

Maine DHHS

COVID-19 Vaccines Information for Clinicians

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Welcome

- Introductions
- Session goals & format
- Future sessions
- Current context – COVID-19 pandemic status

COVID-19 Vaccines – How We Save Lives

Vaccines don't save lives.

Vaccinations save lives.



COVID-19 Vaccines –Key Questions

- Has Operation Warp Speed & the accelerated timeline sacrificed safety?
- Why should I trust vaccine approval process?
- Are the new genetic vaccine technologies the same as gene therapy?
- How do we know the vaccines work?
- Who was included in the trials?
- How do we know the vaccines are safe?
- What side effects should we expect?

COVID-19 Vaccines – Info for Clinicians

- Context
- Science of vaccines
- Vaccine development & approval process
- Likely initial vaccines
- Vaccine distribution planning
- Vaccine hesitancy & patient conversations
- Vaccine storage, handling & administration
- Reporting & tracking adverse events

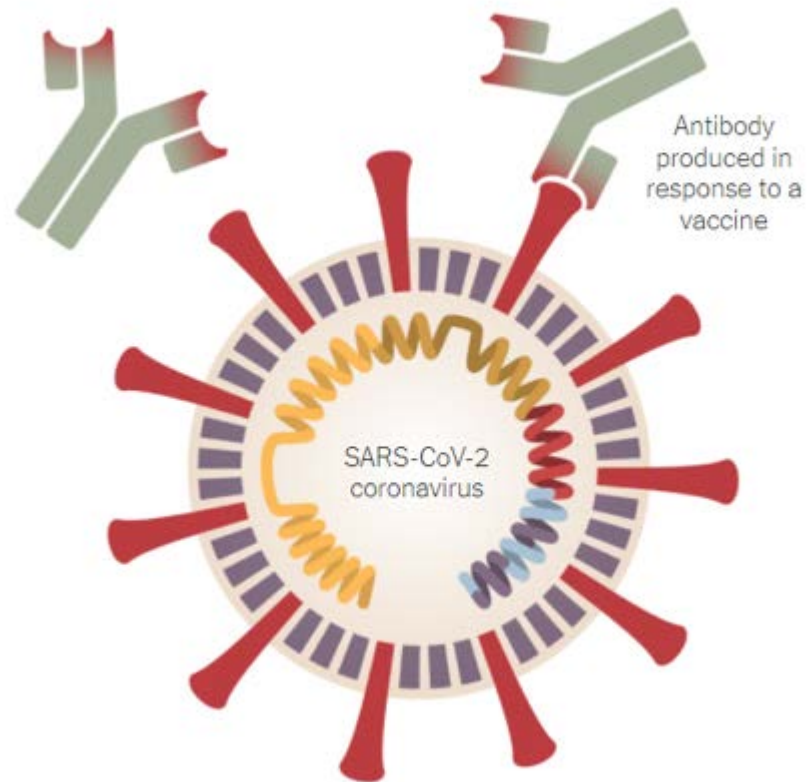
COVID-19 Vaccines: Context

- Overarching goal: interrupting virus transmission
- First cases recognized early Jan 2020
- Global pandemic declared by WHO: 3/11/2020
- Genome sequenced by late January 2020
- Vaccine work began immediately
- Current surge: Dec 1, 2020 totals
 - Global Cases: 64M Deaths: 1.4M
 - US Cases: 14M Deaths: 270K
 - ME Cases: 12,000 Deaths: 214
- Operation Warp Speed (OWS) goals: deliver 300M doses vaccine, with first doses by Jan 2021

Science of Vaccines

Vaccine immunology basics:

- Macrophage response
- B-cell response to virus proteins triggers Ab response
- T-cell response



Vaccine Development Process

Steps in vaccine development

Actions taken to ensure a new vaccine is safe and works well

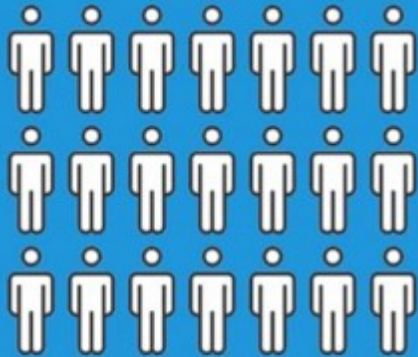
- **Pre-clinical studies**
Vaccine is tested in animal studies for efficacy and safety, including challenge studies
 - **Phase I clinical trial**
Small groups of healthy adult volunteers receive the vaccine to test for safety
 - **Phase II clinical trial**
Vaccine is given to people who have characteristics (such as age and physical health) similar to those for whom the new vaccine is intended
 - **Phase III clinical trial**
Vaccine is given to thousands of people and tested for efficacy and safety
 - **Phase IV post marketing surveillance**
Ongoing studies after the vaccine is approved and licensed, to monitor adverse events and to study long-term effects of the vaccine in the population
 - **Human challenge studies**
Studies in which a vaccine is given followed by the pathogen against which the vaccine is designed to protect. Such trials are uncommon in people as they present considerable ethical challenges
-

Vaccine Development Process

Covid-19 Vaccine Watch

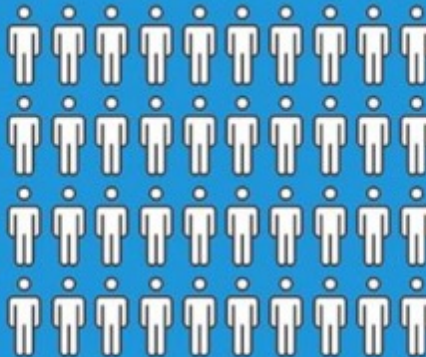
VACCINE HUMAN TRIAL PHASES

Phase I



Usually less than 100 people, and monitors for safety at multiple doses.

Phase II



Slightly larger and looks for safety and early effectiveness.

