COVID-19 & KIDS: UPDATE & VACCINE DEVELOPMENT

TeamPeds NAPNAP TOWN HALL

November 5, 2020

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Faculty Disclosure Announcement

- I have no financial disclosures or conflicts of interest
- I am a liaison member of the Center for Disease Control's (CDC) Advisory Committee on Immunization Practices (ACIP) representing NAPNAP which have included attending special COVID vaccine meetings over the summer
- Thank you to Dr. Aimee Sznewajs at Children's Minnesota for use of some slides
- ACIP meeting slides/audio available on their website 2 weeks after each meeting

Objectives

- Review the current COVID epidemiology
- Review general understanding of the virus and the immune responses
- Provide clinical updates on pediatric COVID-19
- Describe what is known about COVID-19 transmission in children
- Review current state of SARS- CoV2 vaccine platforms
- Discuss global vaccine distribution including tiered approach to delivery
- Review the importance of ethical principles including transparency in vaccine development

EPIDEMIOLOGICAL TRENDS

COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)

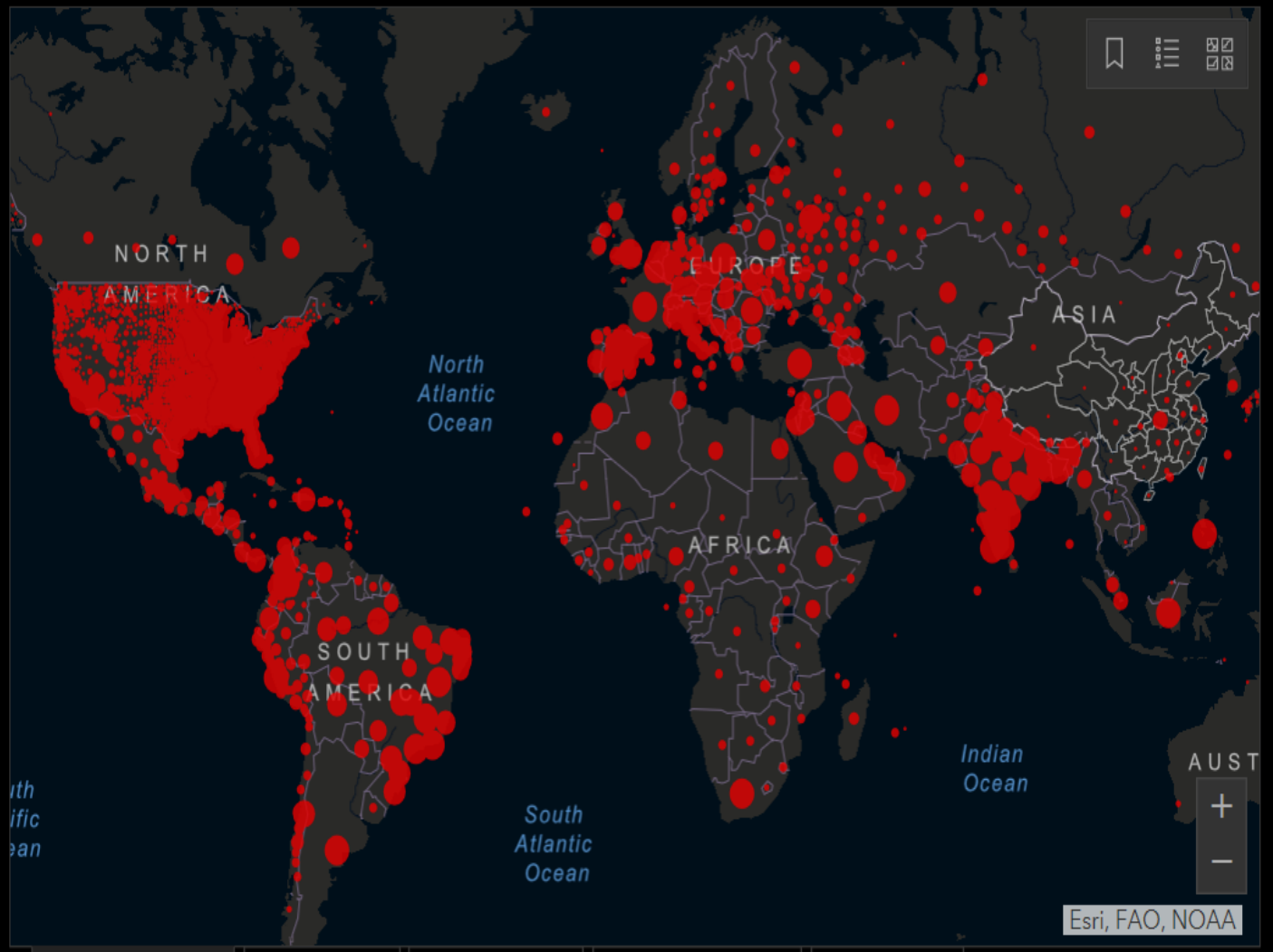
Global Cases
48,005,784

Cases by Country/Region/Sovereignty

- 9,480,195 US
- 8,313,876 India
- 5,590,025 Brazil
- 1,680,579 Russia
- 1,591,152 France
- 1,284,408 Spain
- 1,205,928 Argentina
- 1,108,084 Colombia
- 1,102,305 United Kingdom
- 943,630 Mexico

Admin0

Last Updated at (M/D/YYYY)
11/4/2020, 8:24 PM



Cumulative Cases | Active Cases | Incidence Rate | Case-Fatality Ratio | Testing Rate

190
countries/regions

Lancet Inf Dis Article: Here. Mobile Version: Here. Data sources: Full list. Downloadable database: GitHub. Technical Support: Esri Living Atlas team and JHU APL. Financial Support: JHU, NSF, Bloomberg Philanthropies and Stavros Niarchos Foundation. Resource support: Slack, [illegible]

Global Deaths
1,224,111

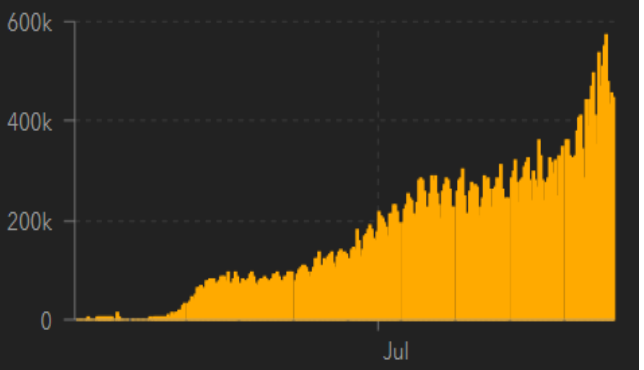
- 233,663 deaths US
- 161,106 deaths Brazil
- 123,611 deaths India
- 93,228 deaths Mexico
- 47,832 deaths United Kingdom
- 39,744 deaths

Global Deaths

US State Level
Deaths, Recovered

- 33,556 deaths, 80,109 recovered New York US
- 18,769 deaths, 797,586 recovered Texas US
- 17,808 deaths, recovered California US
- 16,922 deaths, recovered Florida US

US Deaths, Rec...

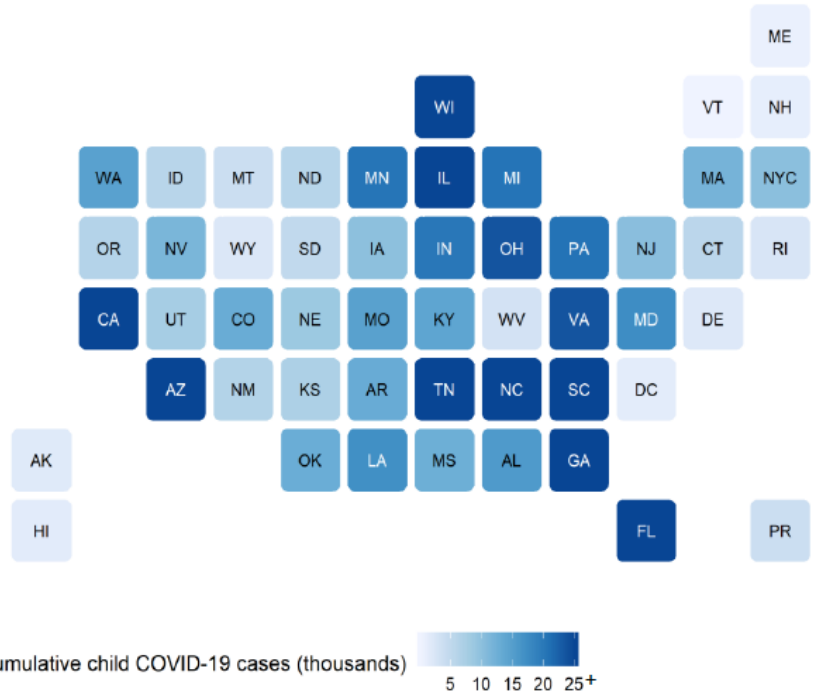


Daily Cases

Fig 5. Cumulative Child COVID-19 Cases and Percent Increase in Child Cases

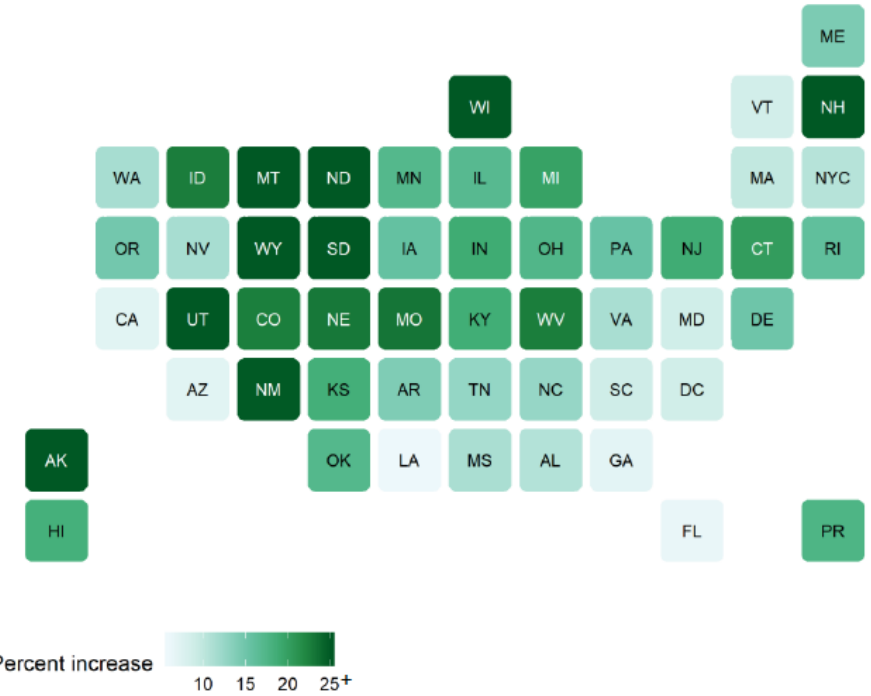
A. Cumulative Child COVID-19 Cases, 10/22/20

Nine states with 25,000+ cumulative child cases



B. Percent Increase in Child Cases, 10/8/20-10/22/20

From 10/8-10/22, there were 94,555 new child cases reported

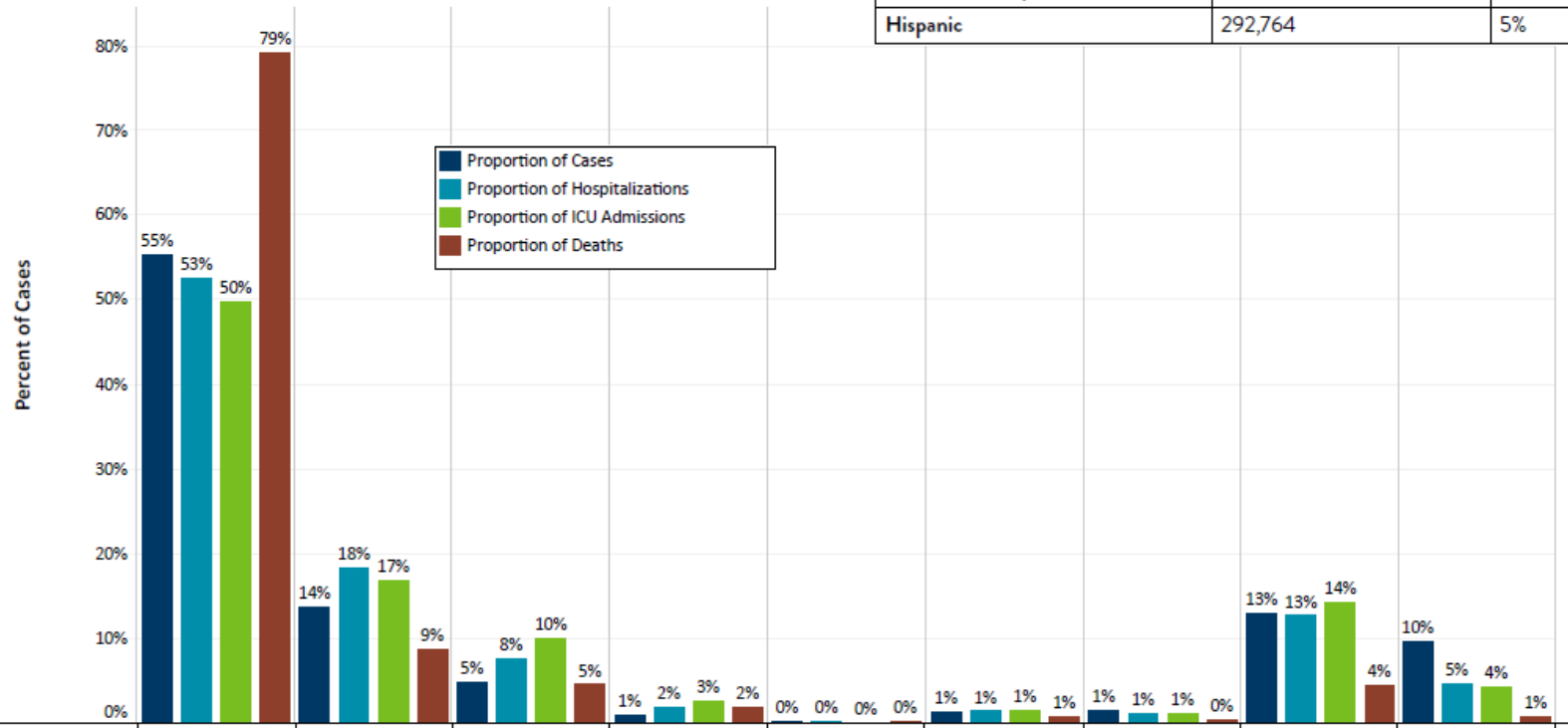


See detail in Appendix: Data from 48 states, NYC, DC, and PR (TX excluded from figures);
All data reported by state/local health departments are preliminary and subject to change; Analysis by American Academy of Pediatrics and Children's Hospital Association

Demographics: Race & Ethnicity

Race and ethnicity for confirmed and probable cases. Race and ethnicity is reported during case interview. Individuals who report more than one race are categorized into the multiple race category.

