Vaccine Hesitancy – What's Happening"
Prof. Rodney Rohde, Texas State University
A Webber Training Teleclass

Vaccine Hesitancy- What's Happening

Prof. Rodney E. Rohde

Hosted by Martin Kiernan

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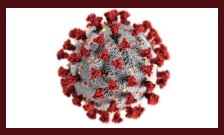

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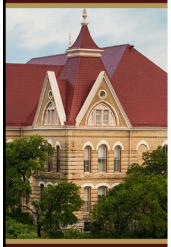

@RodneyRohde
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Speaker Bio

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Rodney E. Rohde [he/him/his]
#WeSaveLivesEveryday in the #MedicalLaboratory

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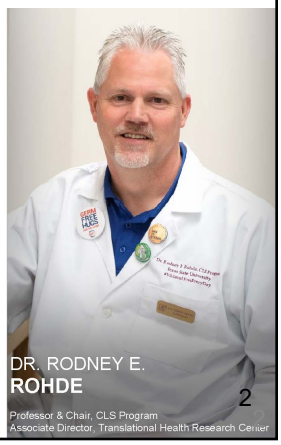

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"The impact of vaccination on the health of the world's peoples is hard to exaggerate. Apart from safe water, no other modality has had such a major effect on mortality reduction and population growth."

Susan and Stanley Plotkin, A Short History of Vaccination, in *Vaccines* 1st Edition, 1988

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Overview

CDC PHIL 24150

- A brief historical view
- Vaccine hesitancy
- Elements of vaccine confidence
- Strategies for building vaccine confidence
- Strategies for talking about vaccines, including COVID-19
- Communication resources

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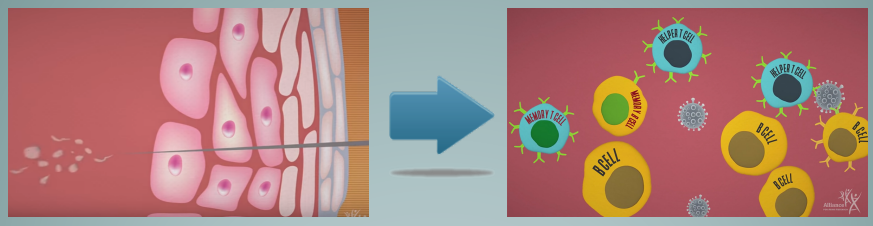
How Vaccines Work



- Vaccines help us develop immunity by imitating an infection and triggering antibodies to develop
- Those antibodies will be available to fight the next time you are exposed to that microbe – virus, bacterium, fungus, protozoan, or allergen.

Source: The Alliance for Aging Research

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THE HISTORY OF VACCINES

The origin of smallpox is unknown, though research says it has existed for centuries. Here's a look at some milestones.

1796 – English physician-scientist Edward Jenner inoculates eight-year-old James Phipps with matter from a cowpox sore – proving that inoculating a person with cowpox pus can create smallpox immunity.

1800 – Harvard physician-scientist Benjamin Waterhouse performs first smallpox vaccinations on his four children.

1813 – Drastic decrease in smallpox mortality after vaccination begins.

1820 – U.S. Vaccine Agency established – then and now, continues to ensure safety, efficacy of vaccines.

1879 – Spanish physician Jaime Ferrán develops a cholera vaccine – first against a bacterial disease.

1885 – French biologist Louis Pasteur develops technology for attenuated vaccines (uses weakened viruses).

1926 – Influenza vaccine approved for civilians.

1946 – Gaston Ramon, a veterinarian at the Pasteur Institute in France, develops diphtheria toxoid; working independently at the Wellcome Research Laboratories in London, physician Alexander Thomas Glenny does likewise.

1957 – Polio vaccine made widely available

1971 – Combination measles, mumps, rubella (MMR) vaccine released after the individual vaccines were released in 1963, 1967, and 1969, respectively.

1990s – Scientists begin exploring how to simplify vaccines using mRNA, discovering it can create a stronger immunity by training the immune system to make antibodies and killer T-cells which kill cells infected with an intruder.

2017 – BioNTech clinical trial in Germany shows mRNA vaccine effective against melanoma.

2018 – Modern plant opens in Massachusetts to manufacture mRNA vaccines for cancer clinical trials.

2020 – In July, Moderna publishes Phase 1 and 2 clinical trial results of COVID-19 vaccine. In August, Pfizer-BioNTech publishes Phase 1 and 2 clinical trial results. In December, U.S. Food and Drug Administration (FDA) issues Emergency User Authorization (EUA) for the Pfizer-BioNTech and Moderna COVID-19 vaccines.

2021 – In February, FDA issues EUA for viral vector COVID-19 vaccine from Johnson & Johnson/Janssen.

Source: Northwestern Medicine - https://www.nm.org/healthbeat/covid-19/believe-in-the-vaccine/history-of-vaccines
EDWARD JENNER ILLUSTRATION: Mario Breda | ADOBE STOCK | ALL OTHER ICONS: ADOBE STOCK AND ISTOCKPHOTO.COM

