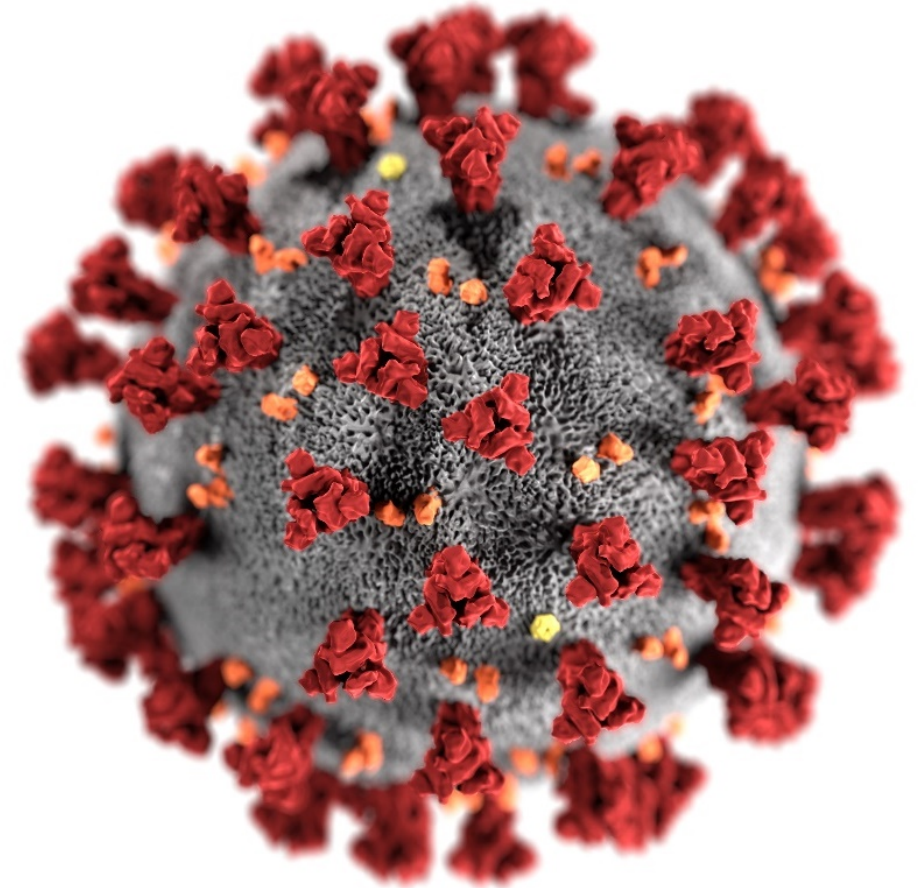


COVID-19 Vaccine Update

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December 2, 2020



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

Candidate	Manufacturer	Type	Phase	Schedule	Age	Size	Trial #	Recruiting
mRNA-1273	Moderna	mRNA	III	2 doses (0, 28d)	≥18 years	30,000 participants	NCT04470427	Enrollment complete
mRNA-BNT162	Pfizer, Inc./ BioNTech	mRNA	III	2 doses (0, 21d)	12-85 years	44,000 participants	NCT04368728	✓
AZD1222	U of Oxford/ AstraZeneca	Viral vector (Non-replicating)	III	2 doses (0, 28d)	≥18 years	40,000 participants	NCT04516746	✓
Ad26COVS1	Janssen	Viral vector (Non-replicating)	III	1 dose	≥18 years	30,000 participants	NCT04614948	✓
NVX-CoV2373	Novavax	Protein Subunit	I/II	2 doses (0, 21d)	18-84 years	1400 participants	NCT04368988	Enrollment complete
--	Sanofi/GSK	Protein Subunit	I/II	1 dose or 2 doses (0, 21d)	≥18 years	440 participants	NCT04537208	✓

*As of Nov 21, 2020

Sources: <https://milkeninstitute.org/covid-19-tracker>; <https://www.who.int/who-documents-detail/draft-landscape-of-covid-19-candidate-vaccines>; https://vaccine.shinyapps.io/ncov_vaccine_landscape/; <https://clinicaltrials.gov/>; <https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html>