Phase III

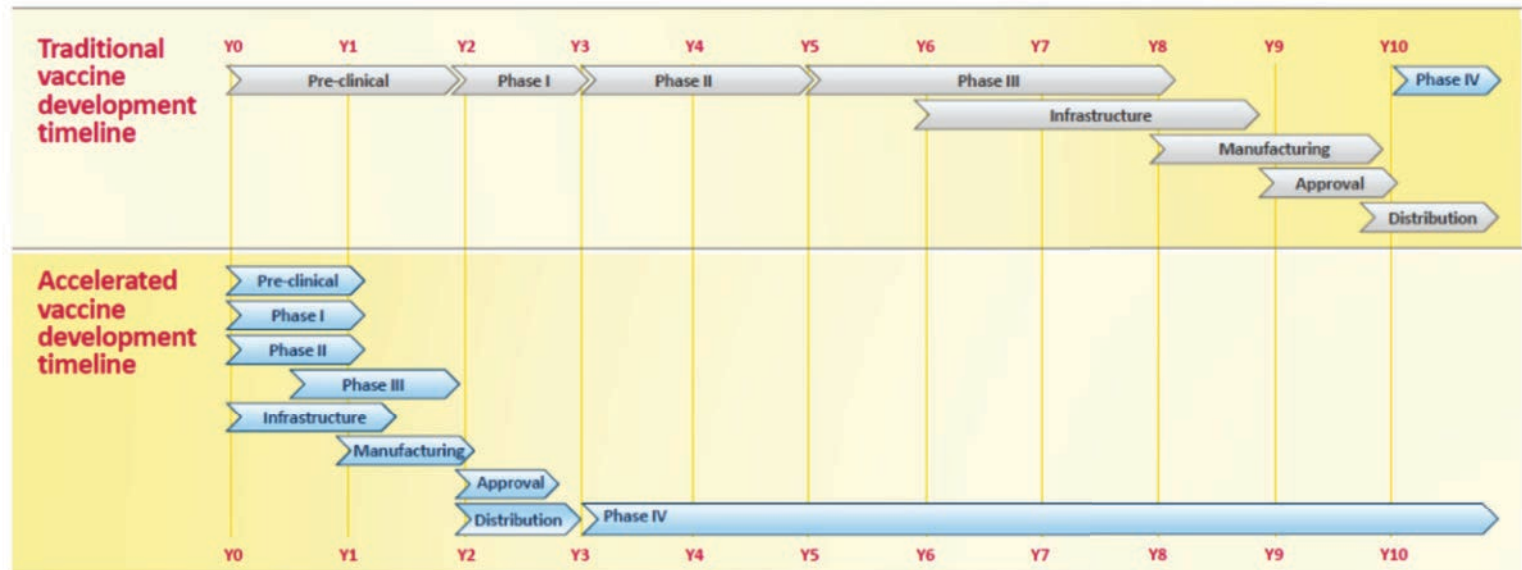


Large scale, normally 30,000 patients, and is the test of effectiveness and long term safety in multiple populations.

Accelerated Development Process

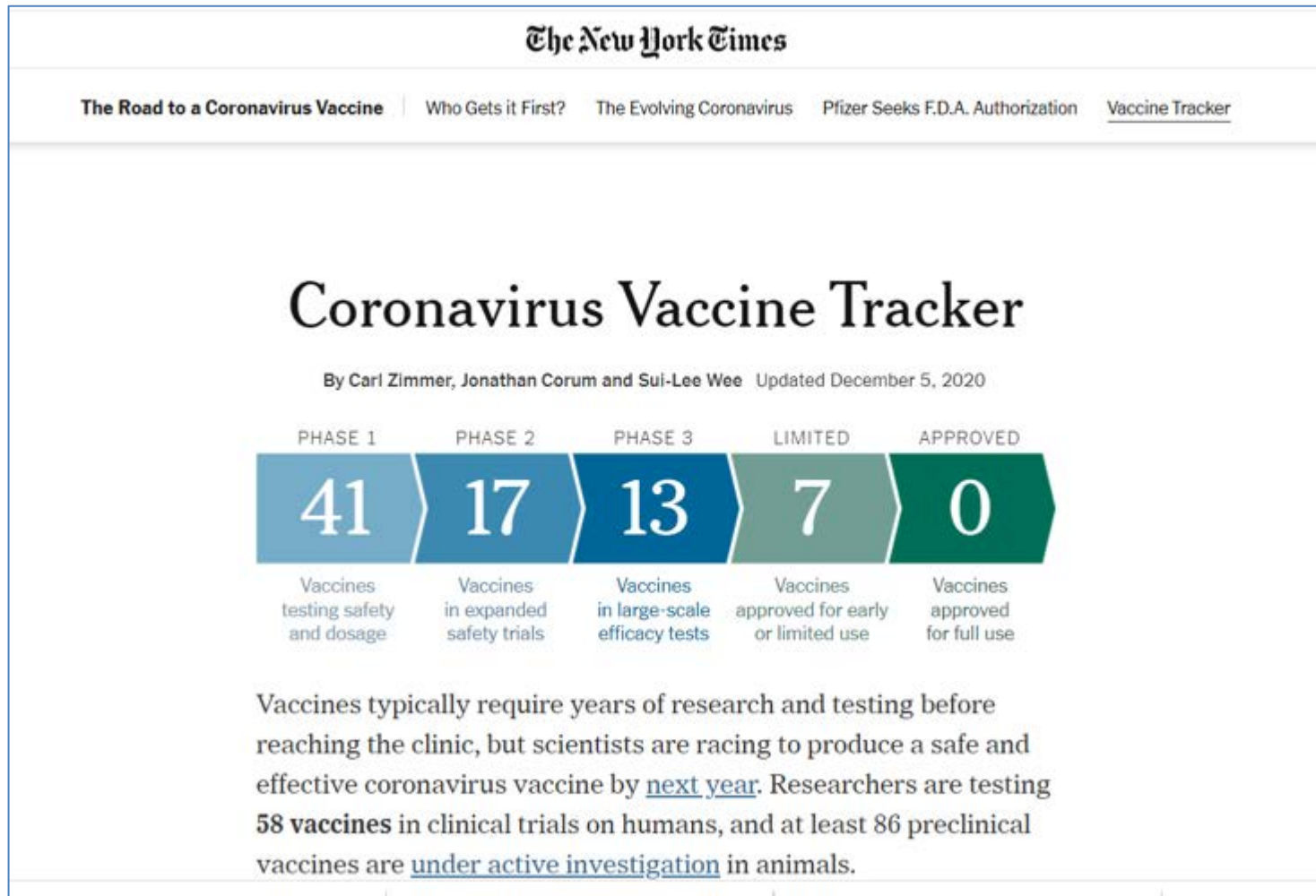
VACCINE DEVELOPMENT

COVID-19 vaccine accelerated development

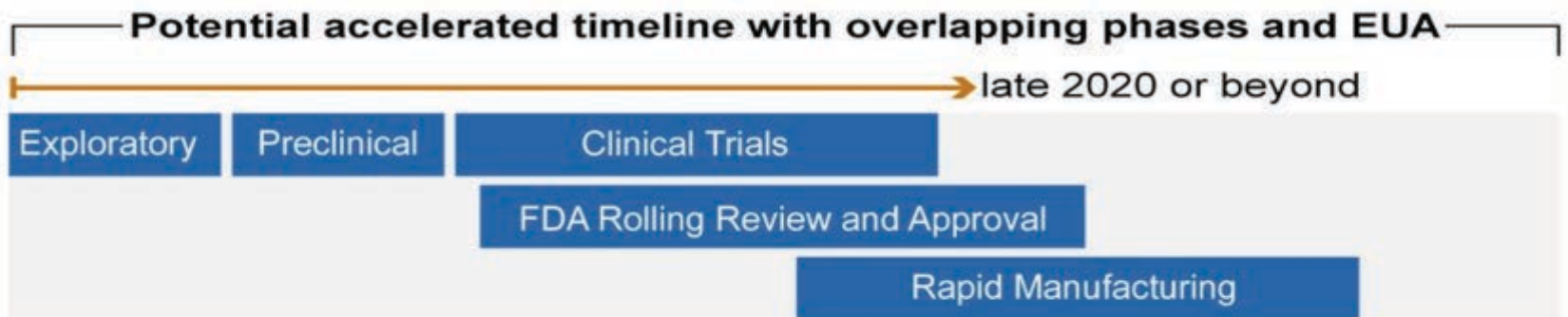
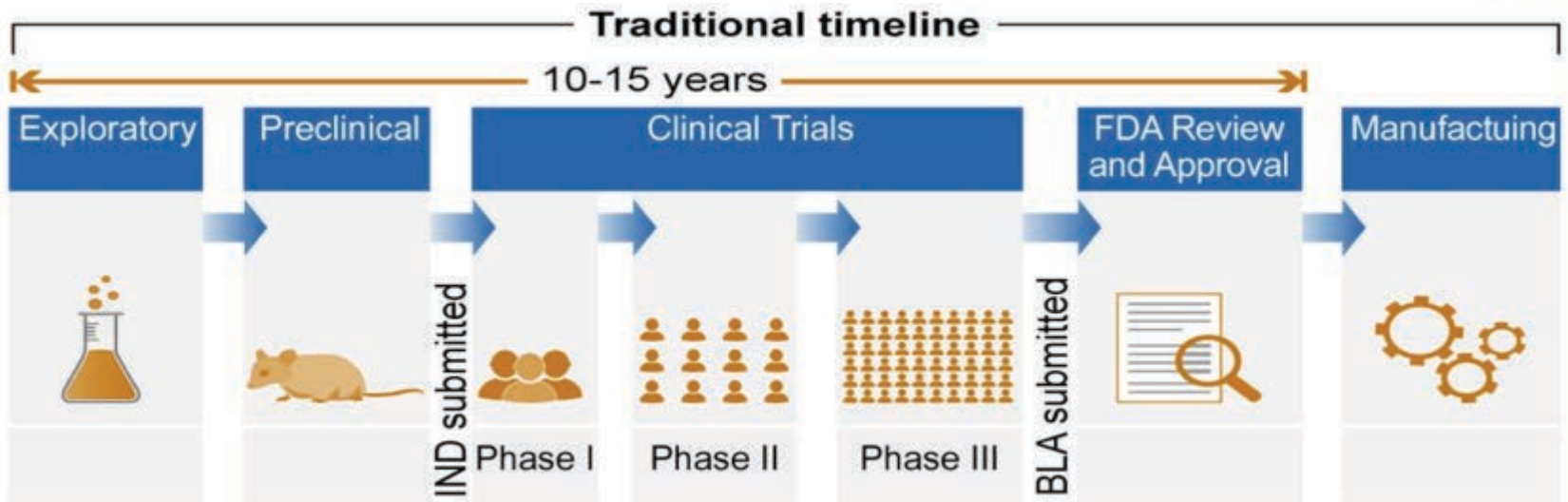