Race/Ethnicity	Minnesota Population (2018)	% of Population
White, non-Hispanic	4,438,071	80%
Black, non-Hispanic	336,505	6%
Asian, non-Hispanic	260,797	5%
American Indian/Alaska Native, non-Hispanic	53,168	1%
Native Hawaiian/Pacific Islander, non-Hispanic	1,799	<1%
Multiple Races, non-Hispanic	137,233	2%
Other, non-Hispanic	7,021	<1%
Hispanic	292,764	5%



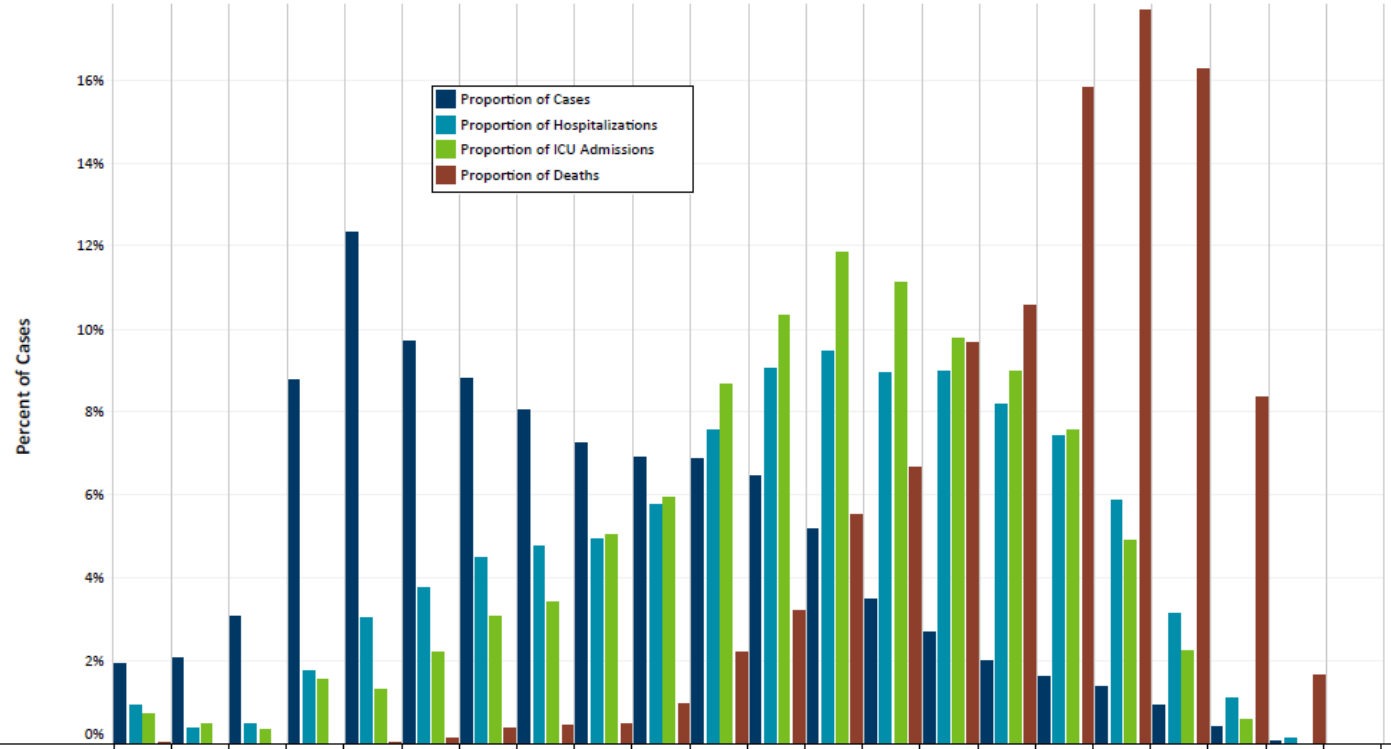
Race/ethnicity	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Amer. Indian/ AK Native, NH	Native HI/ Pacific Isl., NH	Multiple Races, non-Hispanic	Other, non-Hispanic	Hispanic	Unknown/ missing	Total
All Cases	78,489	19,341	6,933	1,272	171	1,628	2,078	18,584	13,815	142,311
Hospitalizations	5,259	1,820	752	184	9	141	97	1,262	467	9,991
ICU Hospitalizations	1,314	442	265	68	2	39	27	374	111	2,642
Deaths	1,916	207	109	42	2	14	6	105	18	2,419

All Ages Affected but not equally: Minnesota COVID-19 Data

Demographics: Age

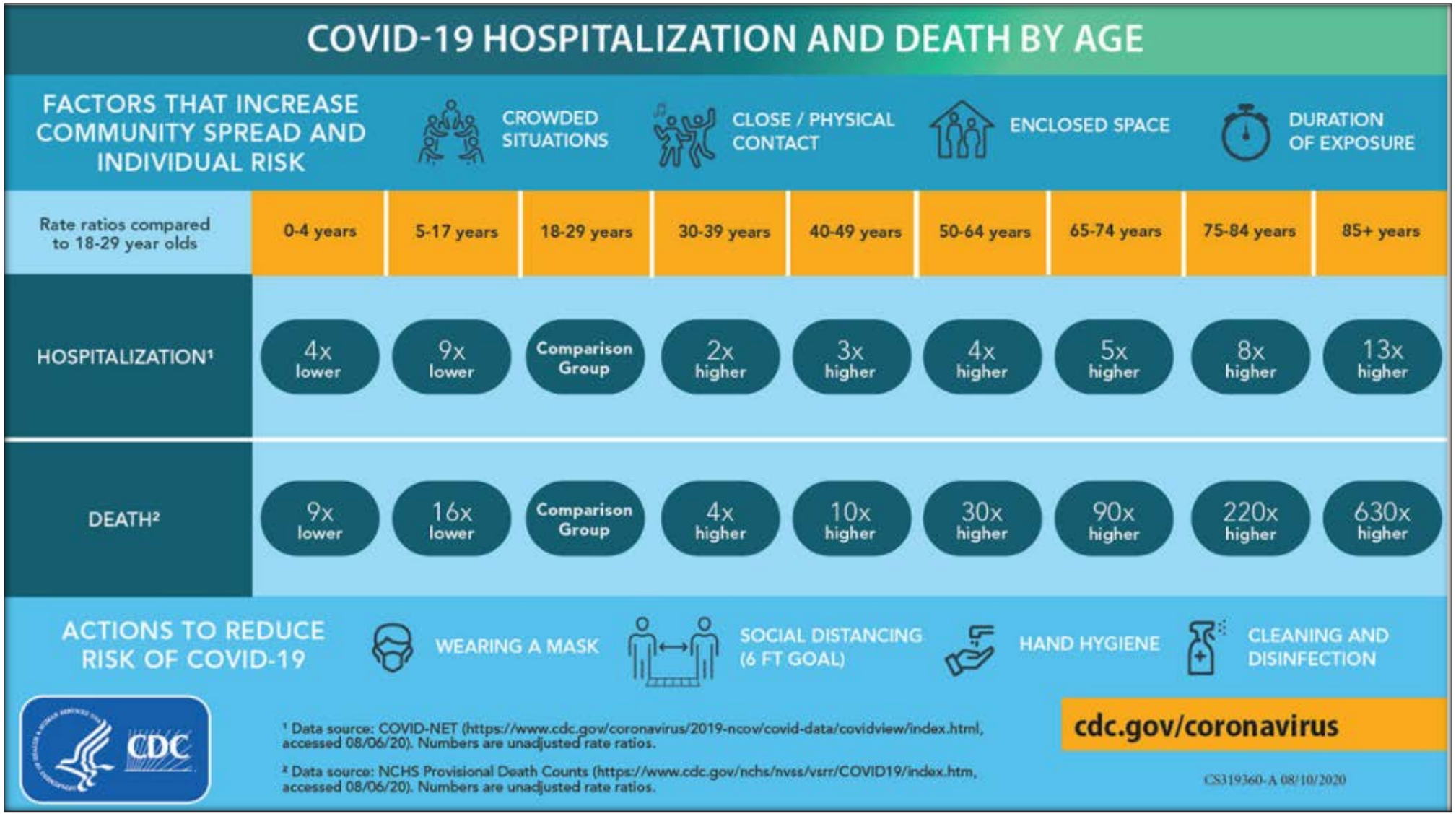
Age groups, median age, and range for confirmed and probable cases.

	Median Age (Range) in Years
All Cases	36 (<1 month – 109)
Non-Hospitalized Cases	35 (<1 month - 109)
Hospitalizations	61 (<1 month - 105)
ICU Hospitalizations	62 (<1 month - 99)
Deaths	83 (<1 - 109)



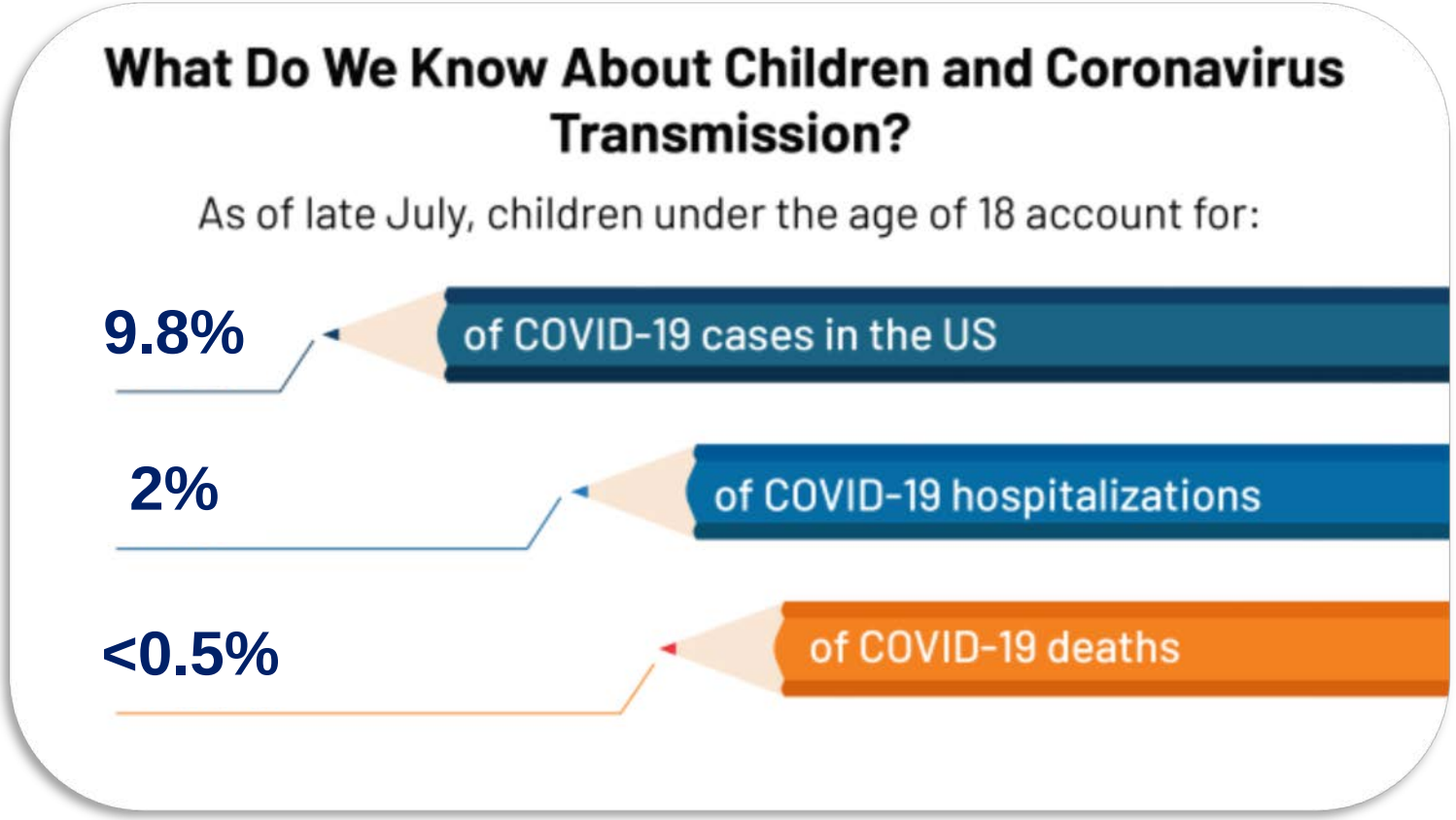
Age Group (in years)	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100+	Unk./ missing	Total
All Cases	2,758	2,936	4,392	12,521	17,575	13,827	12,564	11,490	10,305	9,825	9,789	9,194	7,362	4,957	3,804	2,825	2,294	1,916	1,313	553	102	9	142,311
Hospitalizations	90	35	48	176	302	374	447	475	494	575	755	905	947	894	899	817	742	584	313	108	11	0	9,991
ICU Hospitalizations	19	12	9	41	34	58	81	90	133	157	229	273	313	294	258	238	200	129	59	15	0	0	2,642
Deaths	1	0	0	0	1	3	9	10	11	23	53	77	133	162	232	255	381	427	394	203	44	0	2,419

Minnesota Department of Health Weekly COVID-19 Report: Updated 10/29/2020 with data current as of 4 p.m. the previous day. Page 22


COVID-19 HOSPITALIZATION AND DEATH BY AGE
FACTORS THAT INCREASE COMMUNITY SPREAD AND INDIVIDUAL RISK
CROWDED SITUATIONS
CLOSE / PHYSICAL CONTACT
ENCLOSED SPACE
DURATION OF EXPOSURE
Rate ratios compared to 18-29 year olds
0-4 years
5-17 years
18-29 years
30-39 years
40-49 years
50-64 years
65-74 years
75-84 years
85+ years
HOSPITALIZATION¹
4x lower
9x lower
Comparison Group
2x higher
3x higher
4x higher
5x higher
8x higher
13x higher
DEATH²
9x lower
16x lower
Comparison Group
4x higher
10x higher
30x higher
90x higher
220x higher
630x higher
ACTIONS TO REDUCE RISK OF COVID-19
WEARING A MASK
SOCIAL DISTANCING (6 FT GOAL)
HAND HYGIENE
CLEANING AND DISINFECTION
CDC
¹ Data source: COVID-NET (https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/index.html, accessed 08/06/20). Numbers are unadjusted rate ratios.
² Data source: NCHS Provisional Death Counts (https://www.cdc.gov/nchs/nvss/vsrr/COVID19/index.htm, accessed 08/06/20). Numbers are unadjusted rate ratios.
cdc.gov/coronavirus
CS319360-A 08/10/2020