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

Candidate	Manufacturer	Type	Phase	Schedule	Age	Size	Trial #	Recruiting
V591	Merck	Viral Vector (Replicating)	I/II	2 doses (1, 57d)	≥18 years	260 participants	NCT04498247	✓
VXA-CoV2-1	Vaxart	Viral vector (Non-replicating)	I	2 doses (1, 29d) *Oral	18-54 years	48 participants	NCT04563702	✓
INO-4800	Inovio	DNA plasmid	I	2 doses (0, 4w) *Electroporation	≥18 years	120 participants	NCT04336410	Active, not recruiting
AV-COVID-19	Aivita	AuDendritic cell	I/II	1 dose	≥18 years	180 participants	NCT04386252	Not yet recruiting

*As of Nov 21, 2020

Sources: <https://milkeninstitute.org/covid-19-tracker>; <https://www.who.int/who-documents-detail/draft-landscape-of-covid-19-candidate-vaccines>; https://vaccineshinyapps.io/ncov_vaccine_landscape/; <https://clinicaltrials.gov/>; <https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html>



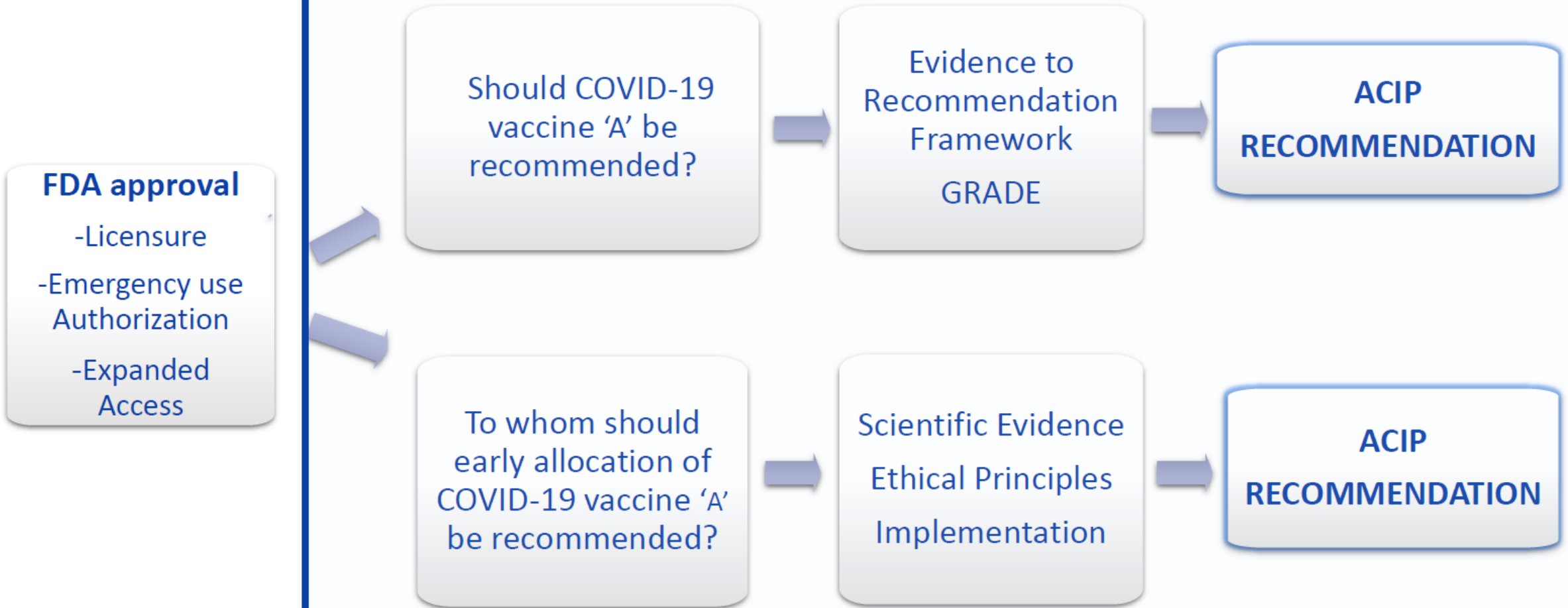
Phase III Trial Results for mRNA COVID-19 Vaccines