- Normal vaccine development performs each step in sequence
- To accelerate COVID-19 vaccine development, steps are done in parallel
- All usual safety and efficacy monitoring mechanisms remain in place; such as adverse event surveillance, safety data monitoring & long-term follow-up
- Phase IV post-marketing surveillance for side effects is critical and essential

International Vaccine Development



FDA Approval Process



BLA = Biologics License Application

EUA = Emergency Use Authorization

IND = Investigational New Drug

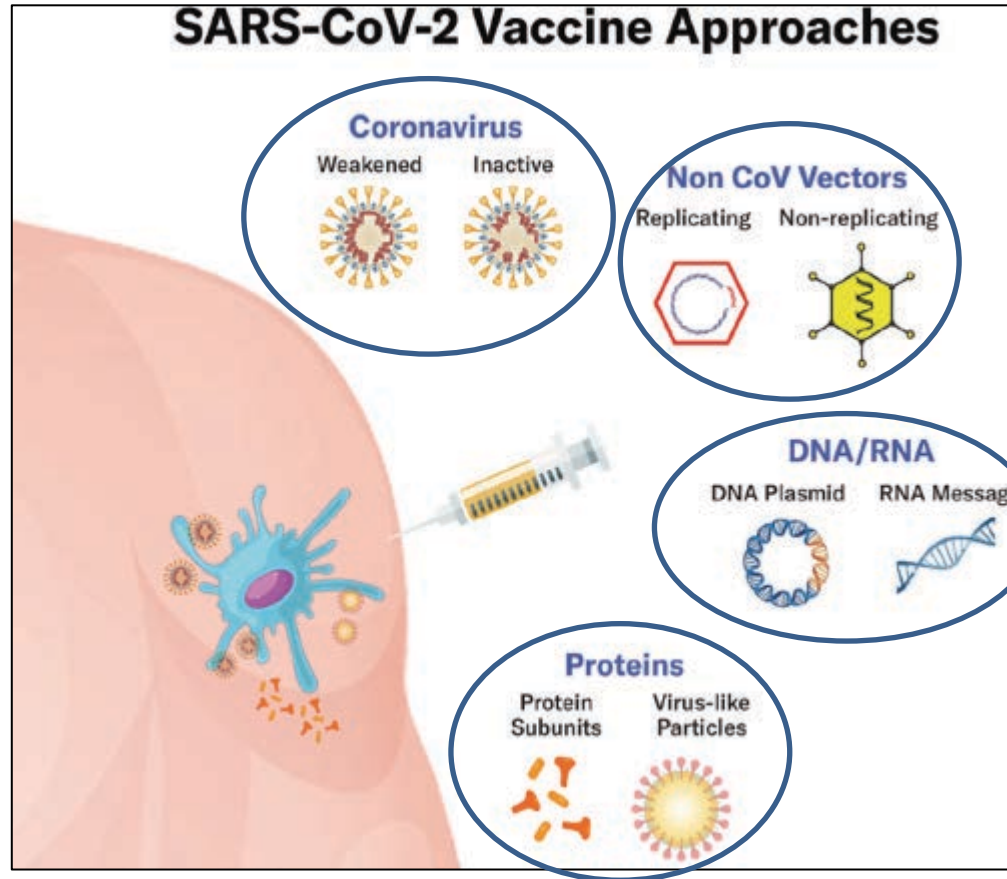
Source: GAO analysis of GAO-20-215SP, FDA, HHS, and Pharmaceutical Research and Manufacturers of America (PhRMA) documentation. | GAO-20-583SP

FDA Vaccine Approval Process

- FDA Emergency Use Application (EUA) vs Biologics License Application (BLA)
- Roles of oversight groups: FDA, ACIP

<https://www.fda.gov/vaccines-blood-biologics/development-approval-process-cber/vaccine-development-101>

Major Types of COVID Vaccines



- Weakened or inactive virus vaccines
- (Non-COVID) viral vector vaccines

- Nucleic acid (mRNA, DNA) vaccines
- Protein-based vaccines

Nucleic Acid Vaccines

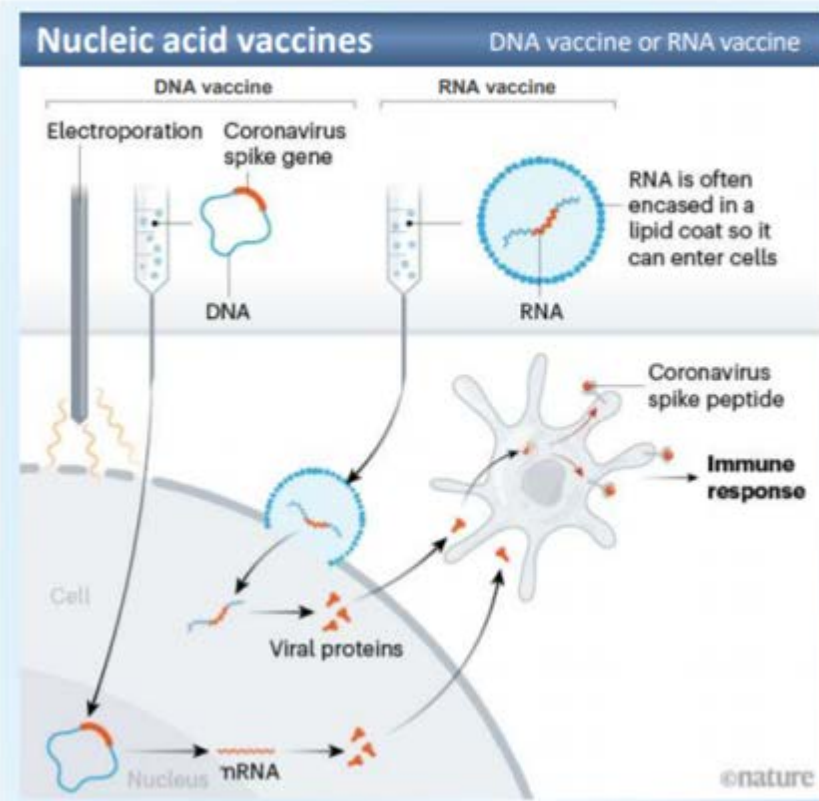
VACCINE DEVELOPMENT — Mechanism of action for types of vaccines