PEDIATRIC TRANSMISSION

Pediatric COVID-19 Transmission



Reference: Kaiser Family Foundation 2020

Morbidity and Mortality Weekly Report (*MMWR*)

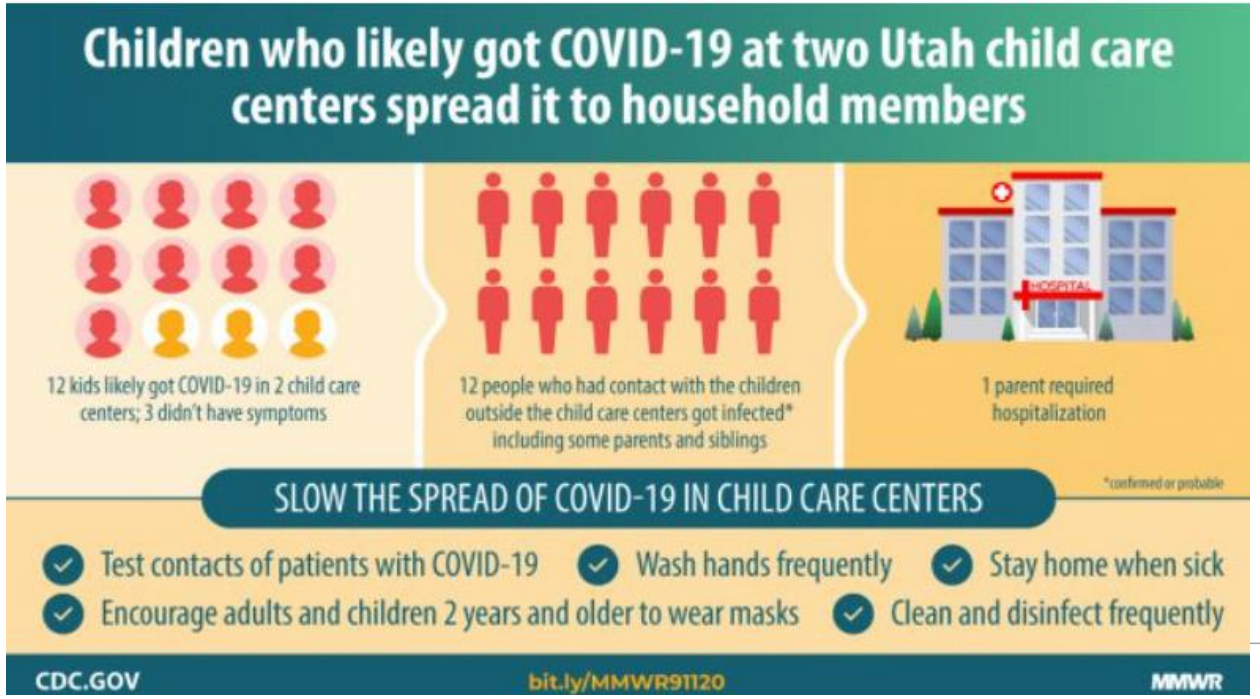
CDC

Transmission Dynamics of COVID-19 Outbreaks Associated with Child Care Facilities — Salt Lake City, Utah, April–July 2020

Weekly / September 18, 2020 / 69(37);1319–1323

On September 11, 2020, this report was posted online as an MMWR *Early Release.*

Adriana S. Lopez, MHS[1]; Mary Hill, MPH[2]; Jessica Antezano, MPA[2]; Dede Vilven, MPH[2]; Tyler Rutner[2]; Linda Bogdanow[2]; Carlene Claflin[2]; Ian T. Kracalik, PhD[1]; Victoria L. Fields, DVM[1]; Angela Dunn, MD[3]; Jacqueline E. Tate, PhD[1]; Hannah L. Kirking, MD[1]; Tair Kiphibane[2]; Ilene Risk, MPA[2]; Cuc H. Tran, PhD[1] (View author affiliations)



Take home messages

- 12 kids in 2 child care centers +
- 12 more infections from them in community
- COVID less severe in kids than adults
- Kids can transmit to parents
- 8 month old transmitted to both parents
- 2 of 3 asymptomatics confirmed spread
- 1 adult hospitalized
- Mask in kids 2 and older
- Daycare worker household ill needs quarantine

Morbidity and Mortality Weekly Report (*MMWR*)

CDC

Transmission of SARS-COV-2 Infections in Households — Tennessee and Wisconsin, April–September 2020

Early Release / October 30, 2020 / 69

Carlos G. Grijalva, MD[1,*]; Melissa A. Rolfes, PhD[2,*]; Yuwei Zhu, MD[1]; Huong Q. McLean, PhD[3]; Kayla E. Hanson, MPH[3]; Edward A. Belongia, MD[3]; Natasha B. Halasa, MD[1]; Ahra Kim, MPH[1]; Carrie Reed, DSc[2]; Alicia M. Fry, MD[2]; H. Keipp Talbot, MD[1] (View author affiliations)

- Findings from a prospective household study with intensive daily observation for ≥7 consecutive days indicate that transmission of SARS-CoV-2 among 191 household members was frequent from either children or adults.
- Household transmission of SARS-CoV-2 from 101 index patients was common and occurs early after illness onset.
- Persons should self-isolate immediately at the onset of COVID-like symptoms, at the time of testing as a result of a high risk exposure, or at time of a positive test result, whichever comes first.
- Secondary infection rate of 53% (95% confidence interval [CI] = 46%–60%). Among fourteen households in which the index patient was aged <18 years, the secondary infection rate from index patients aged <12 years was 53% (95% CI = 31%–74%) and from index patients aged 12–17 years was 38% (95% CI = 23%–56%).
- Approximately 75% of secondary infections were identified within 5 days of the index patient's illness onset, and substantial transmission occurred whether the index patient was an adult or a child
- All household members, including the index case, should wear masks within shared spaces in the household

CLINICAL UPDATES

Clinical Manifestations of COVID-19

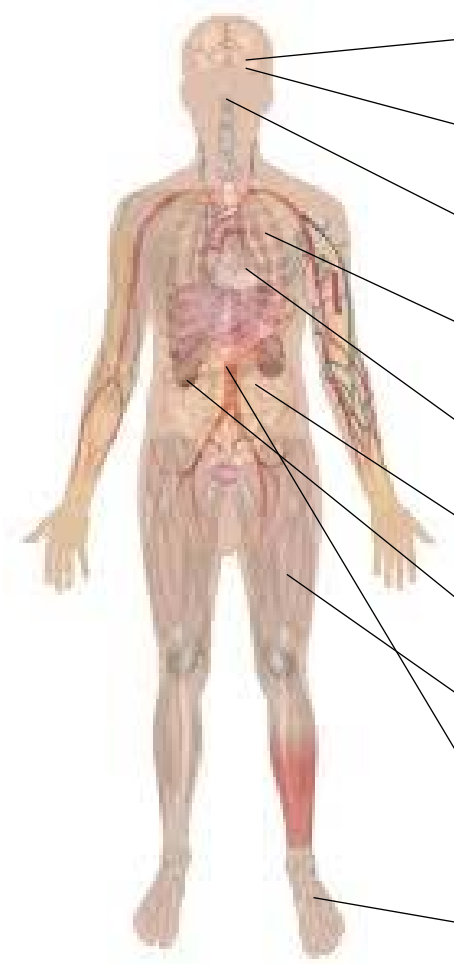
Children's MINNESOTA

- **Asymptomatic**
- **Mild**
- **Moderate**

90%

- **Severe**
- **Critical**

10%



- **Neurologic:**
- **Eyes**: conjunctivitis
- **ENT**: Hyposmia, dysgeusia, lymphadenopathy
- **Lungs**: Cough, sob, pneumonia, ARDS
- **CV**: Myocarditis, cardiomyopathy, vasculitis
- **GI**: Diarrhea, nausea/vomiting, abdominal pain
- **Liver**: Transaminitis
- **Heme**: Thrombosis
- **Constitutional**: Fever → systemic inflammation
- **Skin**: Rash

Dong et al., Epidemiology of COVID-19 Among Children in China. Pediatrics. 2020; 145 (6)

JAMA Network Open

Original Investigation | Infectious Diseases

Comparison of Clinical Features of COVID-19 vs Seasonal Influenza A and B in US Children

Xiaoyan Song, PhD; Meghan Delaney, DO; Rahul K. Shah, MD; Joseph M. Campos, PhD; David L. Wessel, MD; Roberta L. DeBiasi, MD

Children's MINNESOTA

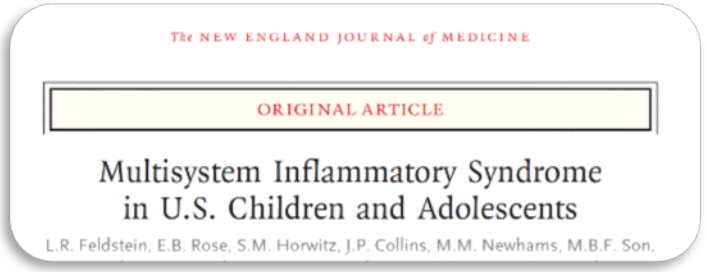
Clinical Features: COVID vs Influenza

- **Study Design:**
  - Retrospective review
  - 315 children with COVID-19 and 1402 diagnosed with Flu A/B 2019-2020
  - Excluded asymptomatic COVID-19
  - March 25 to May 15, 2020

- **Clinical Characteristics**:
  - **Similar rates** of hospitalization (~ 20%), admission to ICU, use of mechanical ventilation
  - **< 1 year and > 15 years** more commonly hospitalized in COVID-19
  - **Fever, diarrhea, vomiting, headache, body aches and chest pain** found more often in hospitalized children with COVID-19

Table 1. Comparison of Outcomes Among Patients With COVID-19, Influenza A, and Influenza B

		Seasonal influenza		
Outcome	COVID-19	A and B	A	B
Patients tested positive, No.	315	1402	674	728
Patients hospitalized, No. (%)	54 (17.1)	291 (20.8)	143 (21.2)	148 (20.3)
Patients requiring ICU stay, No. (%)	18 (5.7)	98 (7.0)	59 (8.8)	39 (5.4)
Patients requiring mechanical ventilator support, No. (%)	10 (3.1)	27 (1.9)	16 (2.4)	11 (1.5)
Hospital length of stay, mean (range), d	8.4 (1-45)	5.7 (1-100)	6.3 (1-100)	5.1 (1-58)
Mechanical ventilator support, median (range), d	10.1 (2-41)	7.0 (1-38)	8.1 (1-38)	5.4 (1-16)
Deaths, No. (%)	0	2 (0.1)	2 (0.3)	0



Children's MINNESOTA

MIS-C in Children in the US

- **Study Design:**
  - **38 sites**
  - Prospective and retrospective surveillance of patients with MIS-C
  - Study period: March 15 to May 20, 2020
  - Standard case definition of MIS-C

- **Clinical Characteristics**:
  - Median age **8.3 years**
  - 27% had an **underlying medical condition**
  - 80% required **ICU admission** and 1 in 5 needed **mechanical ventilation**
  - 70% **fully recovered**, 28% still in hospital
  - 4 **deaths**

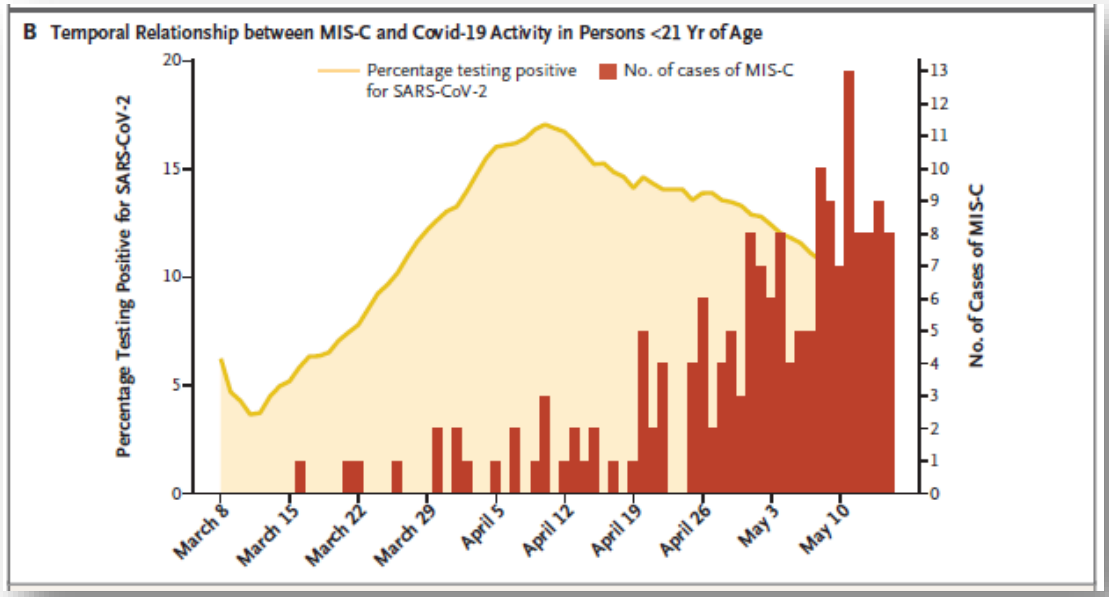
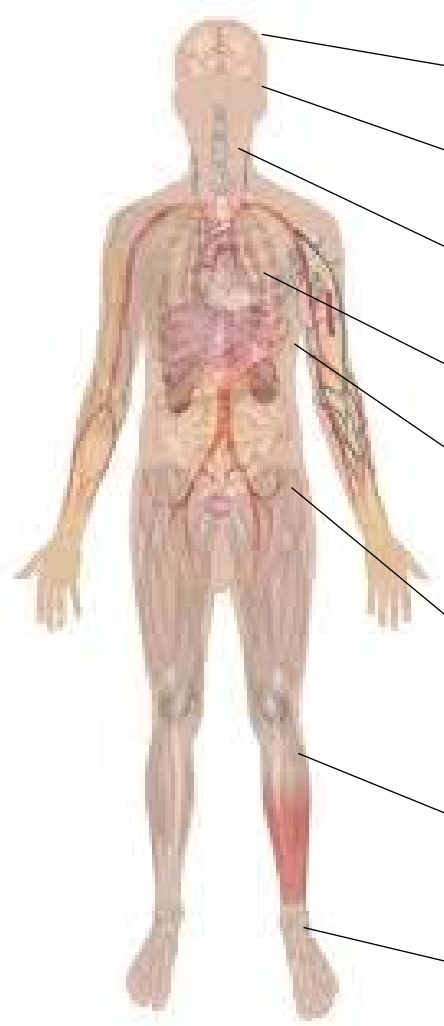


Figure 1. Statewide pooled percentages of positivity for SARS-CoV-2 laboratory testing of respiratory specimens from person < 21 years as compared with hospitalization dates for patients with MIS-C included from participating hospitals during study time period.