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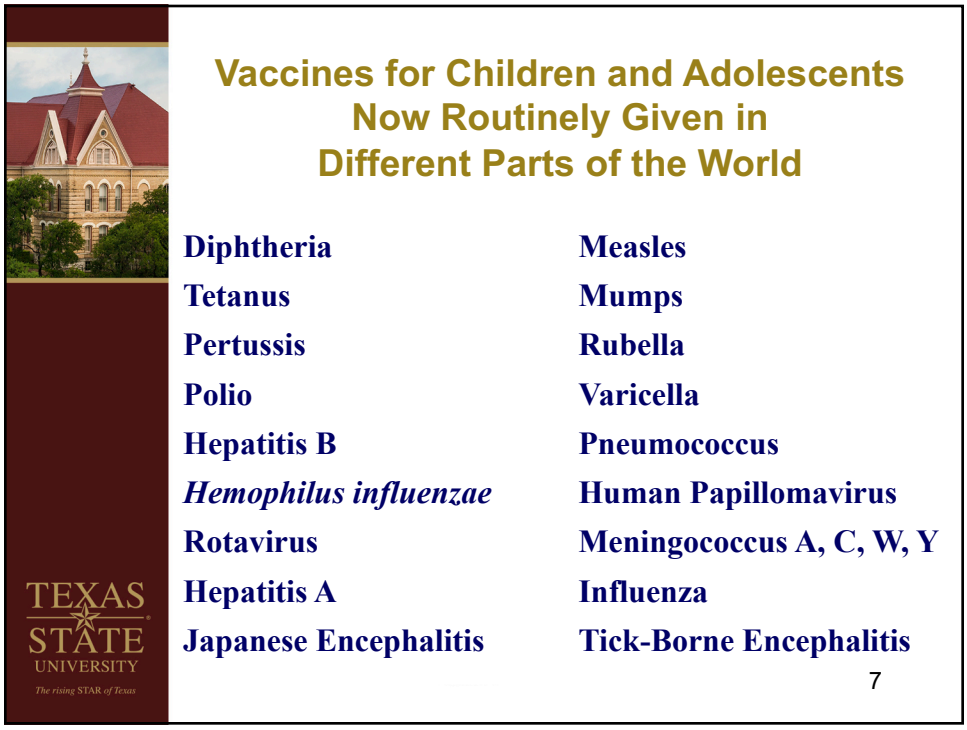
Vaccines for Children and Adolescents
Now Routinely Given in
Different Parts of the World
Diphtheria
Tetanus
Pertussis
Polio
Hepatitis B
Hemophilus influenzae
Rotavirus
Hepatitis A
Japanese Encephalitis
Measles
Mumps
Rubella
Varicella
Pneumococcus
Human Papillomavirus
Meningococcus A, C, W, Y
Influenza
Tick-Borne Encephalitis
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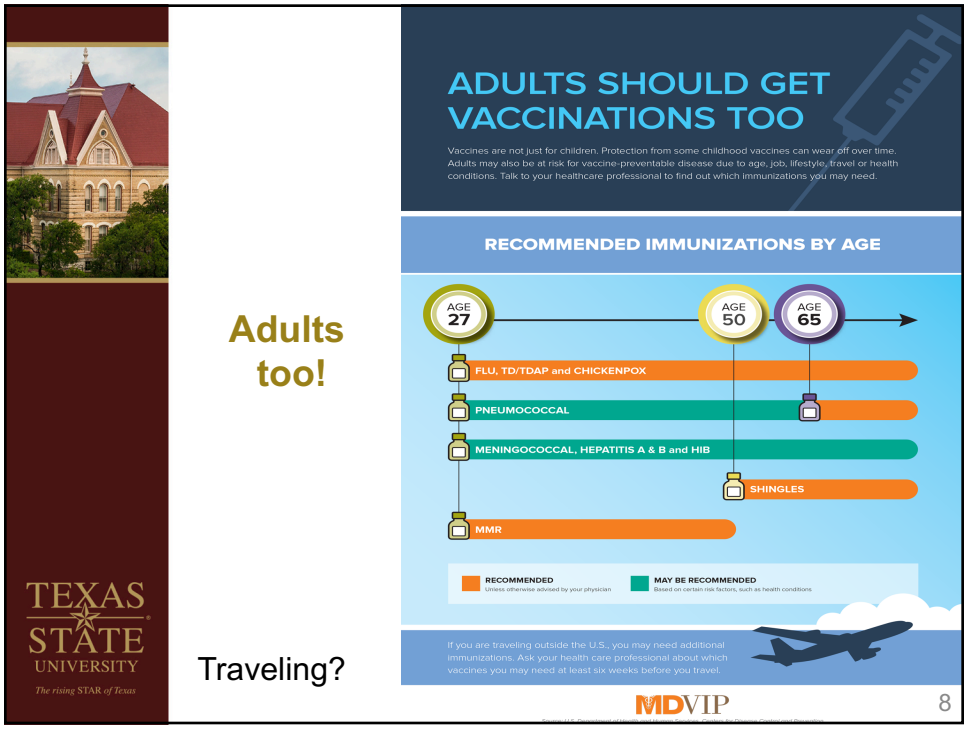
Adults too!
Traveling?
ADULTS SHOULD GET VACCINATIONS TOO
Vaccines are not just for children. Protection from some childhood vaccines can wear off over time. Adults may also be at risk for vaccine-preventable disease due to age, job, lifestyle, travel or health conditions. Talk to your healthcare professional to find out which immunizations you may need.
RECOMMENDED IMMUNIZATIONS BY AGE
AGE 27
AGE 50
AGE 65
FLU, TD/TDAP and CHICKENPOX
PNEUMOCOCCAL
MENINGOCOCCAL, HEPATITIS A & B and HIB
SHINGLES
MMR
RECOMMENDED
Unless otherwise advised by your physician
MAY BE RECOMMENDED
Based on certain risk factors, such as health conditions
If you are traveling outside the U.S., you may need additional immunizations. Ask your health care professional about which vaccines you may need at least six weeks before you travel.
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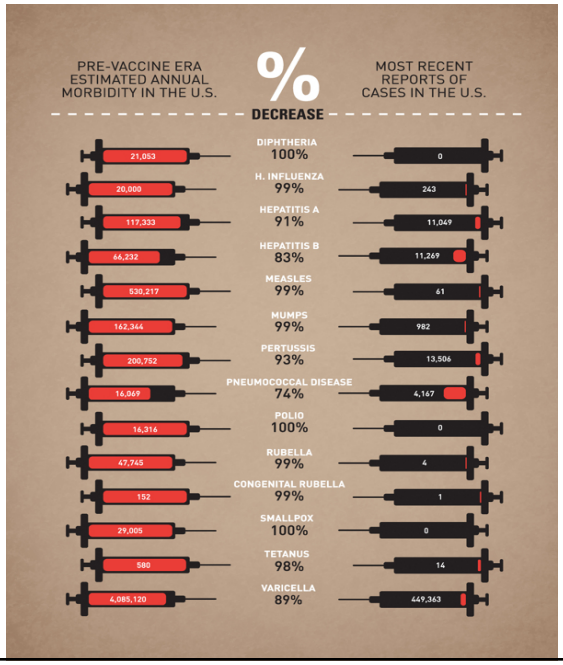
Vaccine Effectiveness



