 thousand deaths, and an economic toll in the trillions of dollars to date
What is the best COVID-19 vaccine?

<table>
<thead>
<tr>
<th>Vaccine Brand Name</th>
<th>Safe?</th>
<th>Effective?</th>
<th>Reduces your risk of severe illness?</th>
<th>Age group who can get this vaccine</th>
<th>How many shots you will need?</th>
<th>When you are fully vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>biontech/pfizer</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>5 years and older</td>
<td>2 shots given 3 weeks (21 days apart*)</td>
<td>2 weeks after your second shot</td>
</tr>
<tr>
<td><strong>moderna</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>18 years and older</td>
<td>2 shots given 4 weeks (28 days apart*)</td>
<td>2 weeks after your second shot</td>
</tr>
<tr>
<td><strong>janssen</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>18 years and older</td>
<td>1 Shot</td>
<td>2 weeks after your shot</td>
</tr>
</tbody>
</table>

*You should get your second shot as close to the recommended 3-week or 4-week interval as possible. However, your second shot may be given up to 6 weeks (42 days) after the first dose, if necessary.
COVID-19 Vaccination among Dental Professionals

• Oral health care workers have an increased risk of being infected

• Prolonged lockdowns on both movement and commerce decrease the rates of novel infections BUT also have devastating consequences on the economy & employment levels.

• One of the most severely affected sectors during this crisis has been dental medicine.

• Healthcare professionals and students have a key role in shaping public opinion about vaccines.
# How Vaccines Eradicated Common Diseases

Annual 20th century morbidity and 2019 morbidity of selected diseases in the U.S.

<table>
<thead>
<tr>
<th>Disease</th>
<th>20th Century Annual Morbidity</th>
<th>Reported Cases in 2019</th>
<th>Percentage Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measles</td>
<td>530,217</td>
<td>1,287</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Pertussis</td>
<td>200,752</td>
<td>15,662</td>
<td>92%</td>
</tr>
<tr>
<td>Mumps</td>
<td>162,344</td>
<td>3,509</td>
<td>98%</td>
</tr>
<tr>
<td>Rubella</td>
<td>47,745</td>
<td>3</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Smallpox</td>
<td>29,005</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>21,053</td>
<td>2</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Polio (paralytic)</td>
<td>16,316</td>
<td>0</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Centers for Disease Control and Prevention

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**SARS-CoV-2**
- SARS-CoV2 genome sequenced
- 1st vaccine batch (mRNA-1273)
- Worldwide pandemic declared
- 1st clinical trial
- Vaccine in 12-18 months?

**MERS**
- MERS genome sequenced
- MERS outbreak (Saudi Arabia)
- 1st clinical trial

**SARS-CoV-1**
- SARS-CoV-1 genome sequenced
- 1st clinical trial

**Ebola**
- ebola genome sequenced
- Canadian team publishes 1st vaccine
- Largest outbreak: West Africa
- 1st clinical trial
- Vaccine approved Ervebo (rVSV vector)

**Polio**
- First Epidemic (USA)
- Polio determined to be viral
- Salk vaccine (inactivated virus)
- Sabin vaccine (oral, live attenuated)
- "Wild" polio eradicated (USA)
- Polio genome sequenced

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Vaccine Safety History

The Vaccine Life Cycle

- Safety at every phase

- Safety is a priority during vaccine development + approval

- Safety monitoring for serious, unexpected adverse events

- Continues with CDC + FDA safety monitoring

- Phases:
  - Phase 1: Safety
  - Phase 2: Effectiveness
  - Phase 3: Safety + Effectiveness
  - Phase 4: FDA Approval or Rare Vaccines
  - Post-Approval Monitoring + Research

- Basic Research, Discovery, Pre-Clinical Studies, Clinical Studies/Trials, FDA Review, ACIP Review, ACIP Recommendation
Sample of Historical Vaccine Safety concerns