Clinical Manifestations of MIS-C



Constitutional: Fever, systemic inflammation

Eyes: conjunctivitis

ENT: lymphadenopathy

Lungs: infiltrate, respiratory insufficiency and/or failure

Heart (80%): myocarditis, cardiomyopathy, vasculitis, hypotension, depressed function

GI (91%): abdominal pain, diarrhea, nausea/vomiting

Skin (72%) : rash mucocutaneous

Hematologic (76%): DVT or pulmonary embolism

Neurologic or Renal

CDC Case Definition:

- **< 21 years** old with **fever**
- Lab evidence of **inflammation**
- Illness requiring hospitalization
- **> 2 organ** involvement
- No other reasons for disease
- **Positive COVID** testing now or recently

Immunity from COVID 19 *Disease*

Natalie J. Thornburg, PhD Respiratory virus immunology team lead ACIP SARS-CoV-2 working group June 24, 2020

What is known

- Most COVID-19 patients mount IgG and IgM responses to the virus
- Many CoVID-19 patients mount neutralizing antibody responses
- Magnitude of antibody response correlates to disease severity

What is not fully known

- Are COVID-19 patients susceptible to reinfection?
- Are antibodies a correlate of immunity?
- If so, what quality (Isotype, antigenic region, neutralizing)?
- Is there a threshold of protection?
- How long will serum antibodies last?

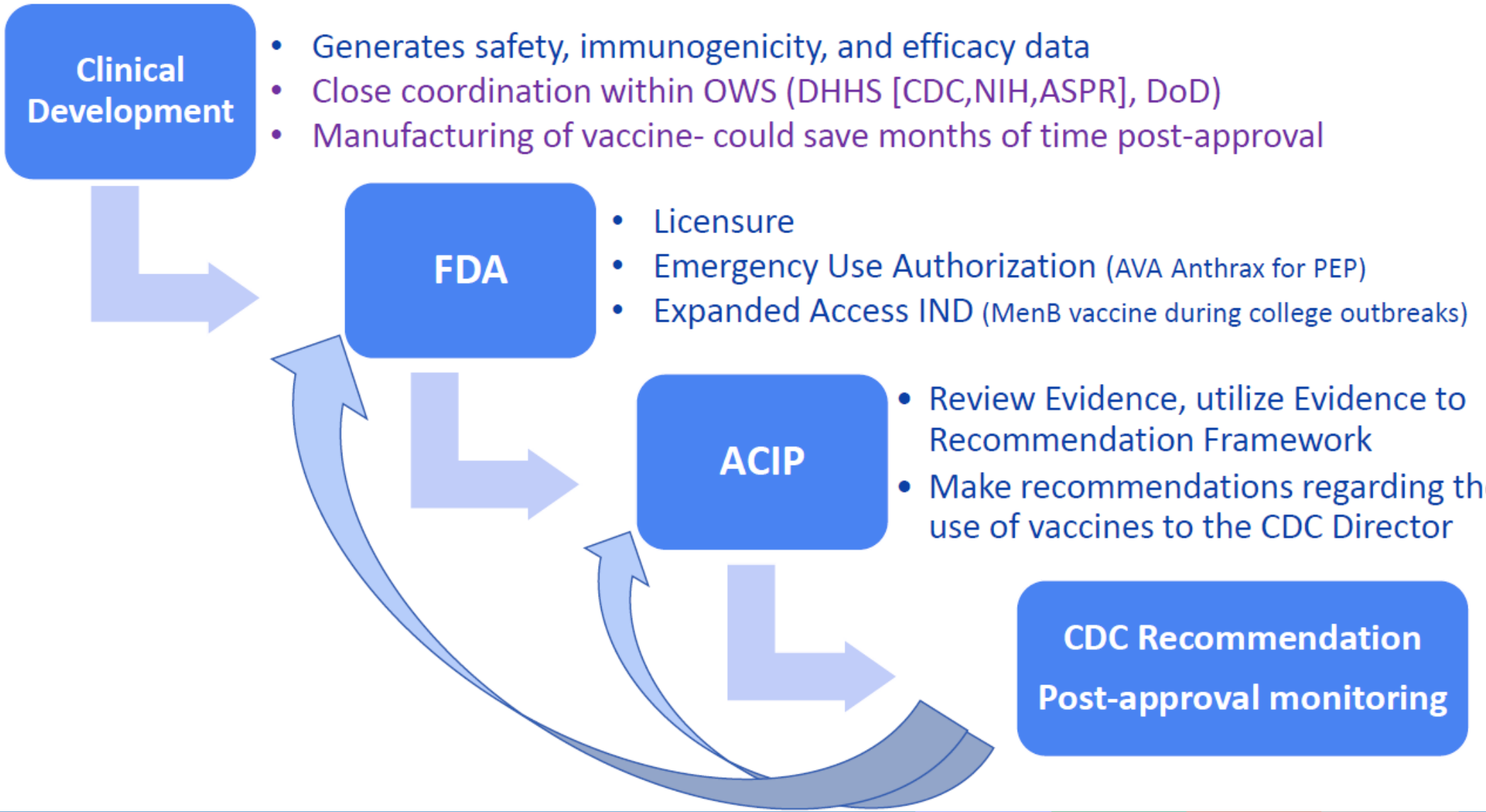
Genetically what do we know?

Dr. Eric Topol Managing Editor Medscape Accessed on Twitter 9/23/2020

- SARS CO-V2 has had a very slow genetic drift to date
- Seems to be a highly stable genome
- Remarkably low genetic diversity makes it well suited for a vaccine
- Difference in glycoproteins is main thing to follow
- Mutation rate is one third of influenza

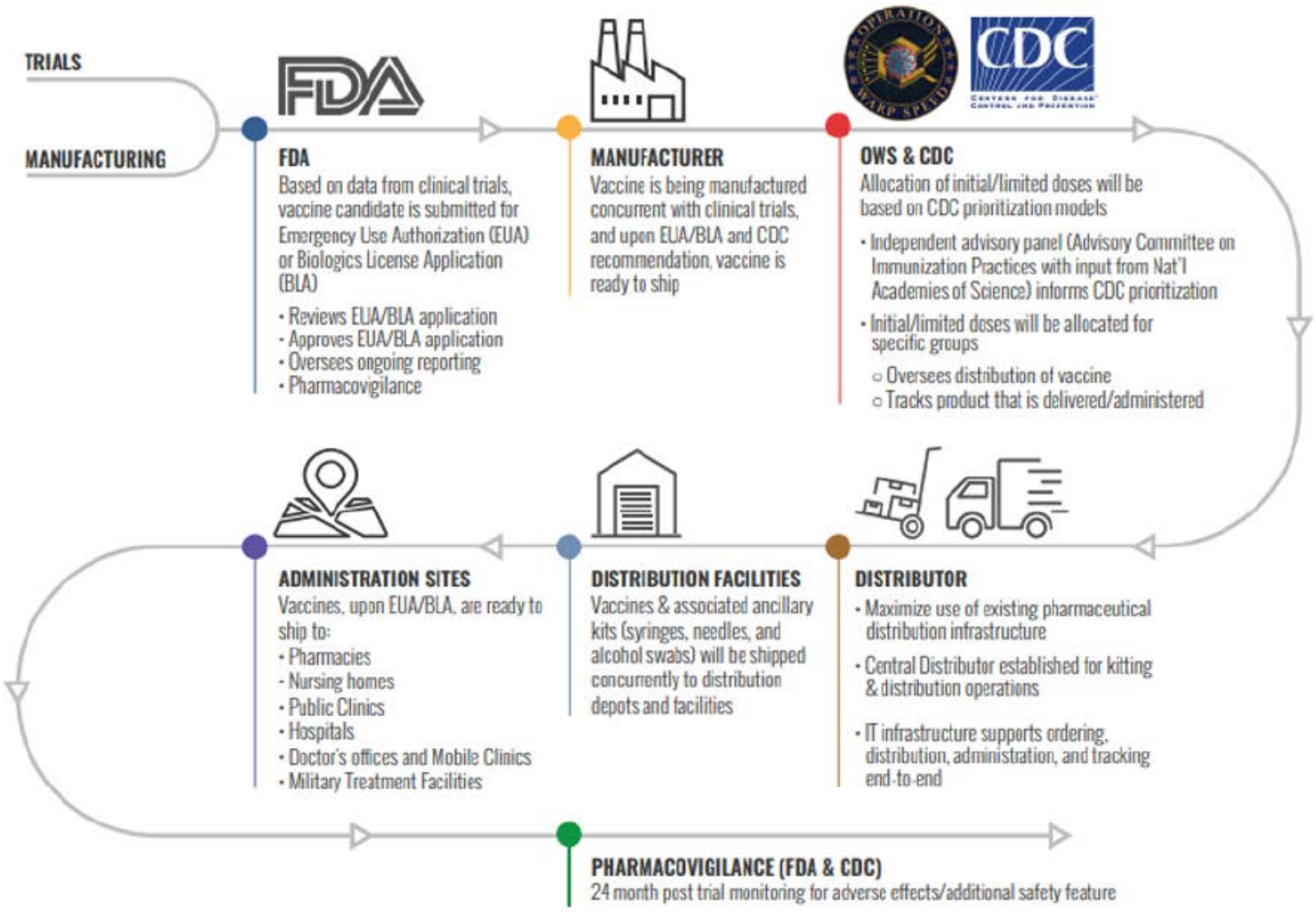
COVID VACCINE UPDATE

Path from clinical development to recommendation



Vaccine Approval & Distribution Plan

Framework for Equitable Allocation of COVID-19 Vaccine



ACIP Meeting Presentation 10.30.20

Expect 50% efficacy vs placebo with CI lower bound >30%
At least half of subjects followed up for at least 2 months
Safety data in well over 3K recipients:
reactogenicity,
adverse events,
at least some severe disease prevention

Vaccine Update Summary

- **248** COVID-19 vaccines currently under develo
  - **91** candidates are in human trials worldwide
    - **10** vaccines in human trials within the Uni
      - **5** candidates are actively recruiting in the United States
    - **84** candidates are in human trials outside the US
      - **2** candidates have completed trials in Russia
      - **51** candidates outside of the US are recruiting participants
        - **16** candidates recruiting are in Phase III
          - **4** candidates are approved for emergency use in Brazil, China, Indonesia, and UAE

As of Oct 19, 2020
Sources https://www.modernatx.com/cove-study; https://www.pfizer.com/science/coronavirus/vaccine, clinicaltrials.gov, https://www.janssen.com/johnson-johnson-initiates-pivotal-global-phase-3-clinical-trial-janssenscovid-19-vaccine-candidate https://vac-lshtm.shinyapps.io/ncov_vaccine_landscape/

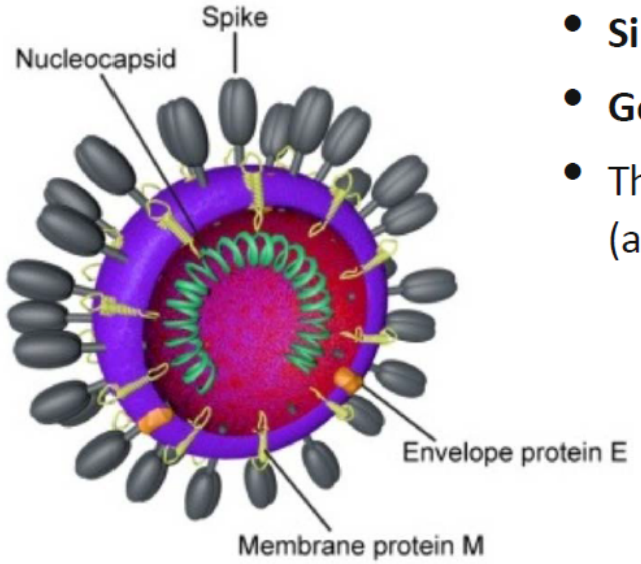
COVID-19 vaccines in human clinical trials – United States*

Candidate	Manufacturer	Type	Phase	Trial characteristics	Trial #	Recruiting
mRNA-1273	Moderna TX, Inc.	mRNA	III	• 2 doses (0, 28d) • IM administration • 18-55, 56+ years	NCT04470427	Enrollment complete
mRNA-BNT162	Pfizer, Inc./BioNTech	mRNA	II/III	• Single or 2 doses • IM administration • 18-85 years	NCT04368728	✓
AZD1222	University of Oxford/AstraZeneca consortium**	Viral vector (NR)	III	• 2 doses (0, 28d) • IM administration • ≥18 years	NCT04516746	✓
Ad26COVS1	Janssen Pharmaceutical Companies	Viral vector (NR)	III	• 1 or 2 doses (0, 56d) • IM administration • 18-55, 65+	NCT04436276	✓
--	Sanofi/GSK	Protein Subunit	I/II	• Single or 2 doses • IM administration • 18-49, 50+	NCT04537208	✓
NVX-CoV2373	Novavax	Protein Subunit	I/II	• 2 doses (0, 21d) • IM administration • 18-84	NCT04368988	Enrollment complete
V591	Merck	Viral Vector	I/II	• 2 doses (1, 57d) • IM administration • 18-55	NCT04498247	✓

*As of October 27, 2020
**Currently on hold in US
Sources: https://milkeninstitute.org/covid-19-tracker; https://www.who.int/who-documents-detail/draft-landscape-of-covid-19-candidate-vaccines; https://vac-lshtm.shinyapps.io/ncov_vaccine_landscape/ ; https://clinicaltrials.gov/; https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html