Nucleic acid vaccines

(Pfizer, Moderna)

- Instead of a virus, a protein antigen, or a virus expressing the protein, **nucleic acid coding for the antigen is injected**
- DNA plasmid: enters nucleus, translated to mRNA for expression of protein
- Or mRNA can be injected. More direct (no translation required) but less stable than DNA
- This is new technology – no other vaccines for human use have used this

Source: <https://www.nature.com/articles/d41586-020-01221-y>



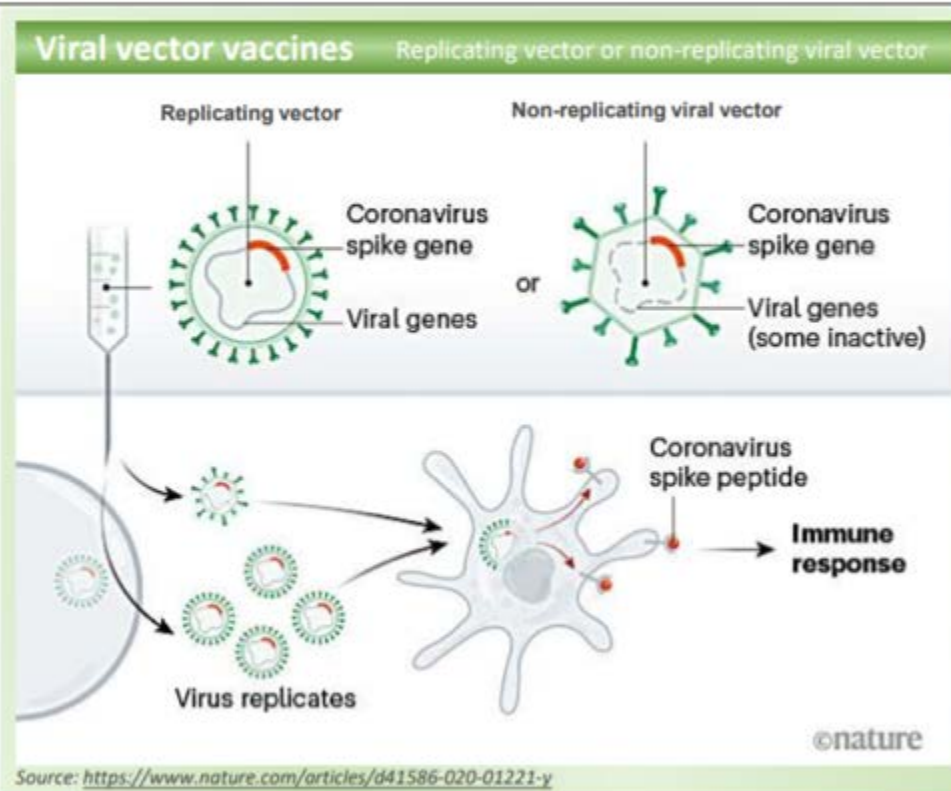
Viral Vector Vaccines

VACCINE DEVELOPMENT — Mechanism of action for types of vaccines

Viral vector vaccines

(Astra-Zeneca/Oxford, J&J)

- The gene for a pathogen protein is inserted into a **different virus** that can infect someone without causing disease
- The safe virus serves as a 'platform' or 'vector' to deliver the protein that triggers an immune response
- The safe virus is then injected as a vaccine
- Some replicate (reproduce) in the body and some do not



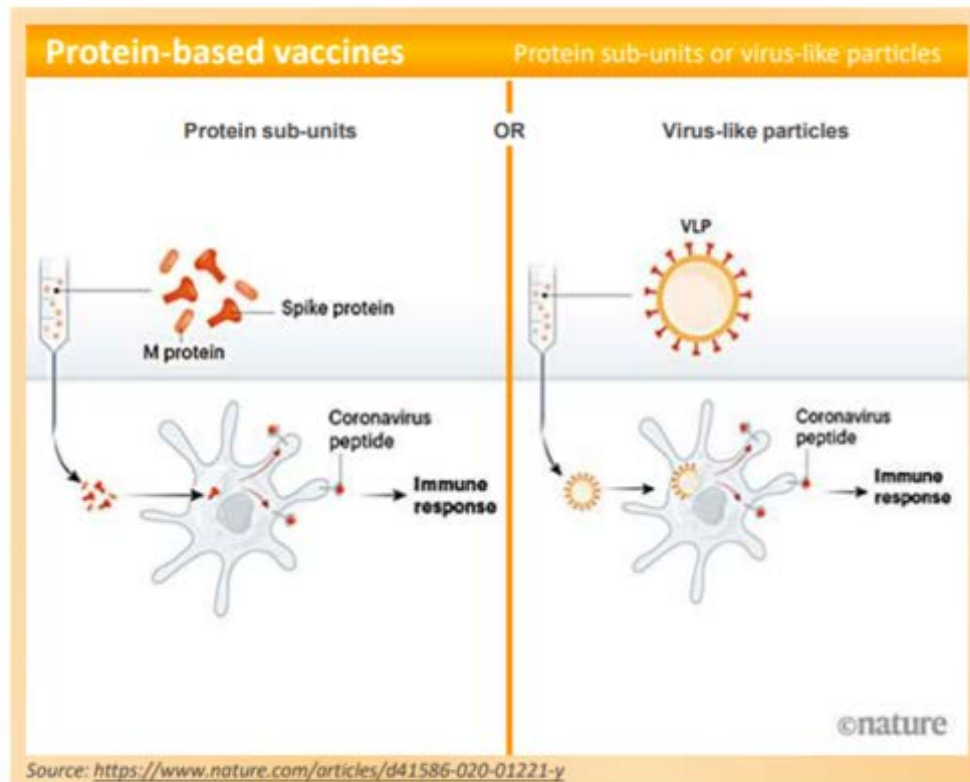
Protein-Based Vaccines

VACCINE DEVELOPMENT — Mechanism of action for types of vaccines

Protein-based vaccines

(Novavax, Sanofi/GSK)

- A protein is extracted from the virus (alive or inactivated), purified, and injected as a vaccine
- For coronavirus, this is most commonly the spike protein
- Virus-like particles work in the same way