- BNT162b2 vaccine (Pfizer/BioNtech)
 - Final analysis of **170** cases
 - 162 cases in placebo group
 - 8 cases in vaccine group
 - **95%** effective 7 days post dose 2
 - **94%** effective in adults ≥ 65 years of age
 - 10 severe cases, 9 in placebo group
 - DSMB: no serious safety concerns
 - EUA submission Friday Nov 20, 2020
- mRNA-1273 vaccine (Moderna)
 - Interim analysis of **95** cases
 - 90 cases in placebo group
 - 5 cases in vaccine group
 - **94.5%** effective 2 weeks post dose 2
 - 11 severe cases, all in placebo group
 - DSMB: no serious safety concerns
 - EUA submission soon

*Information from manufacturer press releases

Sources: <https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-conclude-phase-3-study-covid-19-vaccine>
<https://investors.modernatx.com/news-releases/news-release-details/modernas-covid-19-vaccine-candidate-meets-its-primary-efficacy>

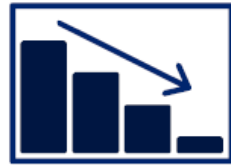
ACIP Pathway to Recommendation



Overarching objectives for COVID-19 vaccination program



Ensure safety and effectiveness of COVID-19 vaccines



Reduce mortality, morbidity, and incidence of COVID-19 disease

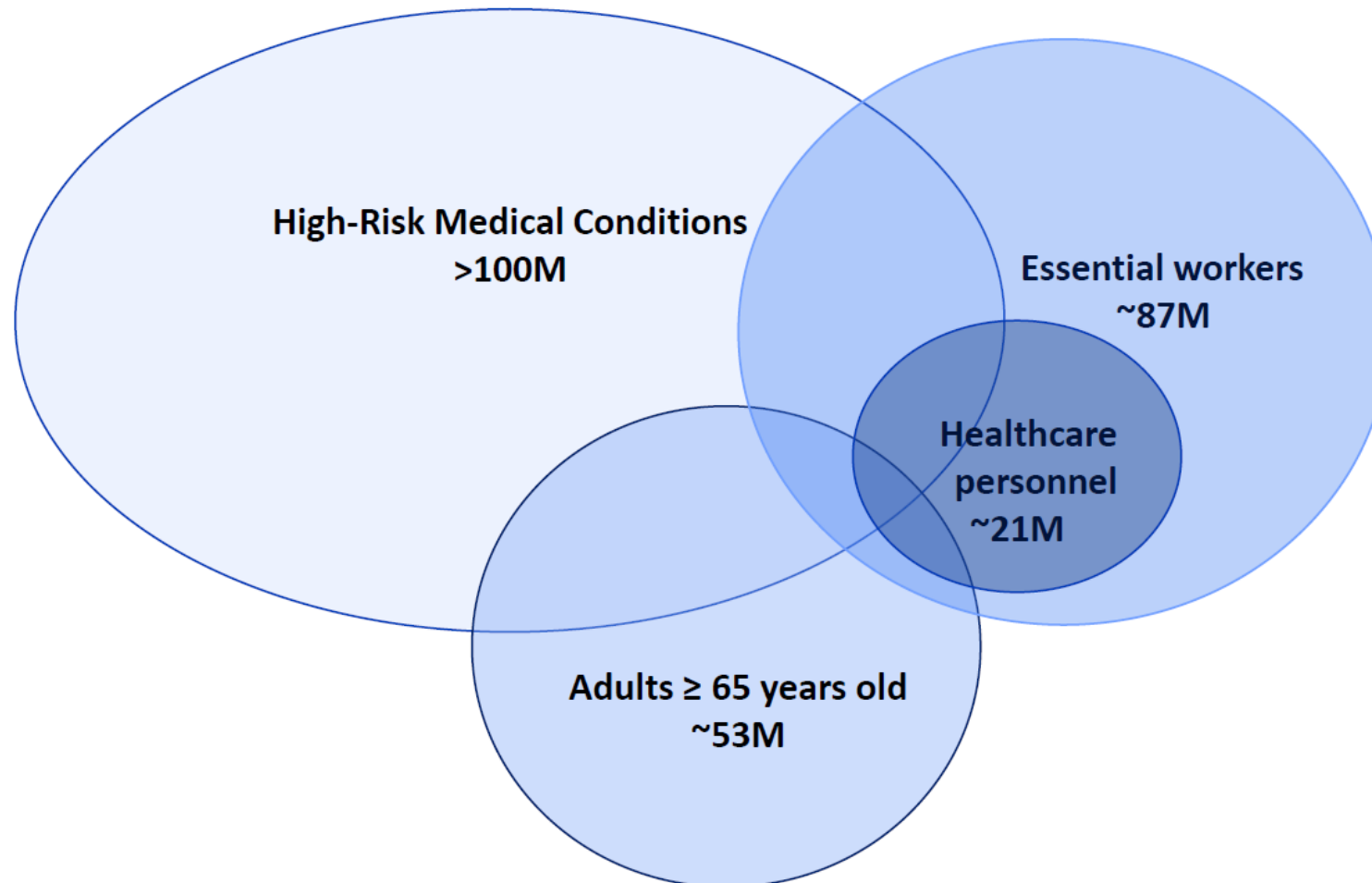


Help minimize disruption to society and economy, including maintaining healthcare capacity