Understanding the virus for vaccine development

Basic Structure of *Coronavirinae*

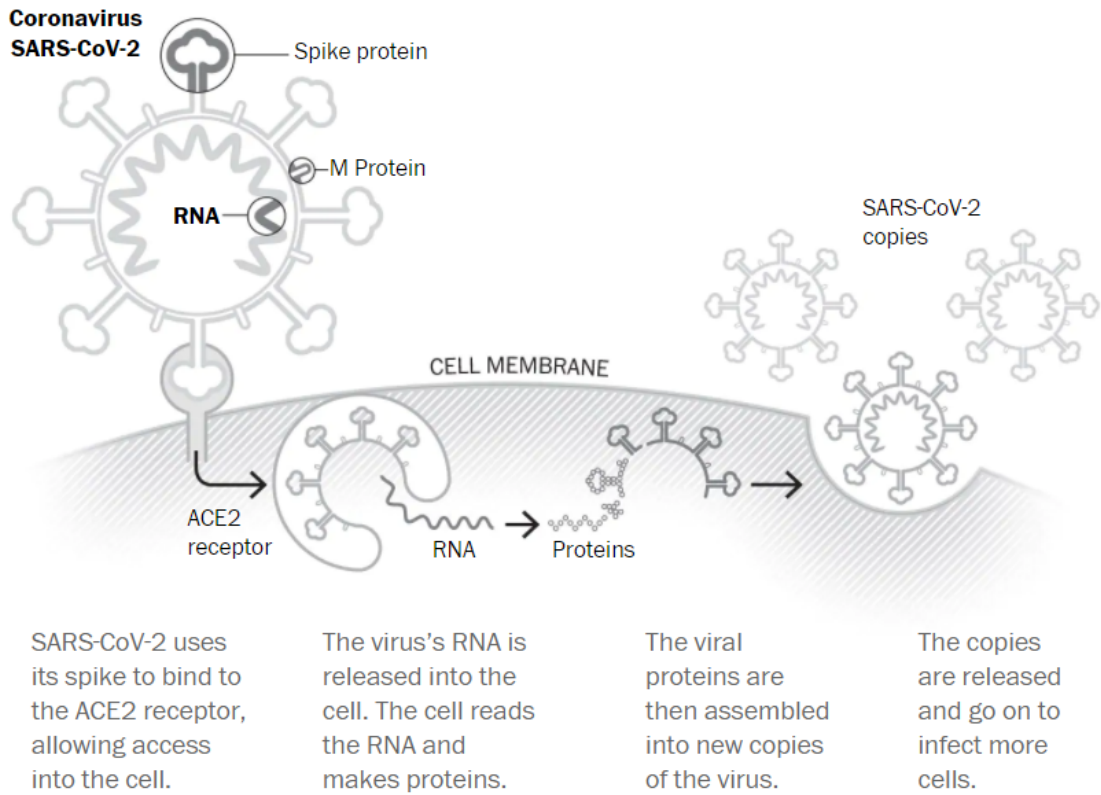


- **Single-stranded RNA viruses**
- **Genomes range from 25 to 32 kilobases**
- The coronaviral genome encodes **four major structural proteins** (all are required to produce a structurally complete viral particle)
  - Spike (S) protein: *binding*
  - Nucleocapsid (N) protein: *RNA synthesis*
  - Membrane (M) protein: *organization/assembly*
  - Envelope (E) protein: *organization/assembly*

Vaccine platforms & immune response

Accessed 11/1/2020

The Washington Post
Democracy Dies in Darkness



Here is a look at how different vaccine technologies being developed around the world would ideally elicit an immune response to prevent SARS-CoV-2 in humans. Each vaccine may vary somewhat in how it works, but each would generally follow these steps.

Phase I/II: Determining safety & dose

Published on September 2, 2020, at NEJM.org. DOI: 10.1056/NEJMoa2026920 Accessed 11.5.2020

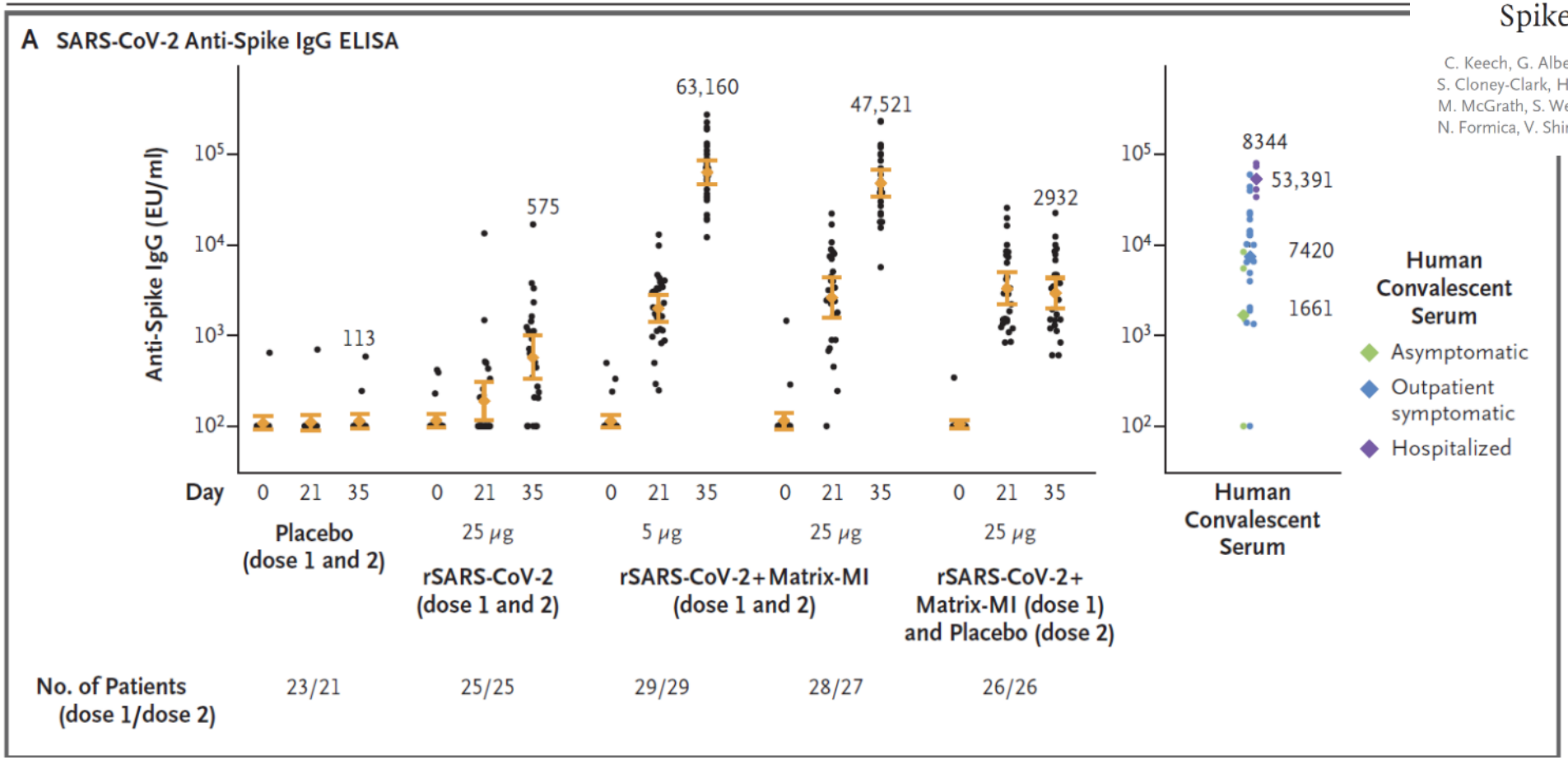
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Phase 1–2 Trial of a SARS-CoV-2 Recombinant Spike Protein Nanoparticle Vaccine

C. Keech, G. Albert, I. Cho, A. Robertson, P. Reed, S. Neal, J.S. Plested, M. Zhu, S. Cloney-Clark, H. Zhou, G. Smith, N. Patel, M.B. Frieman, R.E. Haupt, J. Logue, M. McGrath, S. Weston, P.A. Piedra, C. Desai, K. Callahan, M. Lewis, P. Price-Abbott, N. Formica, V. Shinde, L. Fries, J.D. Lickliter, P. Griffin, B. Wilkinson, and G.M. Glenn

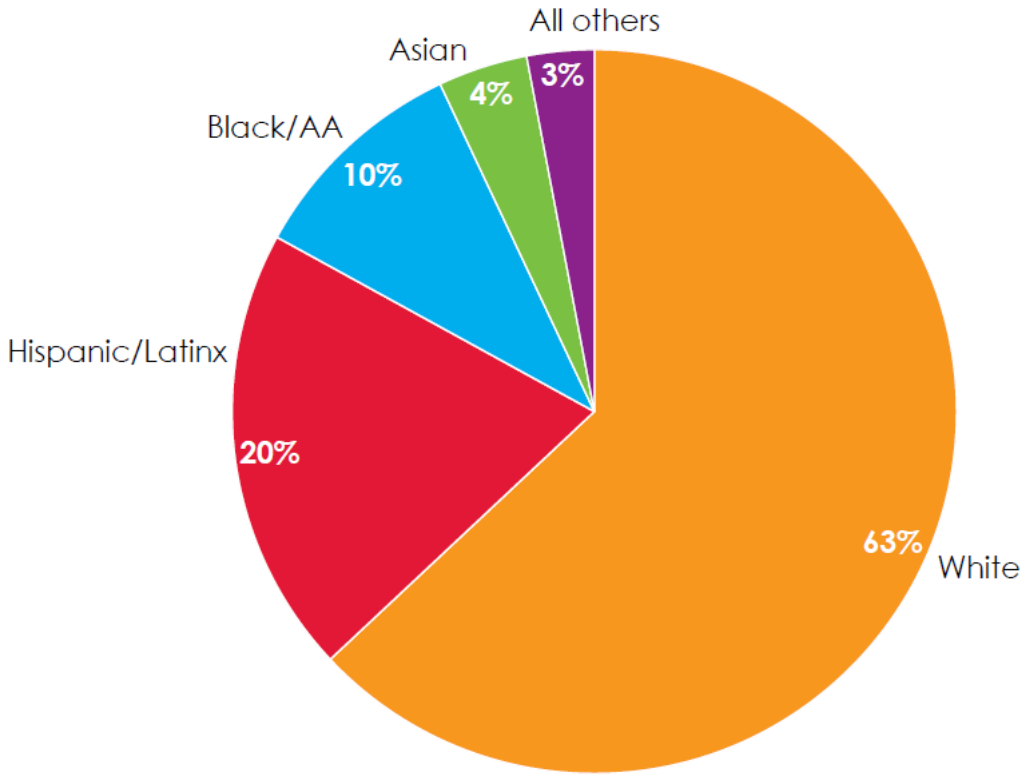
The NEW ENGLAND JOURNAL of MEDICINE



Phase III: Check efficacy in diverse subjects

Race and ethnicity

Interim data snapshot - October 21, 2020 - subject to change

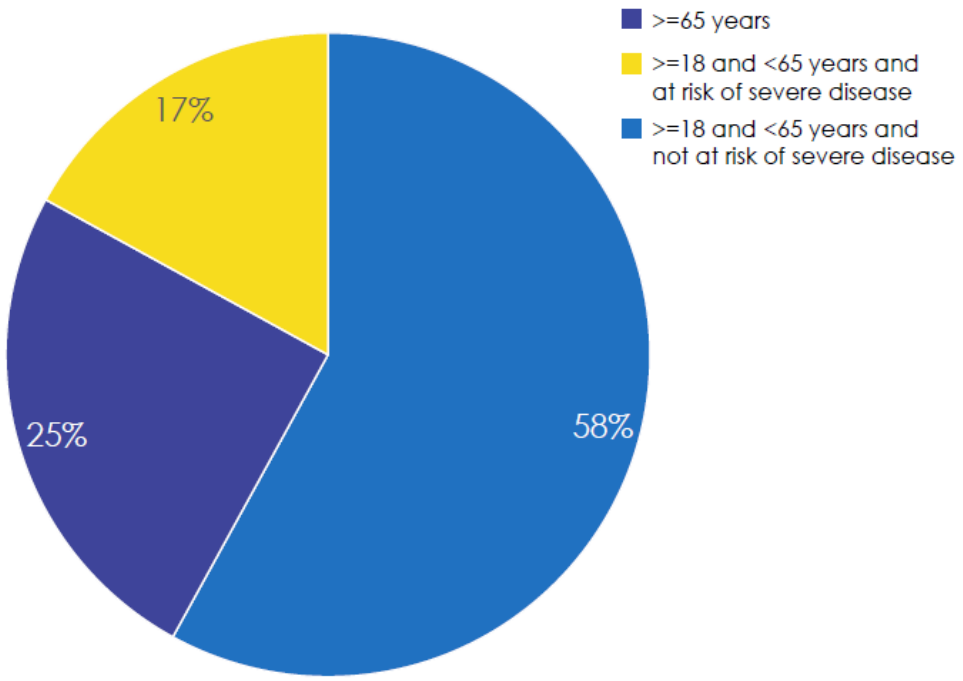


Representative Subjects important

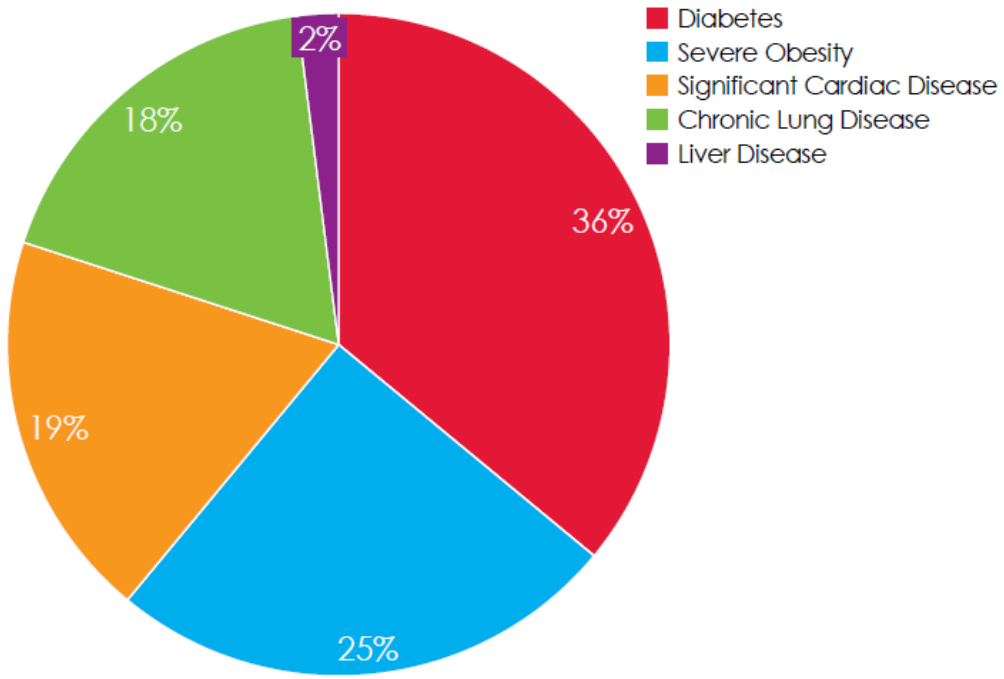
Risk factors for severe COVID-19 disease

Interim data snapshot - October 21, 2020 - subject to change

Risk stratification in Cove Study



Comorbidities of at risk participants in Cove Study



Enrollment transparency

Children's MINNESOTA

A vaccine for everyone…find yourself in the Cove study

Interim data snapshot - October 21, 2020 - subject to change

moderna

Slide

What about kids?

Current enrollment status

- BNT/Pfizer Phase III expanded to 16 & 17 year olds in September
- Sinovac Phase I/II in China registered to enroll 522 kids age 3-17 years
- Sinovac Phase III in Brazil registered to enroll children, pregnant women and older adults >60 years

VACCINE PLATFORMS

Children's MINNESOTA

Nature Materials.19, 810-812 23 July 2020. Next-generation vaccine platforms for COVID-19 Debby van Riel & Emmie de Wit.