Weakened / Inactive Virus Vaccines

VACCINE DEVELOPMENT — Mechanism of action for types of vaccines

Virus vaccines

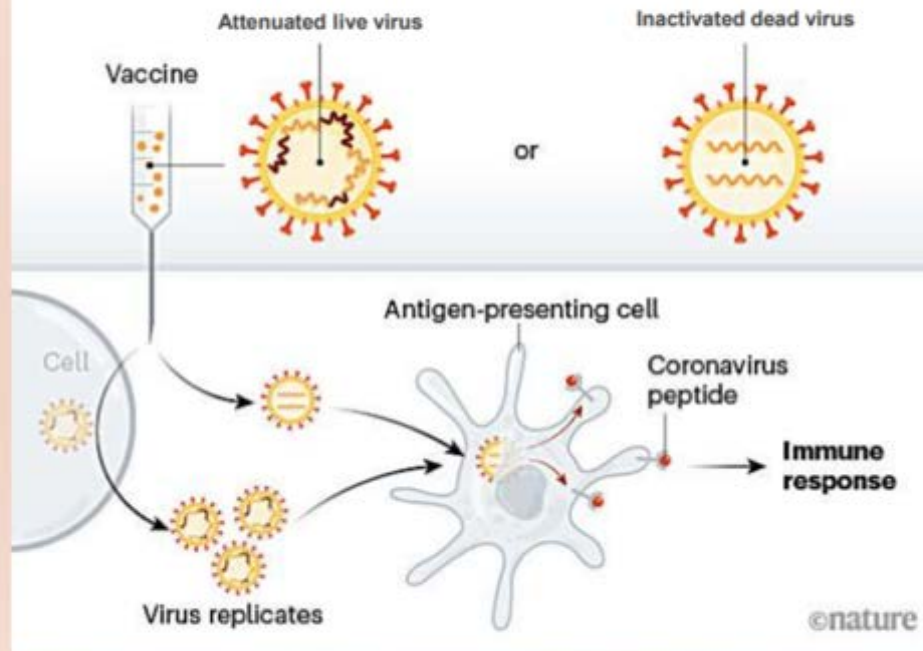
(Sinopharm - China)

- Virus is selected, modified (weakened) or completely inactivated so that it will not cause disease

Note:

This illustration shows injectable vaccines. Some vaccines in this category are administered orally

Vaccines from whole virus Attenuated live or inactivated dead virus



Source: <https://www.nature.com/articles/d41586-020-01221-y>

COVID-19 Vaccines: Likely Candidates

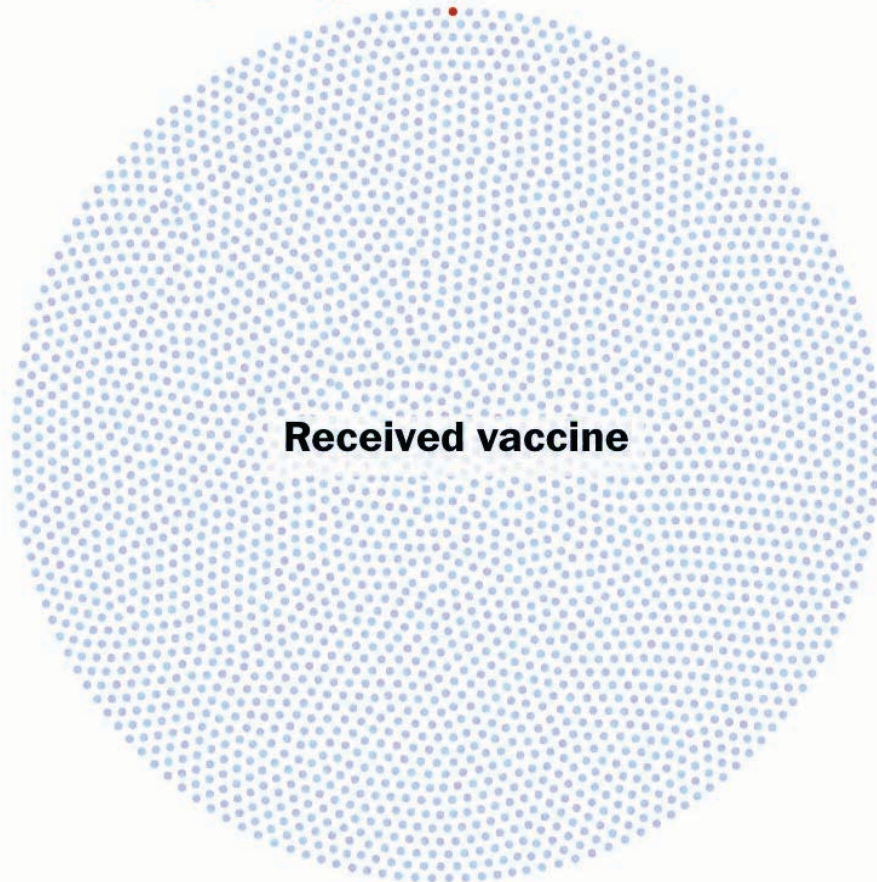
- Pfizer/BioNTech
 - mRNA vaccine, 2 doses, 21D apart
 - Must be stored at -70C
 - Rpt'd 90-95% efficacy: FDA EUA hearing: Dec 10
- Moderna
 - mRNA vaccine, 2 doses, 28D apart
 - Must be stored at -20C
 - Rpt'd 94% efficacy; FDA EUA hearing: Dec 13
- Astra-Zeneca/Oxford
 - Adenovirus vector vaccine, single dose
 - Can be stored in 2-8C (routine refrigeration)
 - Rpt'd 70% efficacy

Pfizer/BioNTech Clinical Trials

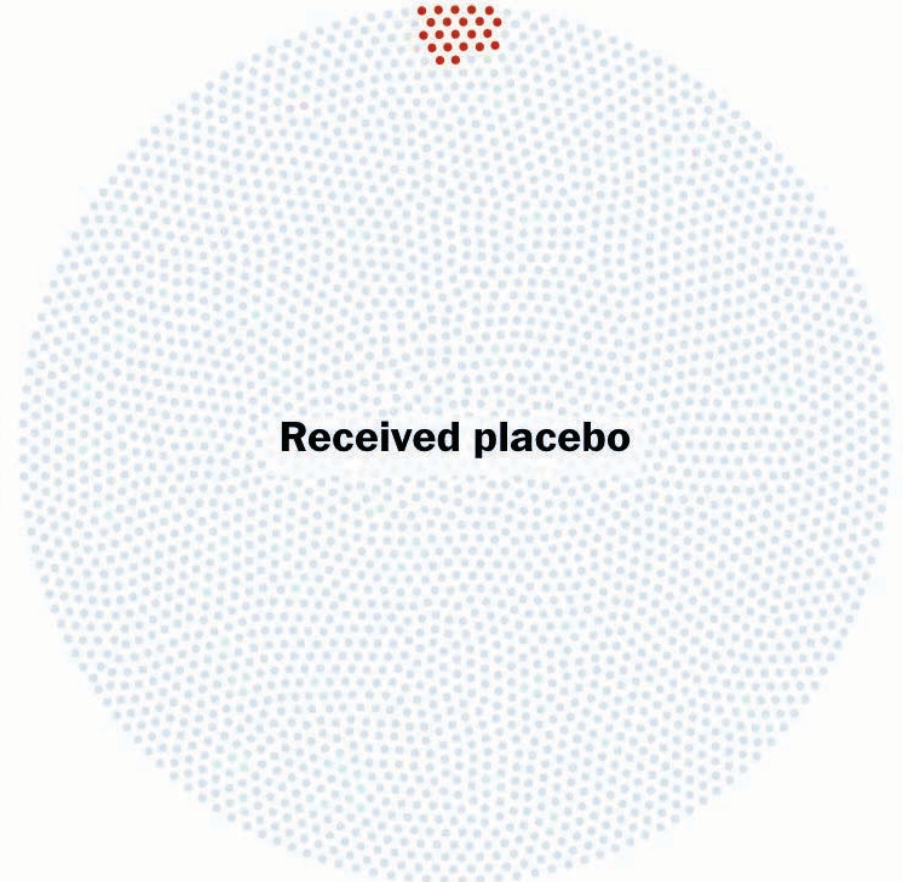
- Phase 2/3 Clinical Trials
 - Started July 27, 2020 in 150 sites in U.S. (39 states) and 5 other countries
 - >43,000 enrolled, 50% placebo matched to vaccinees
 - Enrollees include 42% R/E minorities, 41% ages 56-85yo
- From press release 11/18/2020:
 - Efficacy analysis: 95% effective against COVID-19 at 28 days after first dose
 - 170 COVID infections: 162 in placebo group vs. 8 vaccine group
 - 10 severe COVID cases : 9 in placebo, 1 in vaccinated group
 - Efficacy consistent across age, gender, R/E demographics
 - Efficacy in adults over 65 years of age >94%
 - Safety data: vaccine well tolerated across all populations with >43,000 enrolled:
 - No serious safety concerns observed
 - Grade 3 adverse events: fatigue (3.8%), HA (2.0%) (Grade 3 = prevents daily activity)
 - Older adults had fewer adverse events