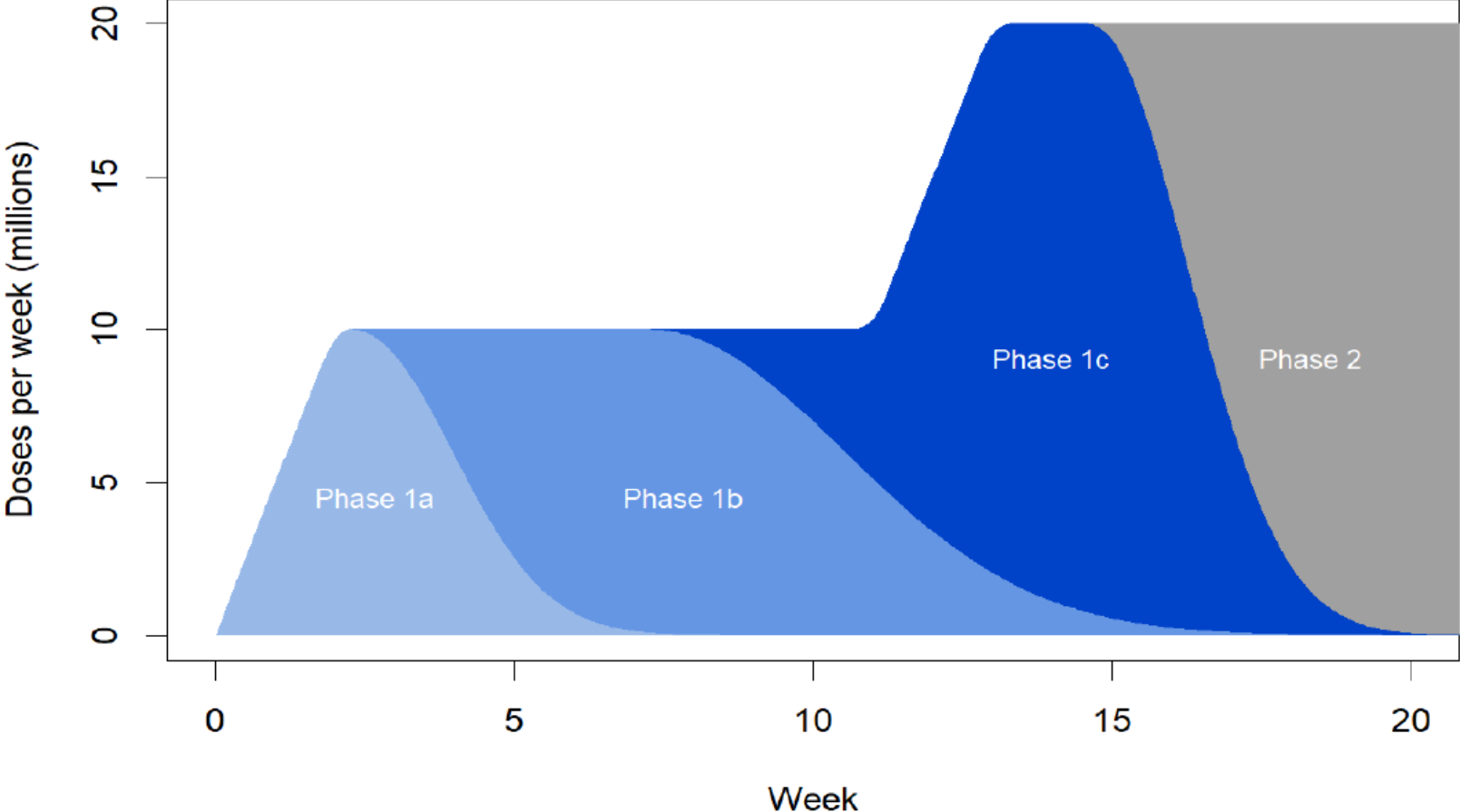


Ensure equity in vaccine allocation and distribution

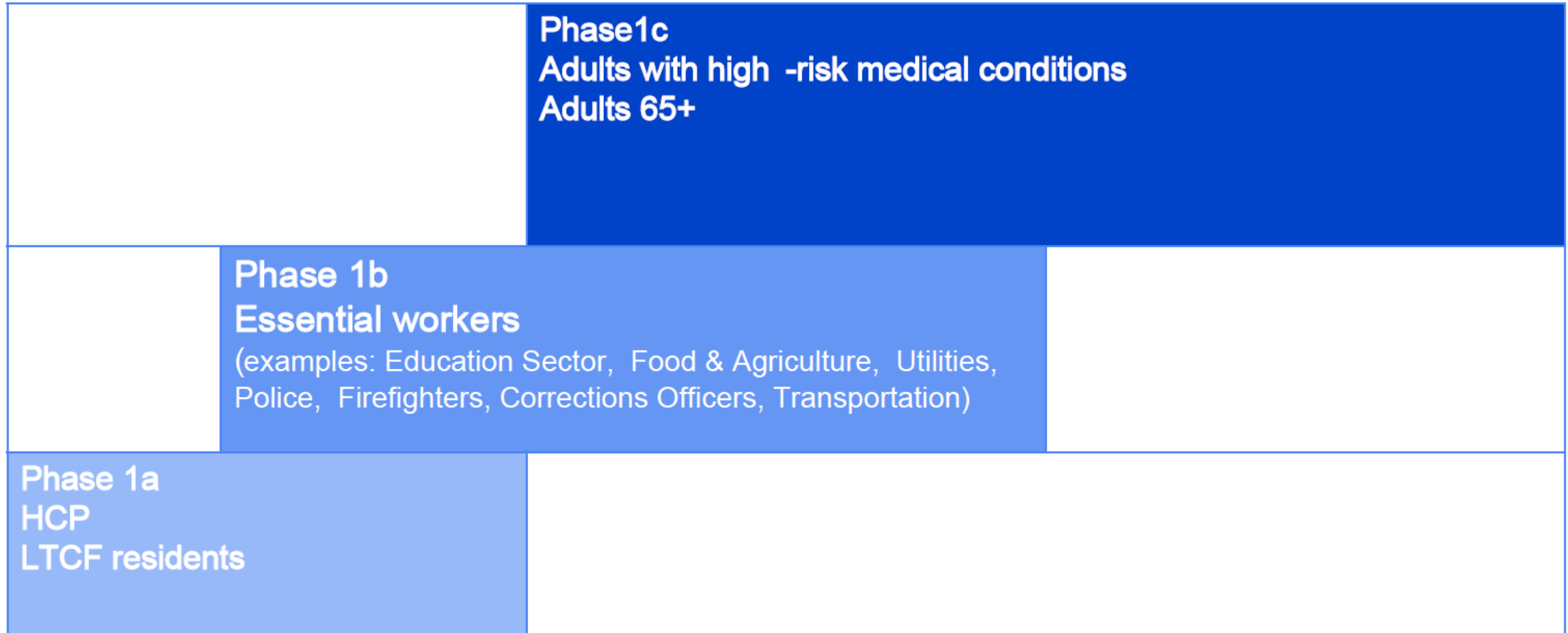
Groups at Higher Risk of Exposure and/or Severe Illness and Essential Workers



Notional Phase 1 Sequence



Proposed Phase 1a, 1B, and 1c Sequence



Time

COVID-19 Vaccine and HCPs

- Preserve capacity to care for patients with *and without* COVID-19
- As of November 28:
 - 238,000 confirmed and reported cases among HCPs
 - >800 deaths