VIRUS

- **Inactivated (polio & flu vaccine)**
  - Humoral immune response
  - Antibody titers diminish with time
  - Requires repeat doses
- **Live, attenuated, weakened (MMR)**
  - Mimics human immune response
  - Both humoral and cellular
  - Few doses required for lasting protection

VIRAL VECTOR

- **Replicating (weakened, Measles)**
- **Non-replicating (Adenovirus) new technology, non-licensed**

- **Viral Vector example (Ebola)**
- Stimulates humoral and cellular immune response
- Single dose highly protective

PROTEIN BASED

- **Protein Based**
- **Protein sub-unit (flu, pertussis, Hep B)**
- **Virus-like particles (HPV)**

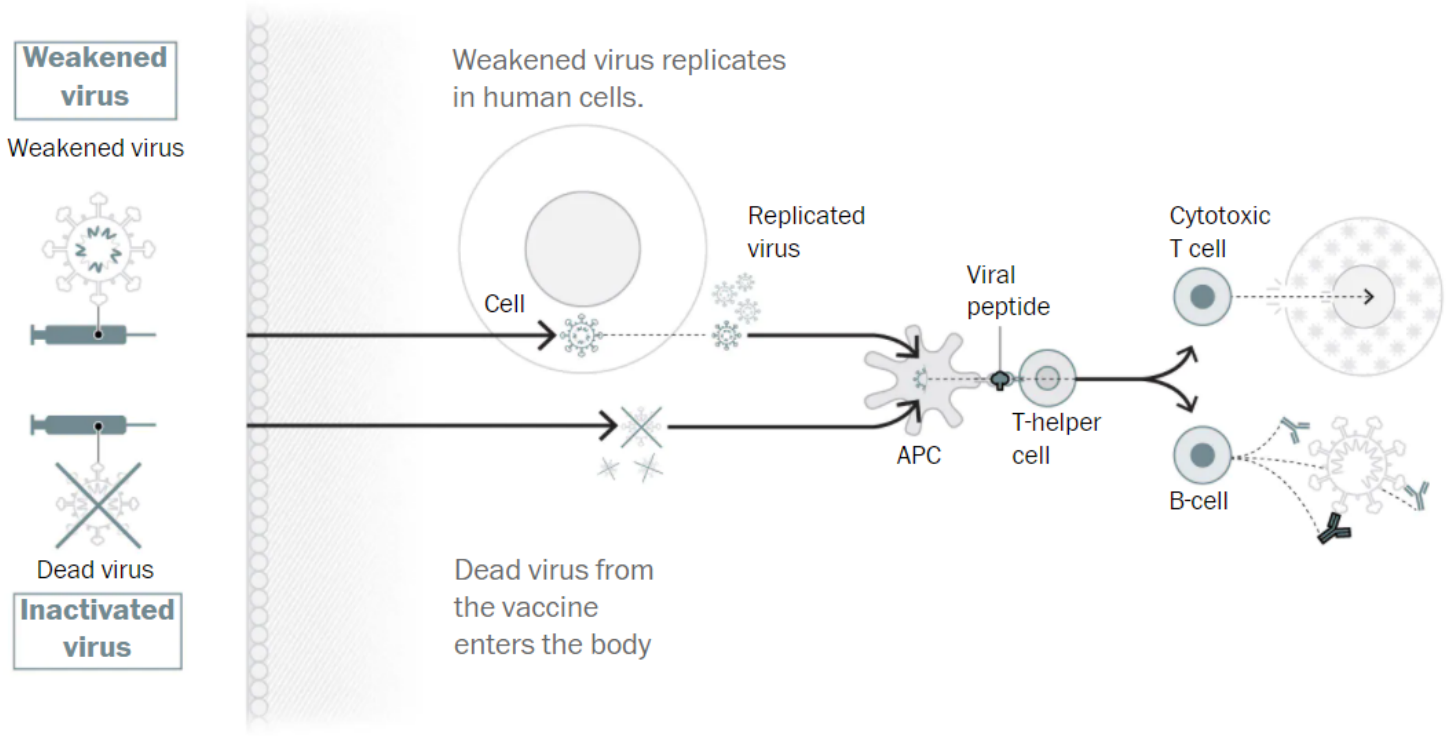
NUCLEIC ACID

- **DNA spike gene**
- **mRNA encased lipid coat**

- **Unlicensed, new technology**
- **Stimulates T and B cell immune response**
- **Multiple doses required**
- **Stability requires extreme cold**
- **Makes genetic material, not virus.**
- **Safe but unproven**

Weakened or Inactivated Vaccines

The Washington Post
Democracy Dies in Darkness

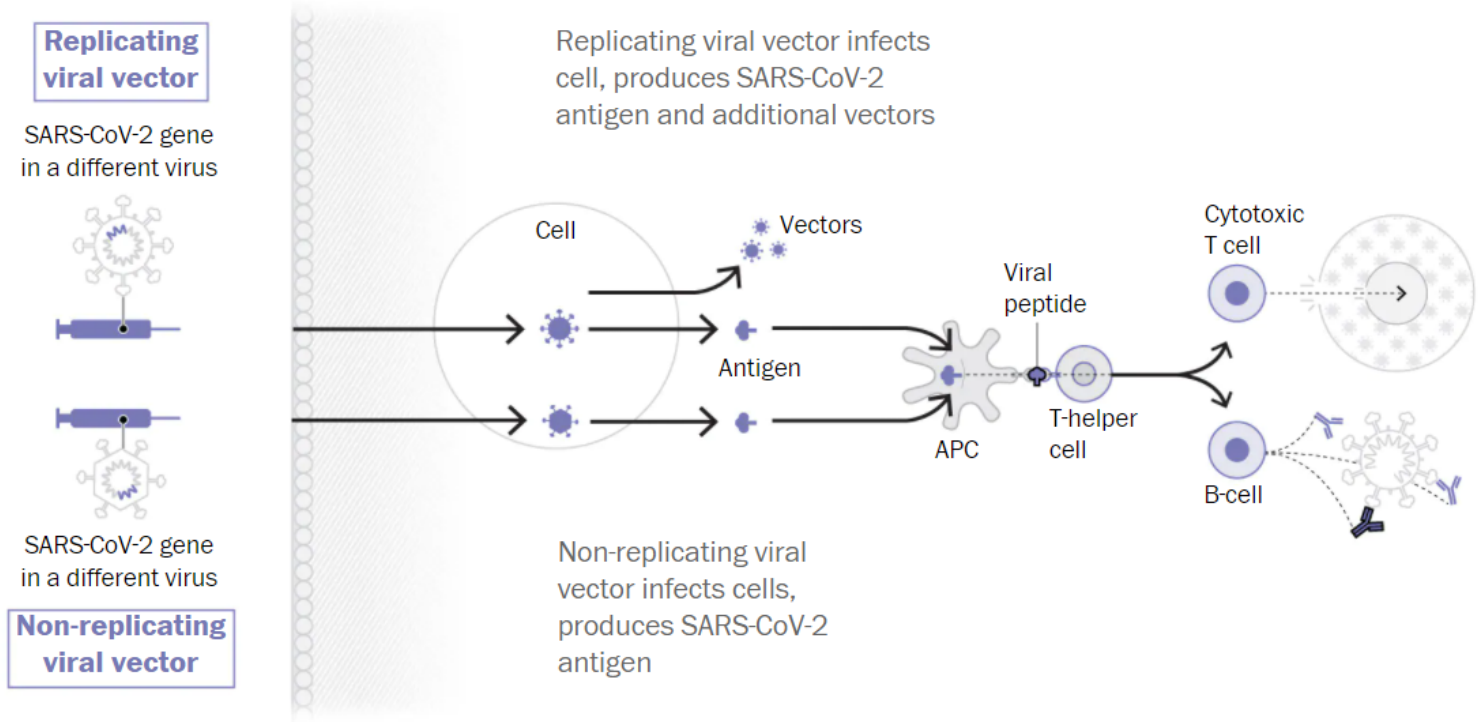


Weakened and inactivated virus vaccines, developed by...

Beijing Institute of Biological Products; Sinopharm	PC P1 P2 P3 A
Sinopharm	PC P1 P2 P3 A
Sinovac	PC P1 P2 P3 A

Viral Vectored Vaccines

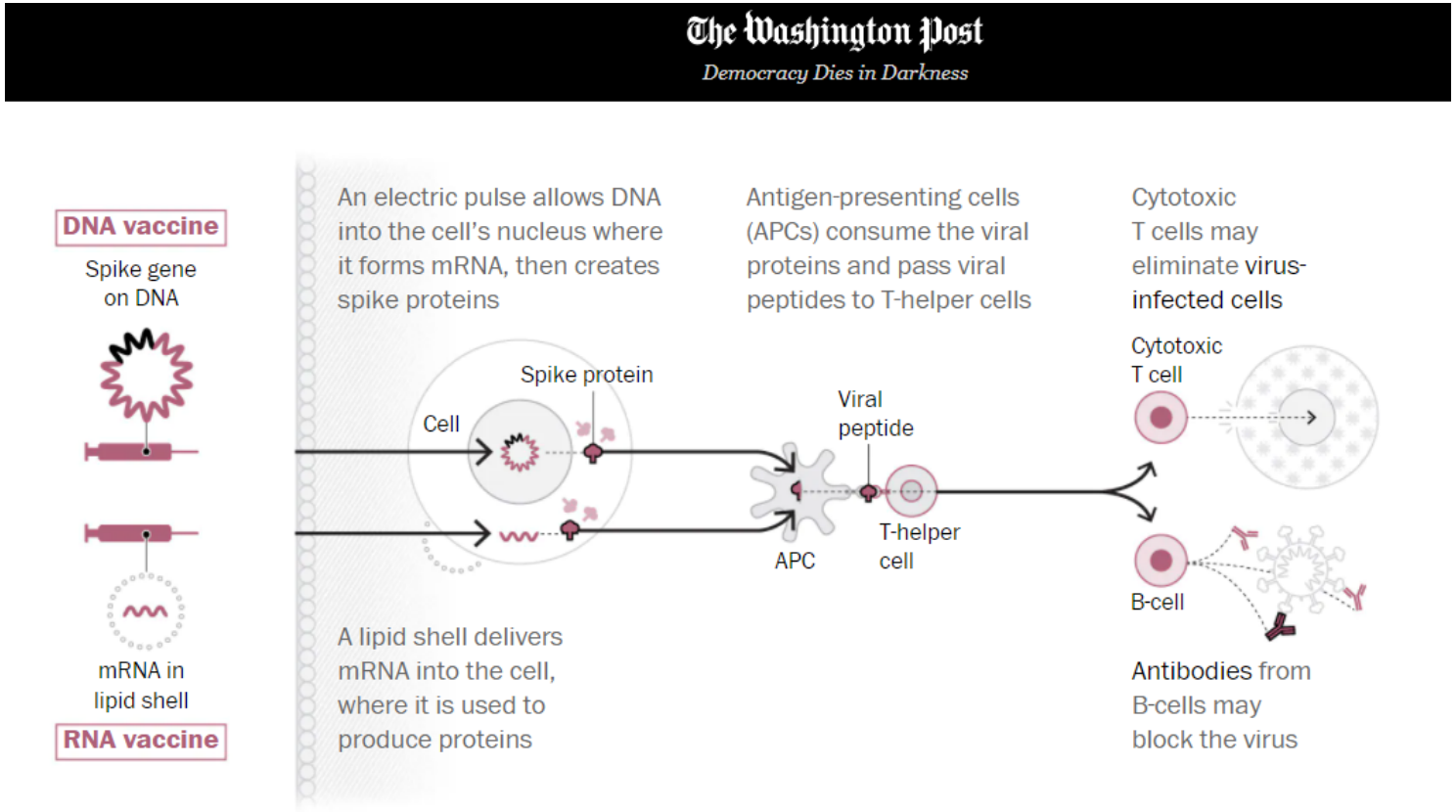
The Washington Post
Democracy Dies in Darkness



Viral-vectored vaccines, developed by...

AstraZeneca; University of Oxford	PC P1 P2 P3 A
CanSino Biologics; Beijing Institute of Biotechnology; Canada's National Research Council; Petrovax	PC P1 P2 P3 A
Gamaleya Research Institute*	PC P1 P2 P3 A

Vaccines using nucleic acid (DNA or RNA)



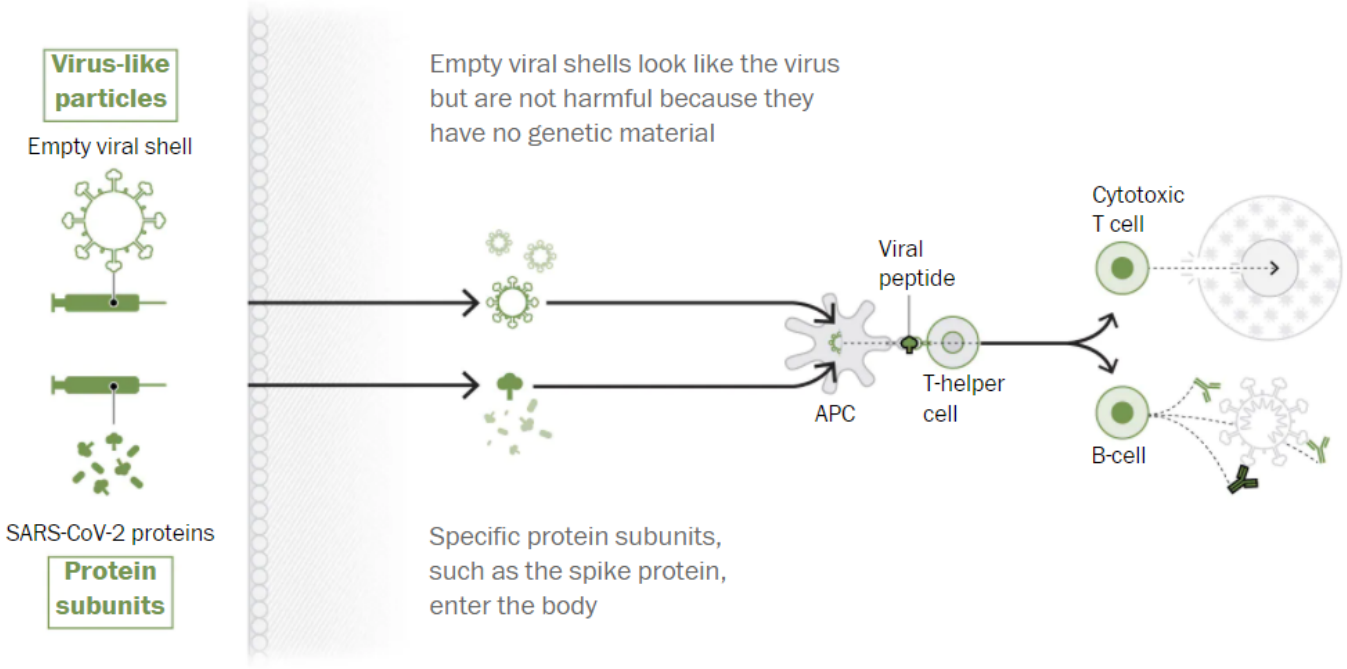
Nucleic acid vaccines, developed by...