Graphic created by Leon Farrant based on CDC data

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Definitions

- **Vaccine hesitancy**
  - Delay in acceptance or refusal of vaccination despite availability
  - Complex and context specific (varies across place, time, and vaccine)
- **Vaccine acceptance**
  - Timely receipt of all childhood vaccines as recommended by ACIP when available
- **Vaccine confidence**
  - Trust that parents or providers have in the recommended immunization, the providers who administer the vaccine, and the process of licensure and vaccination schedule

Source: McDonald NE, et al. Vaccine, 2015; 33
Orenstein WA, et al. Pub Health Rep, 2015; 130

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Decline in Vaccination Rates

- Whole cell pertussis vaccine associated with encephalopathy
  - In 1974, vaccination rate decreased in UK followed by an epidemic of more than 100,000 cases of pertussis and 36 deaths by 1978
  - In Sweden, the annual incidence rate of pertussis per 100,000 children of 0-6 years of age increased from 700 cases in 1981 to 3,200 in 1985
  - In Japan, after vaccination rates plummeted from 70 percent to 20-40 percent, a jump of over 3,000 percent in pertussis cases was observed between 1974 and 1979
- MMR linked with autism in 1990's
  - Decline in vaccination in U.S. and UK followed by outbreaks of measles
  - 5% decline in MMR coverage results in 3-fold increase in cases/yr

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Source: Marshall G. The **Vaccine Handbook**, 9E, 2020
https://www.who.int/vaccine_safety/initiative/detection/immunization_misconceptions/en/index2.html

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Vaccines and Autism – Wakefield.

- In 1998, Andrew Wakefield and colleagues published a paper in the journal Lancet. Wakefield's hypothesis was that the measles, mumps and rubella (MMR) vaccine caused a series of events that include intestinal inflammation, entrance into the bloodstream of proteins harmful to the brain, and consequent development of autism. In support of his hypothesis, Dr. Wakefield described 12 children with developmental delay — eight had autism. All of these children had intestinal complaints and developed autism within one month of receiving MMR. Thus, MMR linked with autism began in 1990's
- The Wakefield paper published in 1998 was flawed for two reasons:

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Source: https://www.chop.edu/centers-programs/vaccine-education-center/vaccines-and-other-conditions/vaccines-autism

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Vaccines and Autism – Wakefield.

- About 90% of children in England received MMR at the time this paper was written. Because MMR is administered at a time when many children are diagnosed with autism, it would be expected that most children with autism would have received an MMR vaccine, and that many would have received the vaccine recently. The observation that some children with autism recently received MMR is, therefore, expected. However, determination of whether MMR causes autism is best made by studying the incidence of autism in both vaccinated and unvaccinated children. This wasn't done.
- Although the authors claim that autism is a consequence of intestinal inflammation, intestinal symptoms were observed after, not before, symptoms of autism in all eight cases.
- Paper retracted and Wakefield eventually loses medical license after a 2nd flawed 2002 study. For complete review, see SOURCE.

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Source: https://www.chop.edu/centers-programs/vaccine-education-center/vaccines-and-other-conditions/vaccines-autism

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Vaccine Hesitancy

- Vaccine hesitancy is a behavior influenced by several factors including issues of confidence, complacency, and convenience. Vaccine-hesitant individuals are a heterogeneous group who hold varying degrees of indecision about specific vaccines or vaccination in general.
- Vaccine hesitant individuals *may accept* all vaccines but *remain concerned* about vaccines*;* some may refuse or delay some vaccines but accept others; some individuals may refuse all vaccines.

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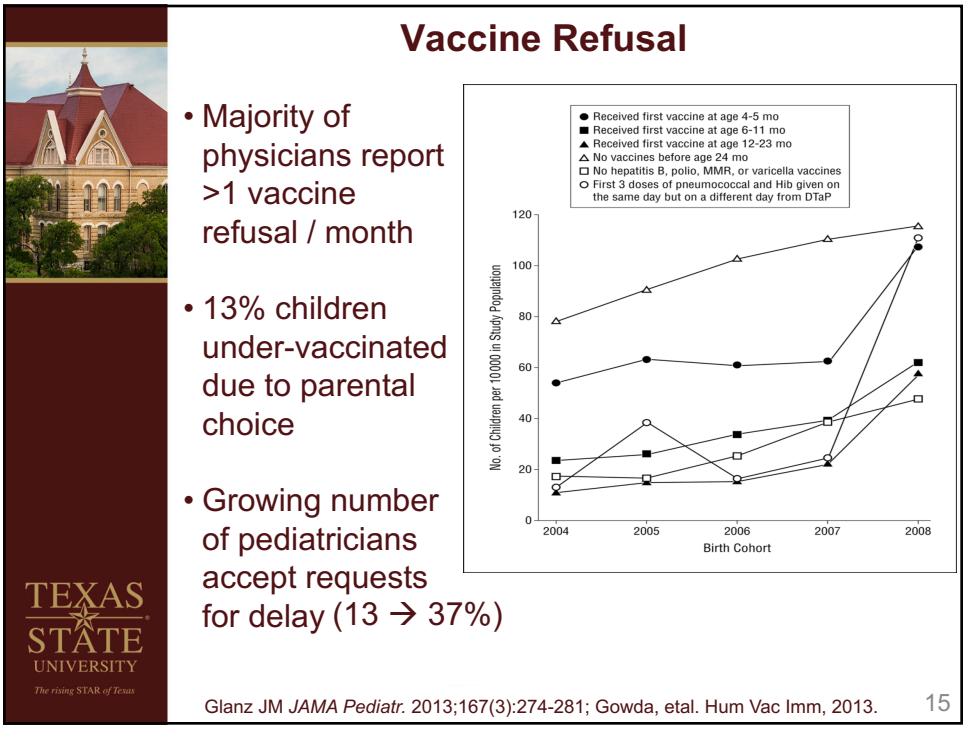

Vaccine Refusal

- Majority of physicians report >1 vaccine refusal / month
- 13% children under-vaccinated due to parental choice
- Growing number of pediatricians accept requests for delay (13 → 37%)

Glanz JM *JAMA Pediatr.* 2013;167(3):274-281; Gowda, etal. Hum Vac Imm, 2013.