Pfizer Clinical Trial: Effectiveness

8 participants sick with covid-19

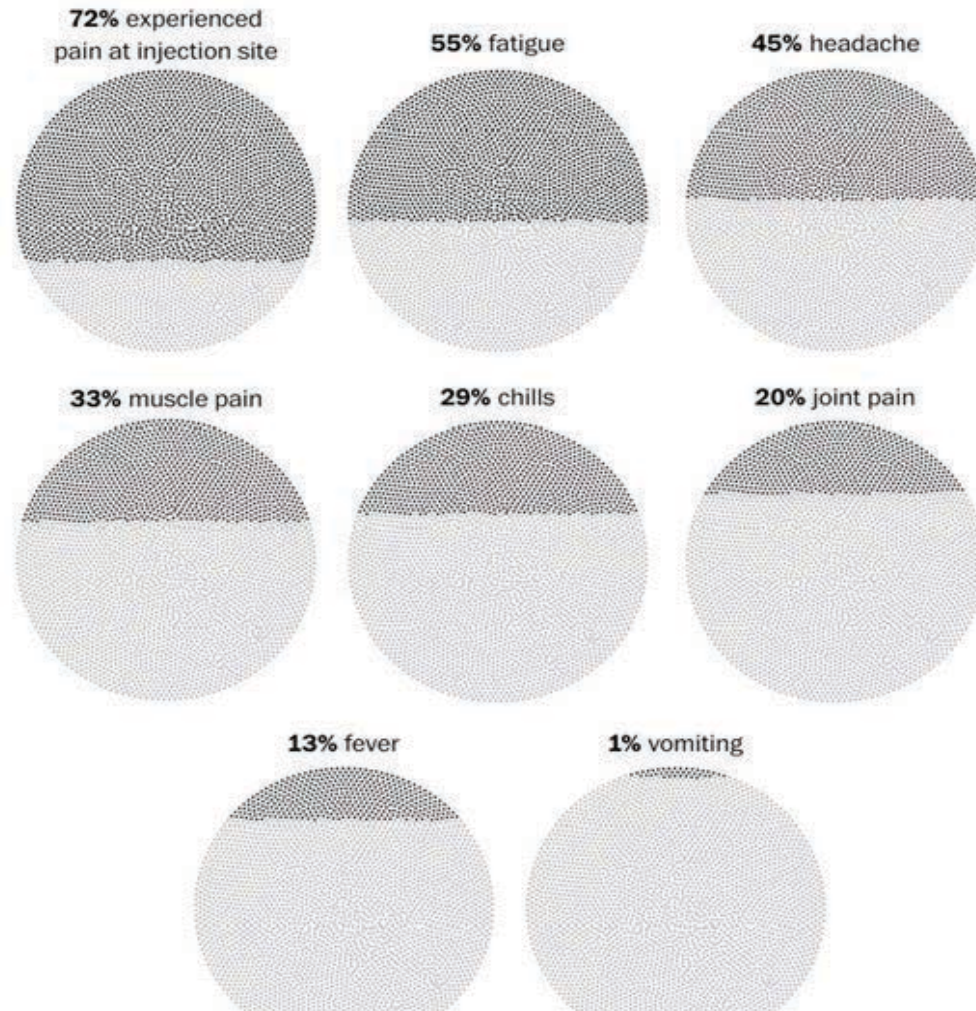


162 sick with covid-19



Pfizer Clinical Trial: Adverse Reactions

Adverse reactions after second dose of vaccine



Moderna Clinical Trials

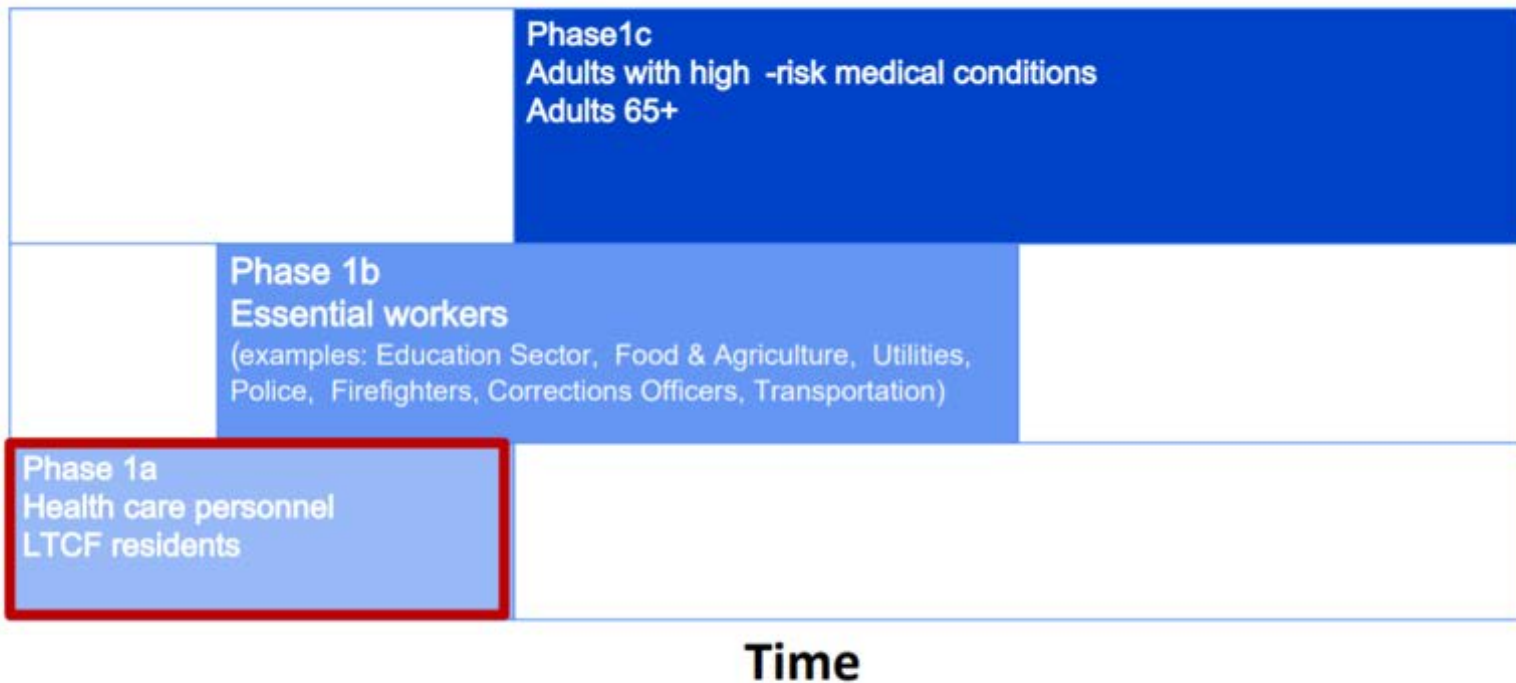
- Phase 3 Clinical Trials
 - Started July 27, 2020
 - >30,000 enrolled, 50% placebo matched to vaccinees
 - Enrollees include 37% R/E minorities, 25% ages >65yo
- From press release 11/16/2020:
 - Efficacy analysis: 94.5% effective against COVID-19 at 28 days after first dose
 - 95 COVID infections: 90 in placebo group vs. 5 vaccine group
 - 11 severe COVID cases : all in placebo group
 - Efficacy consistent across age, gender, R/E demographics
 - Efficacy in adults over 65 years of age >94%
 - Safety data: vaccine well tolerated across all populations with >43,000 enrolled:
 - No serious safety concerns observed
 - Grade 3 adverse events: inj site pain (2.7%), fatigue (9.7%), myalgia (5.2%), HA (4.5%)