Moderna; National Institutes of Health	PC P1 P2 P3 A
Pfizer; BioNTech; Fosun Pharma	PC P1 P2 P3 A
AnGes; Osaka University; Takara Bio	PC P1 P2 P3 A
Arcturus Therapeutics; Duke-NUS	PC P1 P2 P3 A

Subunit Protein Particle Vaccines

Children's MINNESOTA

The Washington Post
Democracy Dies in Darkness



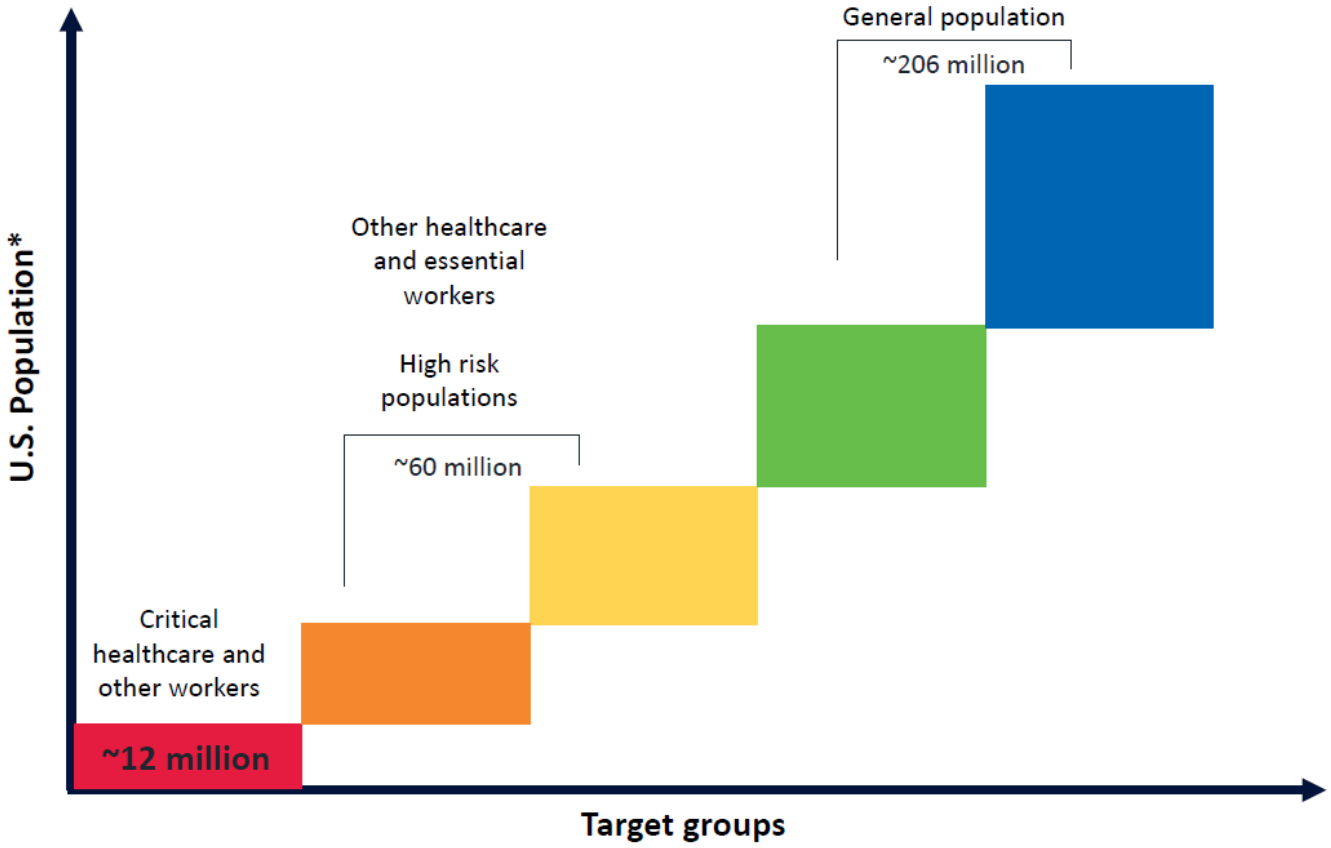
Subunit vaccines, developed by...

Novavax	PC P1 P2 P3 A
Anhui Zhifei Longcom; Chinese Academy of Sciences	PC P1 P2 P3 A
Federal Budgetary Research Institution (FBRI) State Research Center of Virology and Biotechnology "VECTOR"	PC P1 P2 P3 A
Instituto Finlay de Vacunas	PC P1 P2 P3 A

Tiered Approach for Distribution

ACIP meeting 6.24.2020

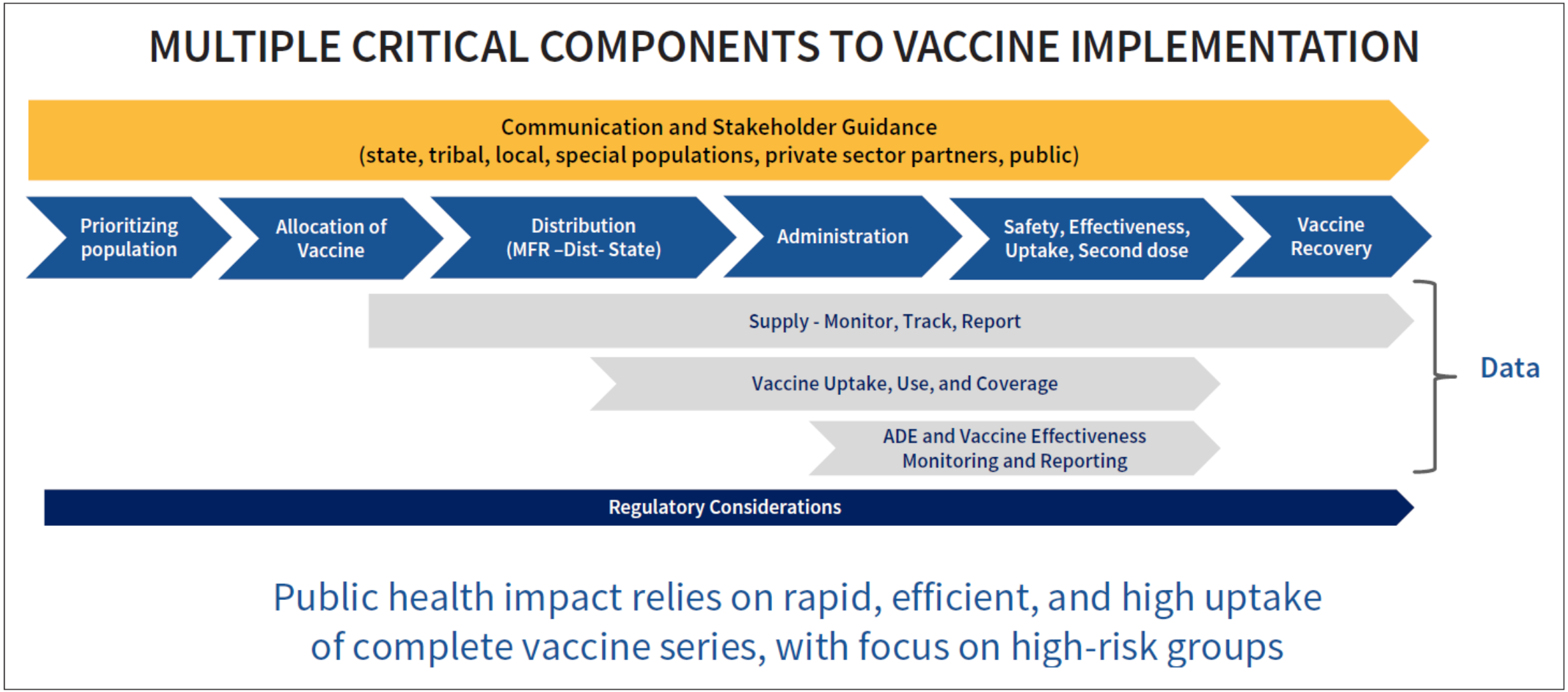
Work Group considerations: Further tiering of target groups may be necessary based on vaccine supply and program planning



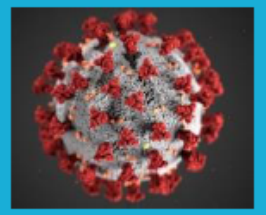
* Based on 2019 U.S. population of 328 million and information from Department of Defense, Department of Homeland Security, Department of Health and Human Services, and U.S. Census Bureau

Vaccine Implementation Plan

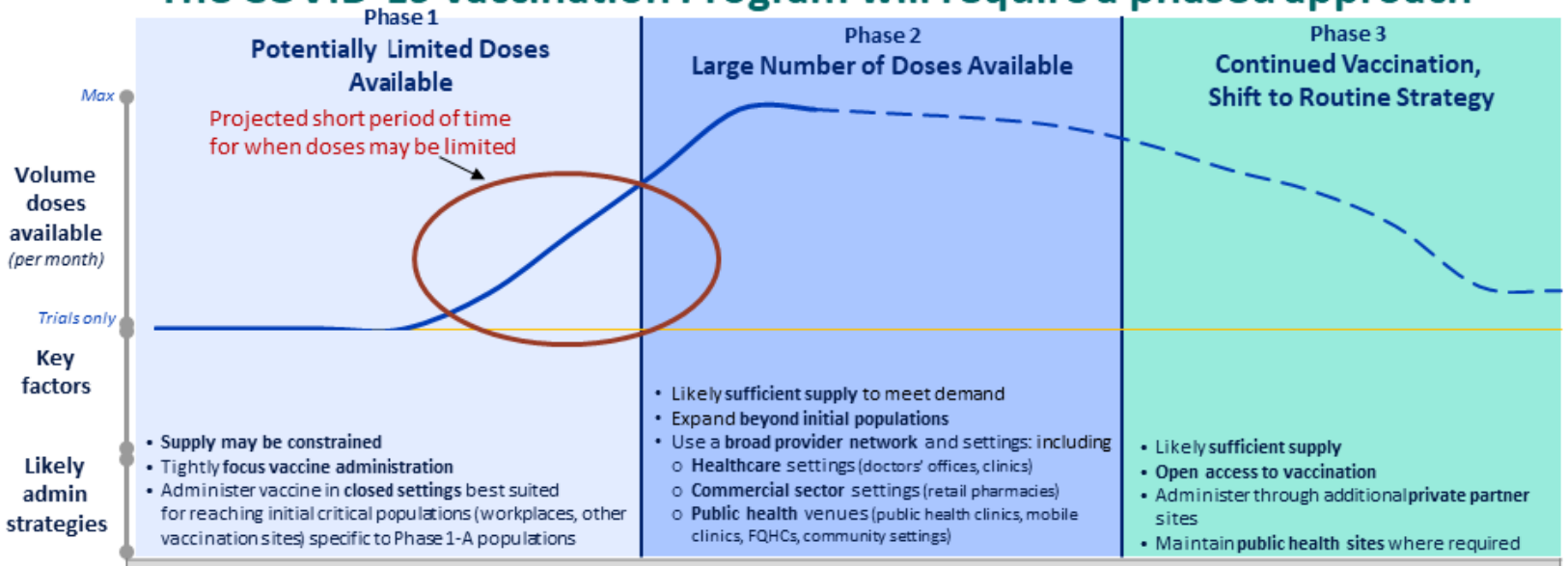
https://www.hhs.gov/sites/default/files/strategy-for-distributing-covid-19-vaccine.pdf



COVID-19 VACCINATION PROGRAM INTERIM PLAYBOOK FOR JURISDICTION OPERATIONS – September 16, 2020



The COVID-19 Vaccination Program will require a phased approach



Populations of Focus*

Phase 1	Phase 2	Phase 3
Phase 1-A: • Paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or infectious materials and are unable to work from home.	• Remainder of Phase 1 populations • Critical populations** • General population	• Remainder of Phase 1 populations • Critical populations** • General population
Phase 1-B: • Other essential workers • People at higher risk of severe COVID-19 illness, including people 65 years of age and older		

9/4/20

**Planning should consider that there may be initial age restrictions for vaccine products.*

***See Section 4: Critical Populations for information on Phase 1 subset and other critical population groups.*

Children's MINNESOTA

Framework for Equitable Allocation of COVID-19 Vaccine (2020)

DETAILS

260 pages | 6 x 9 | PAPERBACK
ISBN 978-0-309-68224-4 | DOI 10.17226/25917

Phase 1

Phase 1a "Jumpstart Phase"

- High-risk health workers
- First responders

Phase 1b

- People of all ages with comorbid and underlying conditions that put them at *significantly* higher risk
- Older adults living in congregate or overcrowded settings

Phase 2

- K–12 teachers and school staff and child care workers
- Critical workers in high-risk settings—workers who are in industries essential to the functioning of society and at substantially higher risk of exposure
- People of all ages with comorbid and underlying conditions that put them at *moderately* higher risk
- People in homeless shelters or group homes for individuals with disabilities, including serious mental illness, developmental and intellectual disabilities, and physical disabilities or in recovery, and staff who work in such settings
- People in prisons, jails, detention centers, and similar facilities, and staff who work in such settings
- All older adults not included in Phase 1

Phase 3

- Young adults
- Children
- Workers in industries and occupations important to the functioning of society and at increased risk of exposure not included in Phase 1 or 2

Phase 4

- Everyone residing in the United States who did not have access to the vaccine in previous phases

Equity is a crosscutting consideration: In each population group, vaccine access should be prioritized for geographic areas identified through CDC's Social Vulnerability Index or another more specific index.