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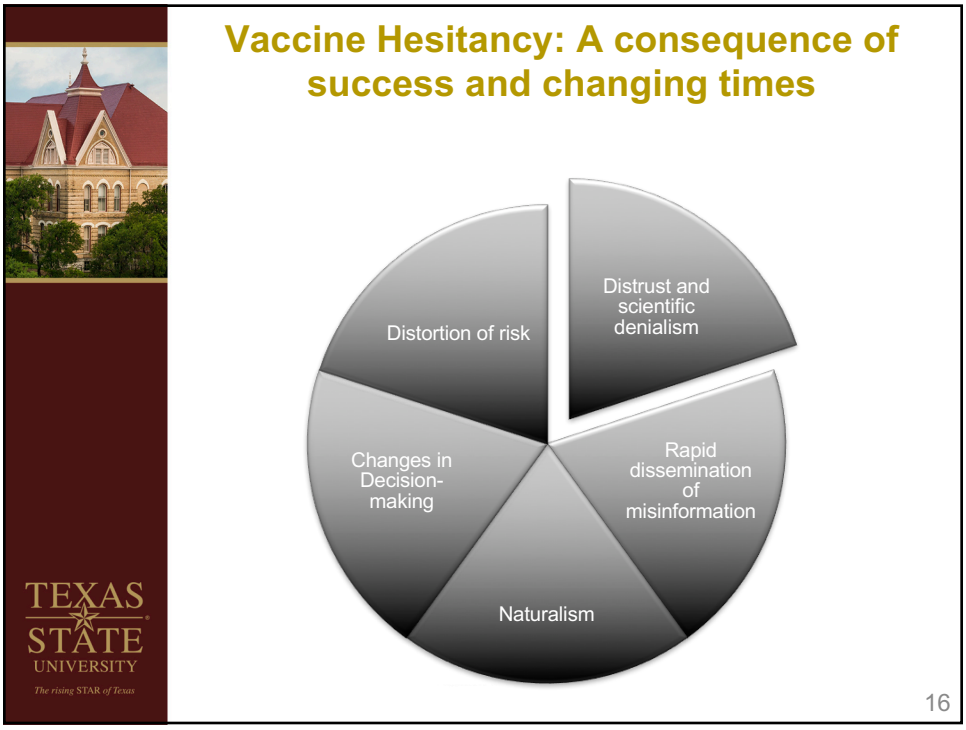