COVID-19 Vaccine Distribution

- Maine CDC: [COVID-19 Vaccine Plan](#)
- Priority groups
- Vaccinator strategy
- Steps to participate as vaccinator
- Operational & technical issues
- Perceived urgency vs. likely vaccine supply

COVID Vaccine – Phased Distribution

Work Group Proposed Interim Phase 1 Sequence



COVID Vaccine – Phase 1a Groups

Proposed groups for Phase 1a vaccination

Health care Personnel ^{1,2} (HCP) (~21million)	Long-Term Care Facility (LTCF) Residents ³ (~3M)
Examples	
<ul style="list-style-type: none">• Hospitals• Long-term care facilities• Outpatient clinics• Home health care• Pharmacies• Emergency medical services• Public health	<ul style="list-style-type: none">• Skilled nursing facilities (~1.3 M beds)• Assisted living facilities (~0.8 M beds)• Other residential care (~0.9 M beds)

1. <https://www.cdc.gov/infectioncontrol/guidelines/healthcare>

2. <https://www.cisa.gov/publication/guidance-essential-critical-infrastructure-workforce>

3. <https://www.cdc.gov/longtermcare/index.html>

COVID Vaccine – Initial Distribution

- Maine CDC anticipates initial receipt of 12,675 doses of Pfizer vaccine by mid-Dec
- Vaccine to be pre-positioned at key locations around state, pending anticipated FDA EUA approval
- Initial allocation to sites w/ ultra-low temp freezers (975 doses each):
 - Central Maine Medical Center - Lewiston
 - Maine Medical Center - Portland
 - Northern Light A. R. Gould Hospital - Presque Isle
 - Northern Light Eastern Maine Medical Center - Bangor
 - Northern Light Mercy Hospital - Portland
 - Maine CDC / MaineGeneral Hospital – Augusta

COVID-19 Vaccine Distribution

When can I get a coronavirus vaccine?

■ Winter 2020 ■ Spring 2021 ■ Summer 2021 ■ Fall 2021

DATE RANGE	DISTRIBUTION
Nov. – Dec. 2020	First vaccines (Pfizer, Moderna) expected to submit for FDA Emergency Use Authorization. Approval could be granted within weeks.
Dec. 2020 – Jan. 2021	Approved vaccines start to go out to 4 priority groups: healthcare workers, frontline workers, people over 65, and people with preexisting conditions.
Feb./Mar. – Apr. 2021	Vaccine distribution to 4 priority groups continues, with roughly 30 million vaccines distributed every month.
Apr. – May/Jun. 2021	Vaccines become more widely available to young, healthy members of the general public.
Jul. – Aug./Sep. 2021	Most adults in the US who want a vaccine likely have access at this point. But, remember, many coronavirus vaccines require 2 shots to become fully effective. The vaccination process can take 3–4 weeks per person.
Oct./Nov. – Dec. 2021	Herd immunity through vaccination could be reached in the US, if 75% of people (or more) get their shots.

COVID-19 – Maine Vaccinators

- Hospitals
- Pharmacies
 - Pharmacy Partnership for LTC (Walgreens, CVS)
 - Commercial pharmacies
- EMS
- Enrolled/registered physician & dental practices
- Public health nursing

Vaccine Hesitancy & Trust

- Historical context, BIPOC concerns
 - Tuskegee Syphilis Experiment (1952-1972!)
 - Henrietta Lacks – HeLa cells
 - Other...
- Factors impacting individual decision-making
 - Trust in government
 - Community vs. individual benefit
- Impact of FDA EUA vs. full approval

Vaccine Hesitancy & Trust

- Building trust
- Engaging in effective vaccine conversations
- Preparing for patient questions
- Implications of multiple vaccine options

Factors Influencing Vaccine Trust

From flu vaccine hesitancy research* ...

- Perceived disease risk was significant predictor of vaccine uptake
- African Americans had higher perceived risk of vaccine side effects and believed side effects were more serious
- Higher disease risk, higher uptake; however, when perceived risk of vaccine side effects increased, uptake decreased

*From Dr Sandra Crouse Quinn, University of Maryland

Building Vaccine Trust

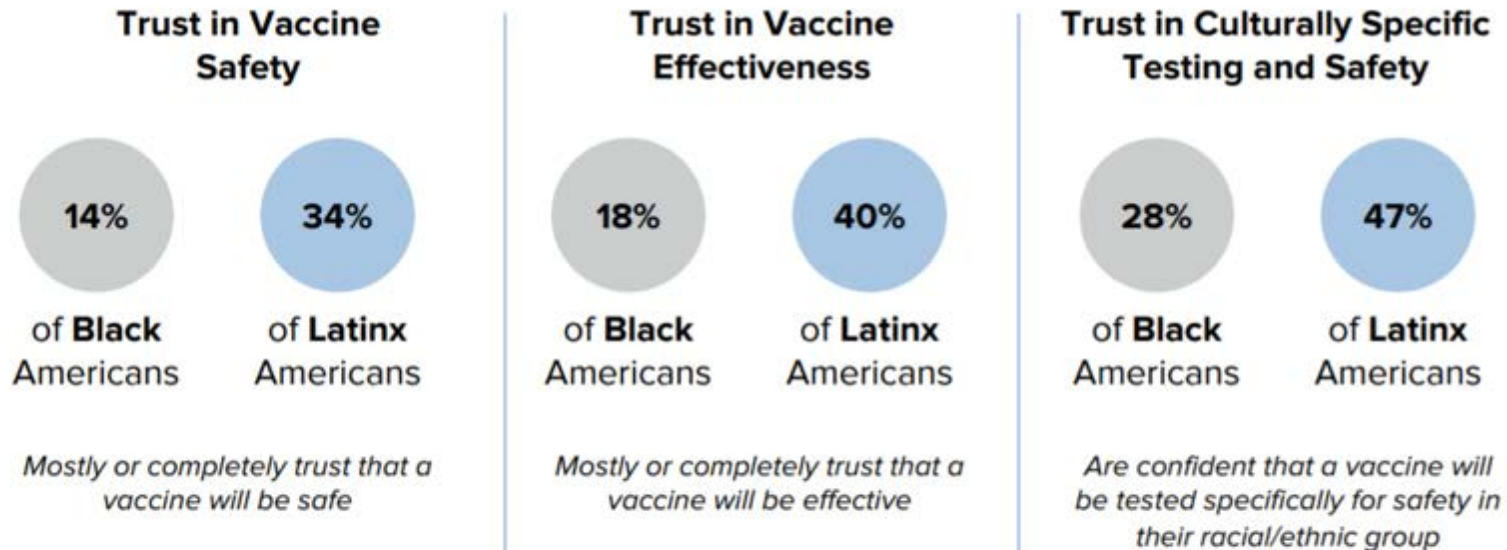
From flu vaccine hesitancy research* ...