COVID-19's Impact in LTCFs

- **Long-Term Care Facility (LTCF) residents and staff accounted for 6% of cases and 39% of deaths in the U.S.¹ (Nov 6, 2020)**
 - **Skilled Nursing Facilities (~1.3M)**
 - ~470,000 confirmed + probable cases (as of Nov 8, 2020)²
 - >67,000 deaths
 - **Assisted Living Facilities (~0.8M)**
 - 27,965 confirmed + suspected cases (as of Oct 15/2020, based on 23 states³)
 - 5,469 deaths (as of Oct 15/2020, based on 20 states³)

1. Kaiser Family Foundation. State data and policy actions to address coronavirus: COVID metrics by state. San Francisco, CA: Kaiser Family Foundation; 2020. <https://www.kff.org/health-costs/issue-brief/state-data-and-policy-actions-to-address-coronavirus/#long-term-care-cases-deaths>

2. CMS COVID-19 data: <https://data.cms.gov/stories/s/COVID-19-Nursing-Home-Data/bkwz-xpvg/>

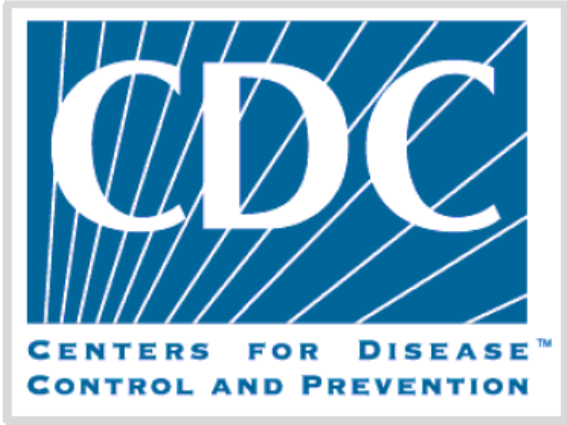
3. Yi SH, See I, Kent AG, et al. Characterization of COVID-19 in Assisted Living Facilities—39 States, October 2020. MMWR Morb Mortal Wkly Rep 2020;69:1739-1735. DOI: <http://dx.doi.org/10.15585/mmwr.mm6946a3>

Ethical Considerations of Phase 1a Prioritization

Ethical Principle	Health care personnel (~21 million)	Long-Term Care Facility Residents (~3 Million)
Maximize benefits & minimize harms	Multiplier effect- protection of HCPs and preservation of healthcare capacity	LTCF residents are at high risk for infection, severe disease and death from COVID-19. Prevention may reduce hospital utilization
Promote justice	HCP provide care in high-risk settings and will be essential for vaccine distribution	Federal Pharmacy Partnership Program will facilitate equal access to vaccine across most LTCFs
Mitigate health inequities	HCP includes broad range of occupations, inclusive of low-wage earners and racial and minority groups	Federal Pharmacy Partnership Program will reach LTCF across the socioeconomic spectrum

Vaccine Safety Monitoring

- The Vaccine Safety Datalink (VSD), Clinical Immunization Safety Assessment (CISA) Project, and other planned projects are key components of COVID-19 vaccine safety monitoring and adverse event assessment
- VAERS is the U.S. frontline vaccine safety monitoring system
 - VAERS traditionally has provided the initial data on the safety profile of new vaccines when they are introduced for use in the population
 - Healthcare providers (HCPs) can play an important role in identifying and reporting potential AEs to VAERS: **HCPs are partners in safety monitoring**
- **V-safe** is a new smart-phone based active surveillance program
 - HCPs can play an important role in helping CDC enroll patients in **v-safe** at the time of vaccination: **HCPs are partners in safety monitoring**



1. Text message check-in or email from CDC (daily 1st week post-vaccination and weekly thereafter until 6 weeks post-vaccination)