Vaccine Hesitancy: A consequence of success and changing times

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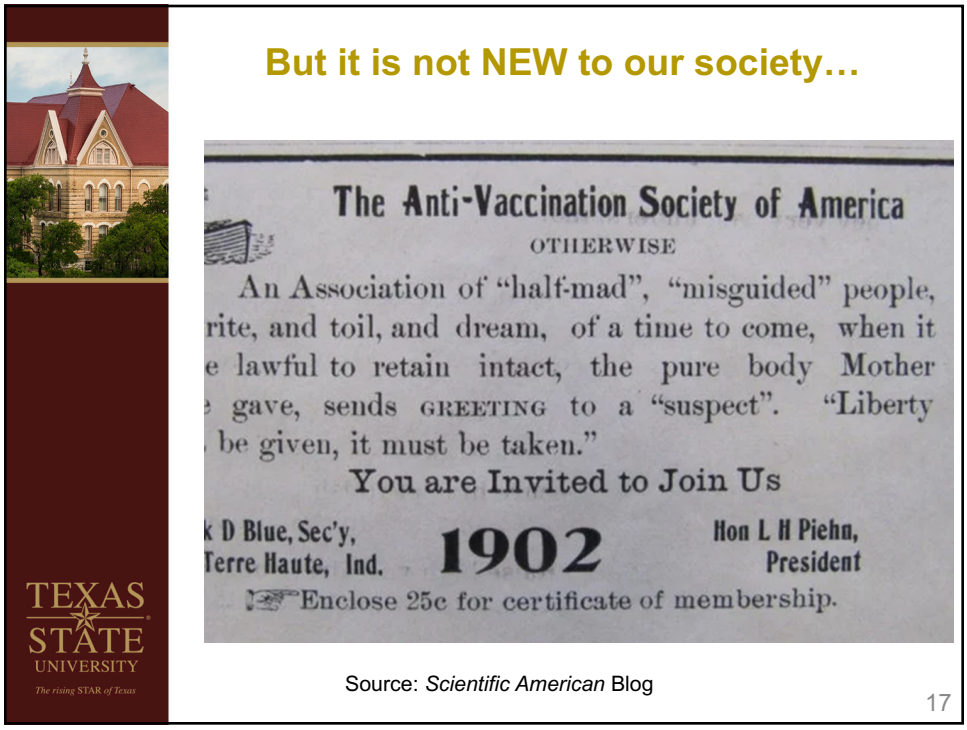
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But it is not NEW to our society…
The Anti-Vaccination Society of America
OTHERWISE
An Association of "half-mad", "misguided" people,
rite, and toil, and dream, of a time to come, when it
e lawful to retain intact, the pure body Mother
gave, sends GREETING to a "suspect". "Liberty
be given, it must be taken."
You are Invited to Join Us
D Blue, Sec'y,
Terre Haute, Ind.
1902
Hon L H Piehn,
President
Enclose 25c for certificate of membership.
Source: Scientific American Blog
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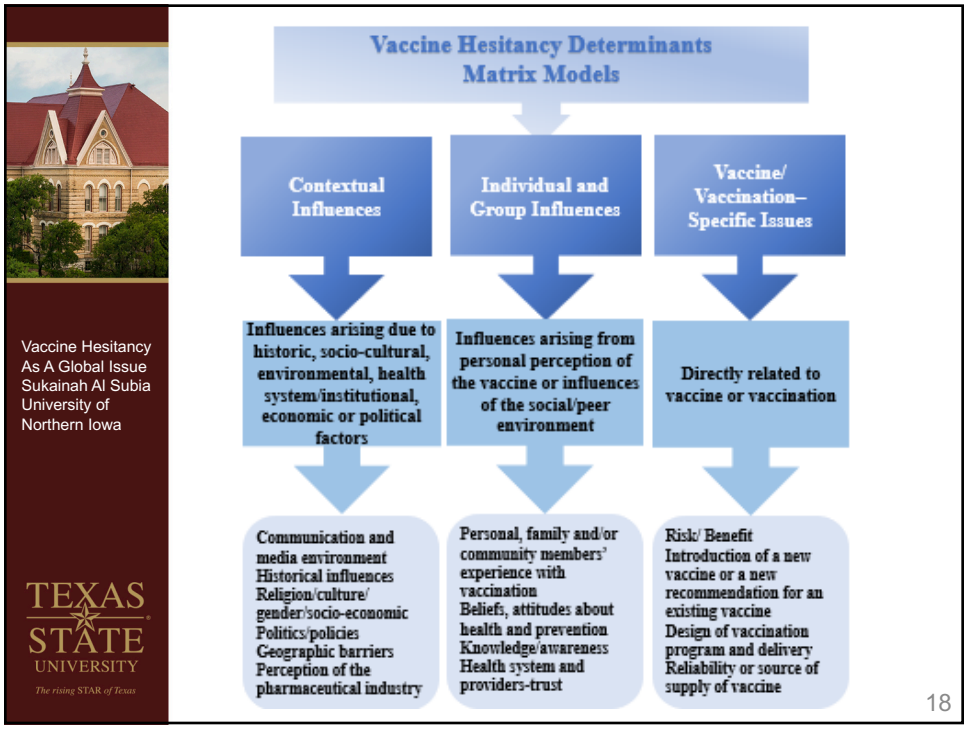
Vaccine Hesitancy As A Global Issue
Sukainah Al Subia
University of Northern Iowa
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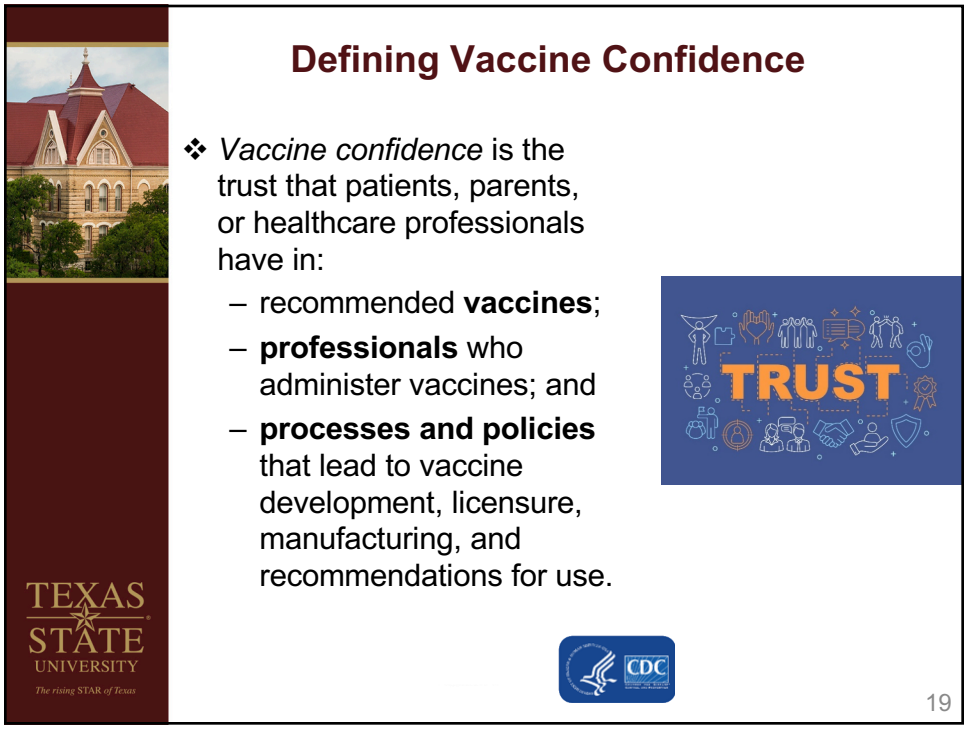
Vaccine Hesitancy Determinants Matrix Models
Contextual Influences
Individual and Group Influences
Vaccine/ Vaccination– Specific Issues
Influences arising due to historic, socio-cultural, environmental, health system/institutional, economic or political factors
Influences arising from personal perception of the vaccine or influences of the social/peer environment
Directly related to vaccine or vaccination
Communication and media environment
Historical influences
Religion/culture/ gender/socio-economic
Politics/policies
Geographic barriers
Perception of the pharmaceutical industry
Personal, family and/or community members' experience with vaccination
Beliefs, attitudes about health and prevention
Knowledge/awareness
Health system and providers-trust
Risk/ Benefit
Introduction of a new vaccine or a new recommendation for an existing vaccine
Design of vaccination program and delivery
Reliability or source of supply of vaccine
18