• Cutter Incident – 1955 – 250 cases of polio
  – Vaccine recall, gov oversight, better regulatory systems, and the VICP

• Simian Virus 40 (SV40) – 1963
  – Testing requirements to verify all lots & no vax contains SV40

• Swine flu & Guillain-Barre Syndrome (GBS) – 1976
  – 1 additional GBS case / 100,000 people that receives vax
  – CDC continually monitors safety of seasonal and pandemic flu vaxx

• Hepatitis B vaccine and Multiple Sclerosis – 1998
  – No link found
Vaccine Development Comparisons

Comparing vaccine development throughout history

- **Polio**
  - First animal studies
  - First human trial
  - Larger clinical trial
  - Rollout
  - Eradication

- **Typhoid fever**

- **Yellow fever**

- **Influenza**

- **MMR**

- **Chickenpox**

- **Hepatitis B**

- **Swine flu**

- **Coronavirus**

Sources: The College of Physicians of Philadelphia; WHO; CDC; National Institutes of Health; Business Insider
mRNA vaccine vs Traditional Vaccine

**mRNA Vaccine**

- **Components**
  - mRNA (blueprint of protein)

- **Production**
  - Faster because mRNA molecules are easier to produce

- **Process**
  - Components are injected into the arm and serve as instructions for the body to make microbial protein

**Traditional Vaccine**

- **Components**
  - Microbial protein or inactive microbe

- **Production**
  - Slower and more difficult to produce the right type of protein

- **Process**
  - Components are made in a lab and injected into the arm to stimulate immune response

Ref: Vanderbilt Vaccine Research Program. Vanderbilt Institute for Infection, Immunology and Inflammation
The “accelerated” pathway

Keys:

1. Extensive knowledge base about viruses overall, specific families, & specific targets
2. >10 years of mRNA research
3. Quick enrollment on and feedback from clinical trials
4. Manufacturing facilities were built earlier
5. Overlap of study phases
6. Expedited review
Clinical Trials

Vaccines were evaluated in tens of thousands of participants in clinical trials before applying for EUA:

Examples of Meta-analysis


What is the Safety profile reported in the trials?

• In vaccine recipients, the SP was characterized by short term, mild to moderate local reactions (pain, erythema, swelling), and systemic reactions (fever, headache, myalgias)
• More after second dose
• Resolved rapidly (1-3 days)
• No major safety concerns were noted
• Favorable safety profile
How effective are these vaccines compared to other vaccines?

- Seasonal flu: 19% (2014-15), 45% (2019-20 estimate)
- Moderna: 94.1%
- Pfizer/BioNTech: 95%
- German measles, measles: 97%
- Polio: 99%
Real world safety and effectiveness?

Morbidity and Mortality Weekly Report (MMWR)

COVID-19 VACCINATION PREVENTS INFECTION AND SEVERE ILLNESS

- Infection: 3x more likely among unvaccinated compared with fully vaccinated people
- Hospitalization: 2x more likely among unvaccinated compared with fully vaccinated COVID-19 patients
- Death: 7x more likely among unvaccinated compared with fully vaccinated COVID-19 patients

Study of patients ages 12 and up in a large health system*

Vaccinate all eligible people as soon as possible

After Delta became the most common variant,* fully vaccinated people had reduced risk* of...

- INFECTION: 5x
- HOSPITALIZATION: >10x
- DEATH: >10x

Vaccination offers strong protection against COVID-19

*Based on the most current data, as of July 29, 2021
†1-10 days after completing a two-dose COVID-19 vaccination series

bit.ly/MMWR704604

bit.ly/MMWR91021

Compared with unvaccinated people
How do we know that this vaccine is safe and effective?

Up until Jan 12, 2022:

- Over 524 M doses have been administered only in the USA
- Over 208.5 M (62.8% of the total US population) have been fully Vaccinated
- And over 78.1 M (37.5% of the total US population) have taken boosters

And the Safety Profile continues to be acceptable
Why getting vaccinated against COVID-19?