Scenario 3: FDA has authorized vaccines A and B for EUA in 2020

Availability Assumptions

Vaccine availability under EUA by				
Candidate	**End of Oct 2020**	**End of Nov 2020**	**End of Dec 2020**	**Notes**
Vaccine A	~2M doses	10M–20M doses	20M–30M doses	Ultra-cold (-70 °C), for large sites only
Vaccine B	~1M doses	~10M doses	~15M doses	Central distribution capacity required (-20 °C)
Total	**~3M doses**	**20M–30M doses**	**35M–45M doses**	

Distribution, Storage, Handling, and Administration Assumptions

Vaccine A

SHIPMENT

3 separately acquired components (mixed on site)

1. Vaccine
   - Direct to site from manufacturer (on dry ice)
   - Multidose vials (5 doses/vial)
2. Diluent
   - Direct to site from USG (at room temperature)
3. Ancillary supply kits
   - Direct to site from USG (at room temperature)

ON-SITE VACCINE STORAGE

Frozen (-70 °C ± 10 °C)

- Must be used/recharged within 10 days
- Storage in shipping container OK (replenish dry ice within 24 hours of receiving shipment and again 5 days later)

Thawed but NOT reconstituted (2–8 °C)

- Must use within 5 days (discard unused doses after 5 days)

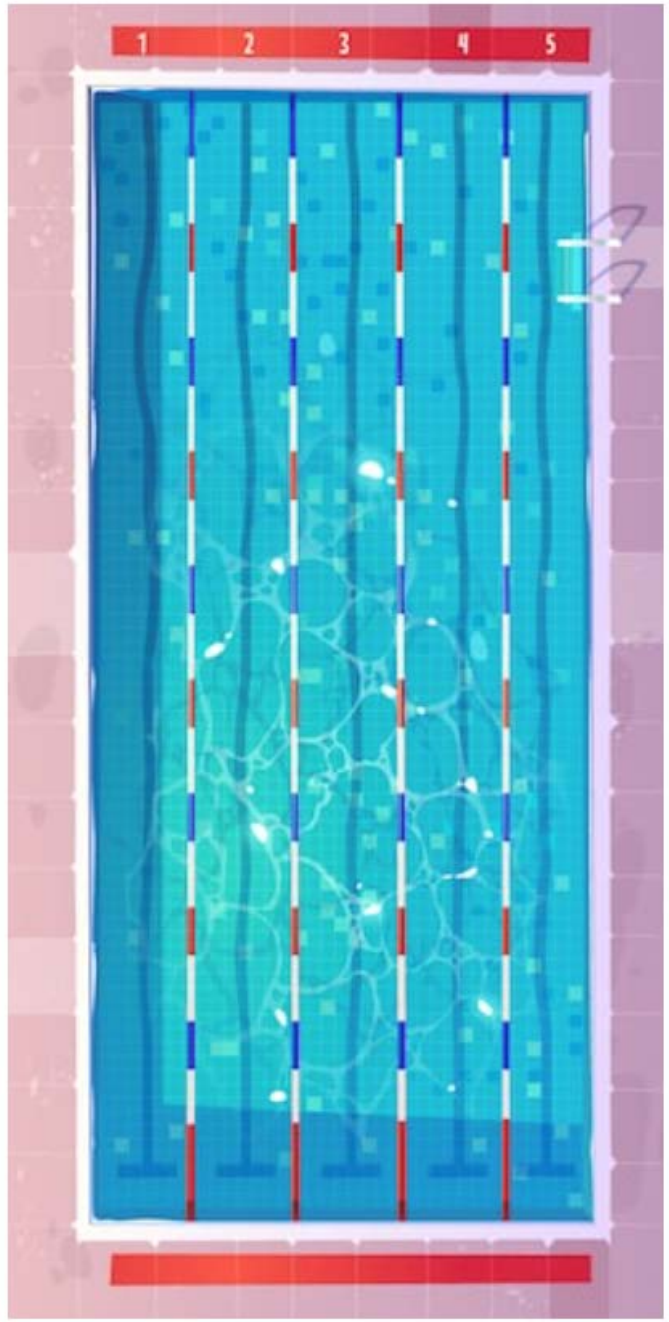
Reconstituted (room temperature)

- Must use within 6 hours (discard any unused, reconstituted vaccine after 6 hours)

ACIP Ethical Principles: Emergency COVID vaccine meeting 10.30.2020 CDC ACIP Meeting Minutes

- Maximize benefits and minimize harms
- Promote justice (fairness folded in)
- Mitigate health inequities
- Promote transparency

How is this going so fast?



Vaccine Safety ACIP Meeting 9.22.2020

- *Safety is not the absence of risk it is the balance of risk.* Dr. Grace Lee
- Safety and efficacy are primary goals with full commitment for no short cuts
- Expect safety signals like the transverse myelitis—explore, background incidence, etc

- **V-SAFE program** Vaccine Safety Assessment for Essential Workers
- Smart Phone app active surveillance daily sx check in
- Numerator for incidences of site pain, adverse events
- VAERS will be active, electronic surveillance as usual

- Hospitals will track weekly doses to NHSN for denominator

V-Safe CDC program

Vaccine safety assessment for essential workers (V-SAFE)

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

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

CDC CENTERS FOR DISEASE CONTROL AND PREVENTION — FDA

Vaccinate with Confidence CDC plan

https://www.hhs.gov/sites/default/files/strategy-for-distributing-covid-19-vaccine.pdf

Vaccinate with **Confidence**

CDC's strategic framework for strengthening vaccine confidence and preventing outbreaks of vaccine preventable diseases.

Protect **communities**

Strategy: Protect communities at risk from under-vaccination

- ✓ Leverage immunization data to find and respond to communities at risk
- ✓ Work with trusted local partners to reach at-risk communities before outbreaks
- ✓ Ensure vaccines are available, affordable, and easy-to-get in every community

Empower **families**

Strategy: Get providers and parents effective information resources

- ✓ Expand resources for health care professionals to help them have effective vaccine conversations with parents
- ✓ Work with partners to start conversations before the first vaccine appointment
- ✓ Help providers foster a culture of immunization in their practices

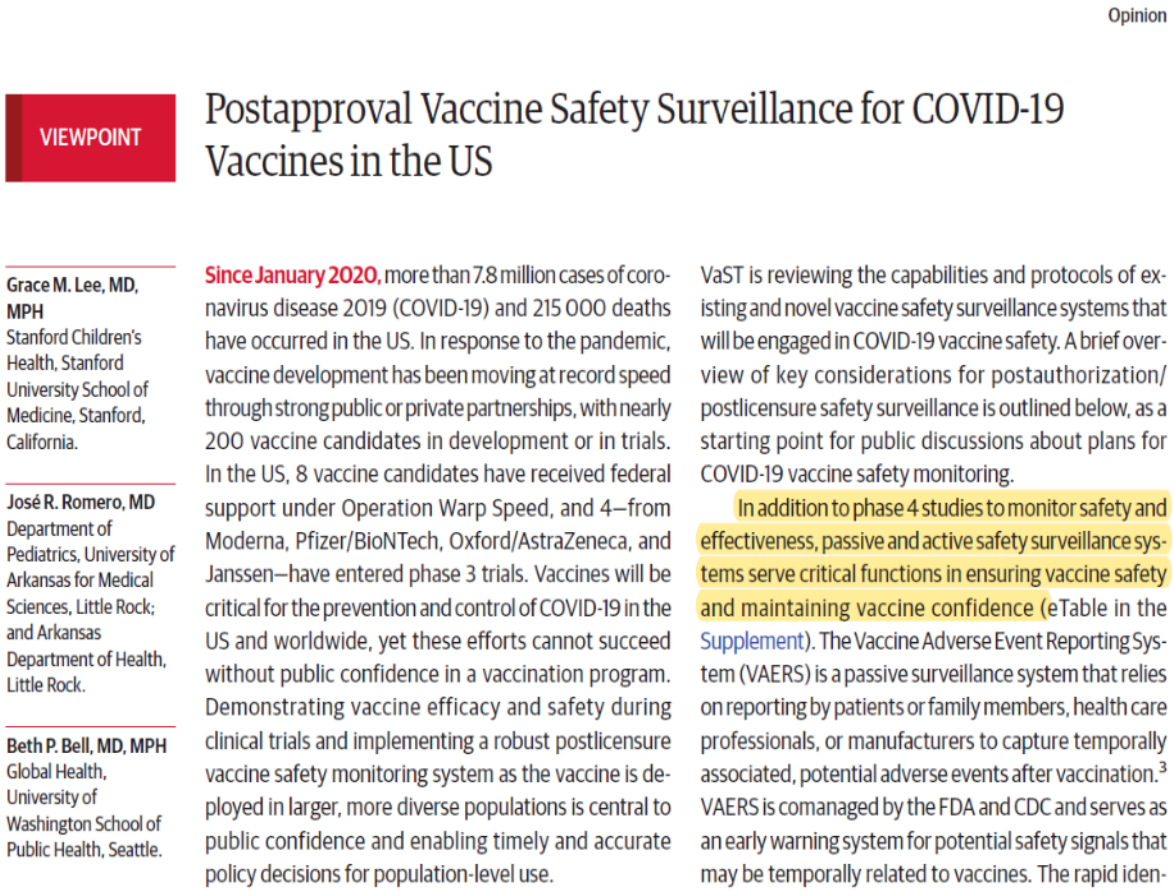
Stop **myths**

Strategy: Stop misinformation from eroding public trust in vaccines

- ✓ Work with local partners and trusted messengers to improve confidence in vaccines among key, at-risk groups
- ✓ Establish partnerships to contain the spread of misinformation
- ✓ Educate key new stakeholders (e.g., state policy makers) about vaccines

Phase 4: Ongoing Safety Marketing as always

https://jamanetwork.com Accessed 10.19.2020 JAMA Published online October 16, 2020



Opinion

VIEWPOINT

Postapproval Vaccine Safety Surveillance for COVID-19 Vaccines in the US

Grace M. Lee, MD, MPH
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José R. Romero, MD
Department of Pediatrics, University of Arkansas for Medical Sciences, Little Rock; and Arkansas Department of Health, Little Rock.

Beth P. Bell, MD, MPH
Global Health, University of Washington School of Public Health, Seattle.

Since January 2020, more than 7.8 million cases of coronavirus disease 2019 (COVID-19) and 215 000 deaths have occurred in the US. In response to the pandemic, vaccine development has been moving at record speed through strong public or private partnerships, with nearly 200 vaccine candidates in development or in trials. In the US, 8 vaccine candidates have received federal support under Operation Warp Speed, and 4—from Moderna, Pfizer/BioNTech, Oxford/AstraZeneca, and Janssen—have entered phase 3 trials. Vaccines will be critical for the prevention and control of COVID-19 in the US and worldwide, yet these efforts cannot succeed without public confidence in a vaccination program. Demonstrating vaccine efficacy and safety during clinical trials and implementing a robust postlicensure vaccine safety monitoring system as the vaccine is deployed in larger, more diverse populations is central to public confidence and enabling timely and accurate policy decisions for population-level use.

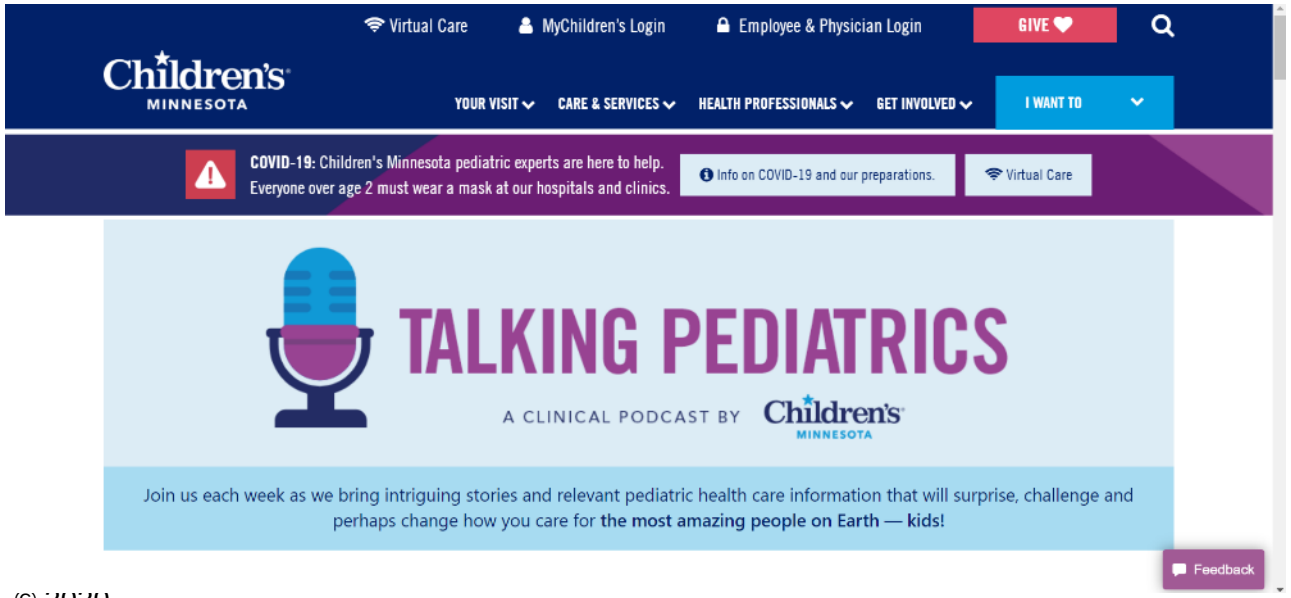
VaST is reviewing the capabilities and protocols of existing and novel vaccine safety surveillance systems that will be engaged in COVID-19 vaccine safety. A brief overview of key considerations for postauthorization/postlicensure safety surveillance is outlined below, as a starting point for public discussions about plans for COVID-19 vaccine safety monitoring.

In addition to phase 4 studies to monitor safety and effectiveness, passive and active safety surveillance systems serve critical functions in ensuring vaccine safety and maintaining vaccine confidence (eTable in the Supplement). The Vaccine Adverse Event Reporting System (VAERS) is a passive surveillance system that relies on reporting by patients or family members, health care professionals, or manufacturers to capture temporally associated, potential adverse events after vaccination.[3] VAERS is comanaged by the FDA and CDC and serves as an early warning system for potential safety signals that may be temporally related to vaccines. The rapid iden-

- VAERS
- CISA
- Vaccine Safety Datalink
- Manufacturer Post-license monitoring

Resources

- ✓ Clinicaltrials.gov for vaccine research update
- ✓ cdc.gov/acip for latest slides, audio, upcoming agendas
- ✓ Coronavirusprevention network.org for trials enrollment



https://www.childrensmn.org/for-health-professionals/talking-pediatrics-podcast/

- *Clinical practice guidelines*
- *COVID-19 updates*
- *Health equity*
- *AND MORE*

Questions?

THANK YOU

@EricTopol Scripps.edu/ translational content accessed 9/22/2020 Five Phase III vaccine trial summary	Pfizer/BioNTech mRNA	Moderna mRNA	Astra-Zeneca Adeno V	J&J Adeno V	Novavax
Sample Size	30,000	30,000	30,000	60,000	
Vaccine Arm Participants	15,000	15,000	20,000	30,000	
Severity Primary endpoint All include mild infxn, diff criteria	+	++	++	++1/2	
Efficacy target	60%	60%	50%	60%	
# of doses	2	2	2	1	
Freezing Required?	Yes	Yes	Yes	No	
Lower 95% CI efficacy	30%	30%	30%	30%	
Events at Completion N =	164	151	150	154	
Interim Analyses N =	4	2	1	NA	
Events at 1st Interim Analysis N =	37	53	75	NA	