Defining Vaccine Confidence
❖ Vaccine confidence is the trust that patients, parents, or healthcare professionals have in:
– recommended vaccines;
– professionals who administer vaccines; and
– processes and policies that lead to vaccine development, licensure, manufacturing, and recommendations for use.
TRUST
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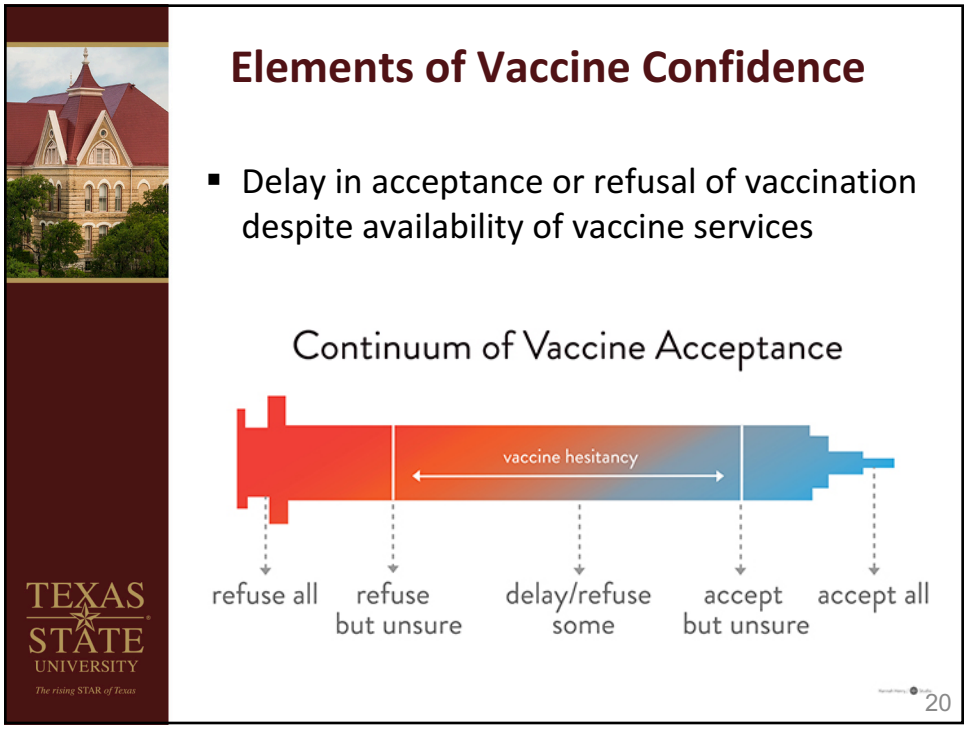
CDC
19


Elements of Vaccine Confidence
▪ Delay in acceptance or refusal of vaccination despite availability of vaccine services
Continuum of Vaccine Acceptance
vaccine hesitancy
refuse all
refuse but unsure
delay/refuse some
accept but unsure
accept all
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Vaccinate with Confidence

A National Strategy to Reinforce Confidence in COVID-19 Vaccines

Build Trust	Objective: Share clear, complete, and accurate messages about COVID-19 vaccines and take visible actions to build trust in the vaccine, the vaccinator, and the system in coordination with federal, state, and local agencies and partners.
Empower Healthcare Personnel	Objective: Promote confidence among healthcare personnel* in their decision to get vaccinated and to recommend vaccination to their patients.
Engage Communities & Individuals	Objective: Engage communities in a sustainable, equitable and inclusive way — using two-way communication to listen, build trust, and increase collaboration.

*Personnel = All staff working in healthcare settings, including physicians, physician assistants/nurse practitioners, nurses, allied health professionals, pharmacists, support staff, and community health workers

https://www.cdc.gov/vaccines/covid-19/vaccinate-with-confidence.html

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Vaccinate with Confidence

A component of the National Strategy to Reinforce Confidence in COVID-19 vaccines

Empower Healthcare Personnel	Objective: Promote confidence among healthcare personnel in their decision to get vaccinated and to recommend vaccination to their patients.

Tactics

- ✓ Engage local and national professional associations, health systems, and healthcare personnel
- ✓ Ensure healthcare systems and medical practices are equipped to create a culture that builds confidence in COVID-19 vaccination.
- ✓ Strengthen the capacity of healthcare professionals to have empathetic vaccine conversations using motivational interviewing techniques.

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Keys to Building Demand for Vaccines

Make vaccines:

- **Accessible** (easy to get)
- **Beneficial** (health benefits outweigh perceived or real risk of getting COVID-19 or perceived or real side effects from vaccination)
- **Convenient** (reduce out of pocket, social, and opportunity costs)
- **Desirable** (appealing)
- **Normative** (presented as a social default)
- **Necessary** (indispensable for accessing things they want to get back to doing)

23

Strategies to Build COVID-19 Vaccine Confidence Among Healthcare Professionals

- **Host discussions** where personnel at different levels can ask questions and share concerns in a safe space.
- **Share key messages** with staff through emails, breakroom posters, and other channels.
- **Highlight the experiences** of employees who were initially hesitant to get vaccinated, but who later made the decision to get the vaccine.
- **Encourage senior leaders** to be vaccine champions.

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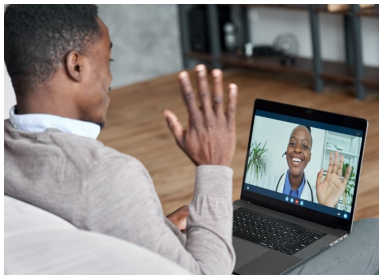
The Role of Healthcare Professionals

- Healthcare professionals are patients' and parents' most trusted source of information on vaccines.
- Your answers to their questions matter and will help them make an informed decision about getting a COVID-19 vaccination for themselves or their children.
- Your strong vaccine recommendation is the most important part of the conversation.



www.cdc.gov/vaccines/covid-19/hcp/engaging-patients.html

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Lead with Listening

- Do not make assumptions about whether your patients will choose to get vaccinated or the reasons for their decisions.
  - Instead, begin with an open-ended question, such as "What are your thoughts on getting a COVID-19 vaccination today?"
- Actively listen and seek to understand the patient's point of view.
- Recognize that these conversations can take time and may continue over the course of multiple encounters.