- Perceived risk (disease & vaccine side effects), perceived effectiveness, importance of vaccine & subjective norms were predictors of trust in vaccine and vaccine process for African Americans
- Trust in government motives is lower
- Deciding to trust vaccines is an active decision for African Americans

*From Dr Sandra Crouse Quinn, University of Maryland

Mistrust in BIPOC Communities

While vaccination is a vital strategy for stopping the virus, a significant majority mistrust the safety and efficacy of a COVID-19 vaccine, particularly among Black Americans.



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SURVEY RESEARCH DESIGN • MANAGEMENT • ANALYSIS

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NAACP

COVID Collaborative 4

Vaccine Confidence in BIPOC Communities

For both Black and Latinx Americans, confidence in vaccine safety and effectiveness are the number one predictors of vaccine intention, making trust building on these fronts vital.

Safety and Intention



of Black Americans



of Latinx Americans

Say confidence in the vaccine's safety is extremely or very important to decision to get vaccinated

Effectiveness and Intention



of Black Americans



of Latinx Americans

Say confidence in the vaccine's effectiveness is extremely or very important to decision to get vaccinated

Vaccine Conversations

Proposed Gist Communication Framework

Patient-provider communication technique based on Fuzzy-Trace Theory* [10, 11]

Verbatim* Establishes credibility & expertise Explicit Link Connects verbatim to gist Gist* Aids in comprehension & recall



Examples:

"And the reason that's important is..."

"What that means to you is..."

"So the thing to remember is..."

"Bottom line... what I tell patients is..."

COVID-19 Vaccine Storage, Handling & Admin

- Temperature requirements, handling implications
- Equipment, PPE required for vaccination
- Required reporting to ME CDC
- Tracking multiple dose requirements
- 2nd dose reminder systems

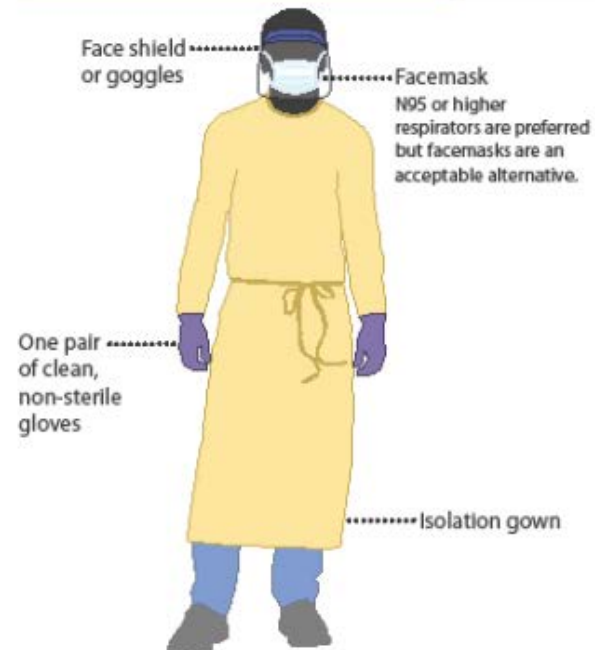
PPE for Health Care Personnel

COVID-19 Personal Protective Equipment (PPE) for Healthcare Personnel

Preferred PPE – Use N95 or Higher Respirator



Acceptable Alternative PPE – Use Facemask



CS110804-01/20/2008

[cdc.gov/COVID19](https://www.cdc.gov/COVID19)

COVID-19 Vaccine- 2nd Dose Issues

- Second dose reminder systems
- COVID vaccine cards



Vaccine Adverse Reporting

- US CDC + FDA: Vaccine Event & Adverse Reporting System ([VAERS](#))
- US CDC: Vaccine Safety Assessment for Essential Workers (V-SAFE)- smart phone app
- National Health Care Safety Network (NHSN) – LTC residents

Federal VAERS Program



VAERS

Vaccine Adverse Event
Reporting System

Co-managed by
CDC and FDA

<http://vaers.hhs.gov>

The screenshot shows the VAERS website homepage. At the top, the VAERS logo is followed by the text "Vaccine Adverse Event Reporting System" and the URL "www.vaers.hhs.gov". Below this is a navigation bar with five items: "About VAERS", "Report an Adverse Event", "VAERS Data", "Resources", and "Submit Follow-Up Information". The main content area features a question: "Have you had a reaction following a vaccination?" with two numbered options: "1. Contact your healthcare provider." and "2. Report an Adverse Event using the VAERS online form or the new downloadable PDF. *New!*". Below this is a box with important information: "Important: If you are experiencing a medical emergency, seek immediate assistance from a healthcare provider or call 9-1-1. CDC and FDA do not provide individual medical treatment, advice, or diagnosis. If you need individual medical or health care advice, consult a qualified healthcare provider." This is followed by the Spanish version of the question and options. To the right of this text is a photograph of a family (father, mother, and two children) looking at a laptop. Below the photo is the heading "What is VAERS?". At the bottom of the page are four tiles, each with a photograph and a title: "REPORT AN ADVERSE EVENT" (with a photo of a doctor and patient), "SEARCH VAERS DATA" (with a photo of hands using a tablet), "REVIEW RESOURCES" (with a photo of a woman reading), and "SUBMIT FOLLOW-UP INFORMATION" (with a photo of a woman at a computer).

<https://vaers.hhs.gov/index.html>

Federal V-SAFE Program

Vaccine safety assessment for essential workers (V-SAFE)



1. Text messages or email from CDC with follow-up – daily 1st week post-vaccination and weekly thereafter out to 6 weeks



Healthcare workers, essential workers, etc.

2. Any clinically important event(s) reported by vaccinated person



VAERS call center



3. Follow-up on clinically important event, complete a VAERS report if appropriate



Next Steps for Clinicians

- Get educated – use existing info & tools to gain needed knowledge to gain trust in COVID vaccines & vaccine development process
 - [US CDC COVID-19 Vaccine Training for Providers](#)
- Start the conversation!
 - [US CDC Engaging Patients in COVID Vaccines](#)
- Understand your audience, especially those likely to have higher levels of vaccine hesitancy
 - [COVID Collaborative: Vaccine Hesitancy in Black & Latinx Comms](#)
- Prepare to answer the questions
 - [US CDC Answering Likely Questions on COVID Vaccine](#)
- Plan your “vaccine argument”

Next Steps for Interested Vaccinator Organizations

- Register with Maine Immunization Program:
 - [ME CDC Maine Immunization Program Info & Forms](#)
- Review COVID-19 Provider Enrollment Checklist:
 - [ME CDC COVID-19 Provider Enrollment Checklist](#)
- Complete Maine CDC COVID-19 Vaccine Provider Agreement form:
 - [ME CDC COVID Vaccine Provider Agreement Form](#)
- Attend ME CDC weekly COVID Vaccine Planning calls
- Questions? C19Vaccine.MECDC@maine.gov

COVID-19 Vaccines

Questions??

Additional Resources

- [HHS Fact Sheet Operation Warp Speed](#)
- [NY Times Vaccine Tracker](#)
- [ME COVID Vaccine Plan](#)
- [ME CDC COVID-19 Vaccine Provider Enrollment](#)
- [US CDC COVID-19 Vaccine Resources for Providers](#)
- [US CDC COVID-19 Vaccine Training for Providers](#)
- [US CDC Engaging Patients in COVID Vaccines](#)
- [US CDC Answering Likely Questions on COVID Vaccine](#)