- To lower the risk of getting & spreading the virus.
- To prevent serious illness & death.
- Because it is a safer way to build protection than getting sick with COVID-19.
- Because the benefits of vaccination outweigh the risks.
Coloradans who got three doses:

- Are 3.3 times less likely to be hospitalized with COVID-19 than people who received two doses of Pfizer or Moderna or one dose of Johnson & Johnson.

- Are 47.5 times less likely to be hospitalized with COVID-19 than people who haven’t been vaccinated at all.

- Are 2.4 times less likely to get infected with COVID-19 than people who received two doses of Pfizer or Moderna or one dose of Johnson & Johnson.

- Are 9.7 times less likely to get infected with COVID-19 than people who haven’t been vaccinated at all.
How many severe allergic reactions have been reported?

- Anaphylaxis, a severe type of allergic reaction, after COVID-19 vaccination is rare and has occurred in approximately 2 to 5 people per million vaccinated in the United States.

- If it happens, healthcare providers can effectively and immediately treat the reaction.

- Allergic reactions resolve rapidly without long-term sequelae.
COVID-19 vaccines administered in the USA from 12/14/2020 – 1/12/2022 = more than 524 million

0.0022% of the reports to VAERS included fatalities that do not necessarily represent a causal relationship with vaccines

Preferential recommendation has been given to mRNA vaccines (Pfizer-BioNTech & Moderna) based on reported J&J adverse events identified as causally associated with the vaccine.

Among 17 million J&J recipients, 54 cases developed thrombosis with thrombocytopenia syndrome (TTS); 36 of them required care at ICU, and 9 died (15% of cases). Based on these numbers, the risk appears to be greatest—1 in 100,000—in women ages 30 to 49.

This updated CDC recommendation follows similar recommendations from other countries, including Canada and the United Kingdom.
Worried about effect of vaccines on fertility?

• No evidence that any vaccines, including COVID-19 vaccines, cause fertility problems (both in men and women)

• No scientific theory for how the COVID-19 vaccines could cause fertility problems

• No differences found in pregnancy success rates among women with or w/o antibodies

• No significant changes in sperm characteristics after vaccination (quantity and movement)

• No increased risk for miscarriage among vaccinated before 20 weeks of pregnancy

• Data from the safety monitoring systems have not identified any safety concerns for pregnant people who were vaccinated or for their babies.
Do COVID-19 vaccines insert microchips, magnetism, DNA alterations, or coronavirus?

COVID-19 vaccines are free from microelectronics, electrodes, carbon nanotubes, nanowire semiconductors, graphene oxide, aluminum, iron, nickel, cobalt, lithium, rare earth alloys, coronavirus.
How do I get an appointment?

To find appointments visit:


- [www.boco.org/CovidVaccines](http://www.boco.org/CovidVaccines) (English) or [www.boco.org/CovidVacunas](http://www.boco.org/CovidVacunas) (Spanish)


- If you need to schedule an in-home vaccination: 1-877-COVAXCO (1-877-268-2926) M-F, 8 am to 8 pm; Sat & Sun 9 am to 6 pm MT (multiple languages avail). If you are unable to make the call, a caregiver, family member, or friend can call on your behalf.
Learn more about the COVID-19 vaccines

• **CDCs website:**  
  www.cdc.gov/vaccines/covid-19/index.html

  **CDPHE website:**  
  https://covid19.colorado.gov/  
  https://covid19.colorado.gov/espanol
Stay Connected with Boulder County

• Boulder County Public Health social media
  
  Facebook

  Twitter

  Instagram
It Takes All of Us to Stop this Virus!

Thank you!
COVID-19 Vaccination Confidence & Hesitation among Dental Professionals
Lessons learned from Research

References:


(2) Riad, Abanoub et al. “Global Prevalence and Drivers of Dental Students' COVID-19 Vaccine Hesitancy.” *Vaccines* vol. 9,6 566. 29 May. 2021, doi:10.3390/vaccines9060566