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Use Patient-Centered Communication Techniques

- **Use open-ended questions** to promote dialogue. Ask about readiness to vaccinate and what questions or concerns they may have.
- **Paraphrase** any information shared to show that you have heard and understood it.
- **Praise measures already taken** to protect themselves or their children from COVID-19, like mask wearing and physical distancing. Then **frame** vaccination as a safe and effective way to help protect them and their loved ones from getting COVID-19.
- **Ask for permission** to share more information on COVID-19 vaccines. This will foster openness and connection.

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Respond to Questions and Concerns with Empathy

- **Respond to questions** and concerns in a non-judgmental, respectful, and empathic way.
- **Provide accurate answers** using clear, simple language. Explore questions patients ask most often about vaccines (see URLs below).
- Some concerns may stem from mistrust in the medical establishment or the government as result of collective or individual mistreatment and traumas. **Acknowledging past traumas** may promote patients' trust in you and your message.
- **Acknowledge uncertainty** about what we don't yet know about COVID-19 vaccines. This can help build trust.

www.cdc.gov/vaccines/covid-19/hcp/answering-questions.html
www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html

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Give Your Strong Recommendation

- **Let your patients know** that you recommend COVID-19 vaccination for them. Your strong recommendation is critical for vaccine acceptance.
- **Tailor your recommendation** to include any relevant reasons why COVID-19 vaccination might be important for this particular patient.

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Give Your Strong Recommendation

- **Talk about your personal decision** and experience in getting a COVID-19 vaccine and your experience treating COVID-19 patients.
- **Share the benefits** of getting vaccinated, including:
  - Protecting themselves and others who may be more vulnerable, and
  - Enabling them to get back to activities they have missed.
    - Explain what they can do when they've been fully vaccinated.

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Examples

- "I strongly recommend you get a COVID-19 vaccine…"
- "…This shot is especially important for you because of your [job/underlying health condition/vulnerable family member]."
- "…I believe in this vaccine so strongly that I got vaccinated as soon as it was available to me, and I recommended that everyone in my family do the same."
- "I have seen what COVID-19 can do to patients and their families. I want to protect you as best I can from COVID-19 infection and complications."

@RodneyRohde
@txst_CLS
@txst_THR

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Key Messages About COVID-19 Vaccination

1. You can help **stop the COVID-19 pandemic** by getting a COVID-19 vaccine.
2. COVID-19 vaccines are **safe *and* effective**.
3. COVID-19 vaccines are **free**.
4. After COVID-19 vaccination, you might have some **temporary side effects.** These are normal signs that your body is building protection.
5. Once you are fully vaccinated, you can resume most activities that you stopped doing because of the COVID-19 pandemic, such as gathering indoors with family and friends, without wearing a mask.

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Address Misinformation About COVID-19 Vaccination by Sharing Key Facts

https://www.cdc.gov/coronavirus/2019-ncov/vaccines/facts.html

COVID-19 vaccines cannot give you COVID-19.

People who have already gotten sick with COVID-19 may still benefit from getting vaccinated.

There is currently no evidence that COVID-19 vaccination causes any problems with pregnancy or fertility.

COVID-19 vaccines do not change your DNA in any way.

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Help Individuals Find Their Motivation for Getting Vaccinated

- Steer the conversation away from "why not?" and toward the important reasons that matter to them—**their "why."**
- The reasons that someone may choose to get vaccinated will always be those that are **most compelling to them personally**.
- You may choose to share your reasons for getting vaccinated or discuss common goals you may have, like visiting with family safely.

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Wrap Up the Conversation

- **Encourage patients** or parents to take at least one action, such as:
  - Scheduling a vaccination appointment with your office, a pharmacy, or another vaccination site, or
  - Reading any handouts that you provide to them.

- If they decline vaccination, acknowledge that this is their decision, and keep the door open to revisiting the topic during future visits.

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It Will Take More Than One Conversation to Change Minds

- Vaccine hesitancy, especially when rooted in **lack of trust** rather than lack of information, is best addressed through **trusted messengers** in trusted spaces.
- Encourage two-way dialogue and allow space for people to ask questions.

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Resources:

Sample Email or Letter on COVID-19 Vaccination To Send to Your Patients

Dear [INSERT PATIENT NAME],

I hope this [email/letter] finds you and your loved ones staying safe and healthy.

The COVID-19 pandemic has caused tremendous disruption in each of our lives. As your primary care provider, I care deeply about your health and well-being. That's why I encourage you to get a COVID-19 vaccine as soon as possible if you haven't already. Getting vaccinated can bring you one step closer to enjoying the activities you miss. It is one of the most important things you can do to help protect yourself and your loved ones from this disease. Everyone 12 years of age and older is now eligible to get a COVID-19 vaccination.

Do you have questions or concerns about vaccination? I want to answer them as best I can and help you make an informed decision. You can call my office at **(###) ###-####**.

Here are some of my answers to questions I've heard most often from patients:

- **Why should I get vaccinated?** COVID-19 can cause serious illness or even death. There's no way to know how COVID-19 will affect you. And if you get sick, you could spread the disease to family, friends, and others around you. COVID-19 vaccination is an important tool to help us stop the pandemic and get back to normal.
- **Are COVID-19 vaccines effective at preventing the disease?** All COVID-19 vaccines available in the United States are effective at preventing the disease. Getting a COVID-19 vaccine will also help keep you from getting seriously ill even if you do get COVID-19.
- **Are the COVID-19 vaccines safe?** COVID-19 vaccines are safe. Over 100 million people in the United States are fully vaccinated. COVID-19 vaccines have undergone the most intensive safety monitoring in U.S. history, and scientists are continuing to monitor their safety.
- **Will the shot make me sick? Will I have side effects?** You may have side effects after vaccination, but these are normal signs that your body is building protection. The most common side effects are pain, redness, and swelling in the arm where you got the shot, tiredness, headache, muscle pain, chills, fever, and nausea. If you have these side effects, they should go away within a few days. Serious safety problems are rare. But if you are concerned about them, I'd be happy to talk to you.

There are many places where you can get vaccinated, and it's 100% free. You can

- Contact our office to schedule a vaccination appointment. [PROVIDER: Remove this bullet if you do not offer vaccination and consider indicating that in the letter.]
- Visit vaccines.gov or www.vacunas.gov to find vaccines near you.
- Text your zip code to 438829 (GETVAX) or 822862 (VACUNA), or call 1-800-232-0233 to find vaccine locations.
- Call your local pharmacy or visit your local health department website.

I'm here to answer your questions, and I look forward to hearing from you.

Sincerely,

[INSERT NAME & CONTACT INFORMATION]

https://www.cdc.gov/vaccines/covid-19/downloads/Sample-Physician-Letter-COVID-19-Vaccine.docx

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Resources for Talking with Patients about COVID-19 Vaccination

- COVID-19 data and vaccination tracker: https://covid.cdc.gov/covid-data-tracker/#datatracker-home
- Vaccines for COVID-19 – information for patients: https://www.cdc.gov/coronavirus/2019-ncov/vaccines/index.html
- Where to find a COVID-19 vaccine: https://www.vaccines.gov/
- Preparing to provide COVID-19 vaccines: https://www.cdc.gov/vaccines/covid-19/training.html
- Talking with patients about COVID-19 vaccines: www.cdc.gov/vaccines/hcp/covid-conversations
- Frequently asked questions about COVID-19 vaccination: https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html
- COVID-19 Vaccines for Children and Teens: https://www.cdc.gov/coronavirus/2019-ncov/downloads/vaccines/toolkits/COVID-19-Vaccine-for-Preteens_Teens-508.pdf
- Clinician Outreach and Communication (COCA) Call – What every clinician should know about COVID-19 vaccine safety and effectiveness and how to address patient questions and concerns: https://emergency.cdc.gov/coca/calls/2021/callinfo_030921.asp

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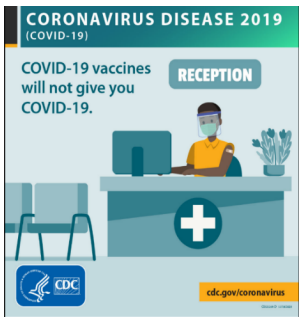
COVID-19 Vaccination Communication Toolkit for Medical Centers, Clinics, and Clinicians

- Stickers
- Social media
- Slides
- Fact sheets & FAQs
- Posters



www.cdc.gov/vaccines/covid-19/health-systems-communication-toolkit.html

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Vaccine Safety Monitoring Systems

- **Existing** systems and data sources are used to monitor safety of vaccines post-authorization and post-licensure, such as:
  - Vaccine Adverse Event Reporting System (VAERS)
  - Vaccine Safety Datalink (VSD)
  - Clinical Immunization Safety Assessment (CISA)
  - Biologics Effectiveness and Safety System (BEST)
- **New** systems have been developed to monitor COVID-19 vaccine safety, such as **v-safe**:
  - Active surveillance that uses text messaging to initiate web-based survey monitoring.
  - Provides telephone follow up to anyone who reports medically significant adverse events.

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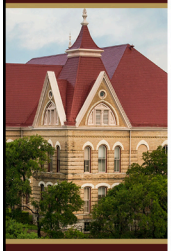

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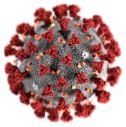
"EVERYTHING WE DO BEFORE A PANDEMIC WILL SEEM ALARMIST. EVERYTHING WE DO AFTER WILL SEEM INADEQUATE"

~ Michael Leavitt



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References and Resources

- Addressing Parental Vaccination Concerns and Maintaining Immunization Rates in the Midst of COVID-19 Presentation. Nevada Immunization Learning Exchange (NILE). www.ImmunizeNevada.org/webinars
- Emily K. Brunson, **Rodney E. Rohde** & Lawrence V. Fulton (2021) College students' willingness to accept COVID-19 vaccines, *Journal of American College Health*, DOI: 10.1080/07448481.2021.1996375
- Centers for Disease Control and Prevention. Accessed from https://www.cdc.gov/vaccines/covid-19/vaccination-resources.html February 8, 2022.
- Rohde, R.E. Personal webpage and resources. January 25, 2022. https://rodneyerohde.wp.txstate.edu/
- The Alliance for Aging Research and Vaccination presentation.
- Vaccine hesitancy presentation. Stanley A. Plotkin

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www.webbertraining.com/schedulep1.php	
March 3, 2022	*(FREE Teleclass ... Denver Russell Memorial Teleclass Lecture)* **BENEFITS AND POTENTIAL UNINTENDED CONSEQUENCES OF ROUTINE CHLORHEXIDINE BATHING IN HEALTHCARE FACILITIES** Speaker: **Prof. Mary Hayden**, Rush University Medical Center, Chicago
March 10, 2022	**HAND HYGIENE: NOT JUST FOR HEALTH CARE WORKERS ANYMORE!!** Speaker: **Dr. Jocelyn Srigley**, University of British Columbia
March 17, 2022	**INFECTION CONTROL IN CORRECTIONAL FACILITIES** Speaker: **Nyreith Adeyemi**, California Correctional Health Care Services
April 7, 2022	**MANAGEMENT PRACTICES FOR LEADERS TO PROMOTE INFECTION PREVENTION** Speaker: **Dr. Ann Scheck McAlearney**, Ohio State University College of Medicine
April 14, 2022	**LIFECYCLE OF MOLECULAR MICROBIOLOGY DIAGNOSTIC TECHNOLOGY: COST VERSUS CLINICAL BENEFIT BEFORE BECOMING OBSOLETE** Speaker: **Professor Colum Dunne**, School of Medicine, University of Limerick, Ireland
April 28, 2022	*(FREE Teleclass)* **HOW DO WE IMAGINE OUR FUTURE? THE INFECTION PREVENTION "CRYSTAL BALL INITIATIVE"** Speaker: **Dr. Hugo Sax**, HumanLabZ, Switzerland

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