Vaccine recipient completes web survey



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Vaccine recipient



2. Clinically important event(s) reported

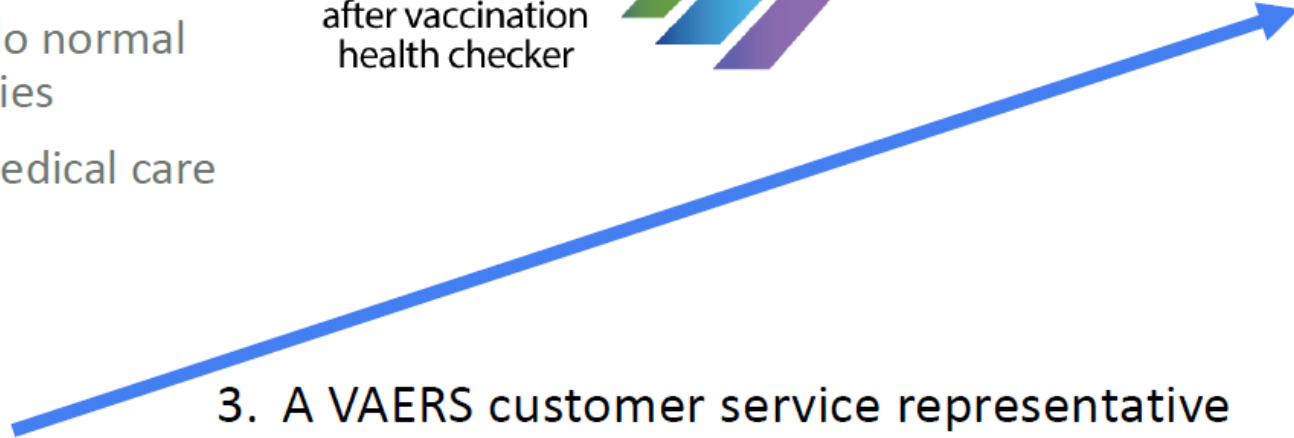
- ✓ Missed work
- ✓ Unable to do normal daily activities
- ✓ Received medical care



VAERS call center



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3. A VAERS customer service representative conducts active telephone follow-up on a clinically important event and completes a VAERS report if appropriate

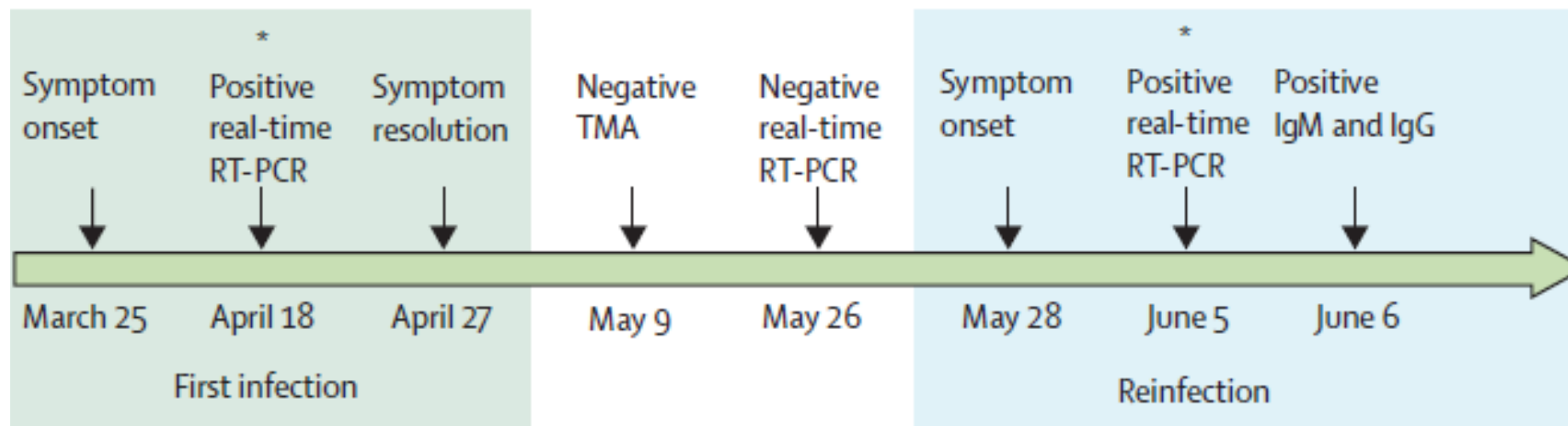


Urgent Outstanding Issues

- Effect of vaccination on asymptomatic infection
 - Data needed before deciding how history of vaccination will guide decisions on PPE use, testing, travel risk, post-exposure quarantine, LTCF visitation policies, etc.
- Recommendations for pregnant and lactating women
 - Increasing evidence that increased risk of severe illness and preterm birth due to COVID-19 disease
 - 75% of HCPs are female; ~330,000 could be pregnant or post-partum
- Management of febrile reactions to vaccination
 - Differentiating from COVID-19 disease
- Vaccination of persons previously infected and duration of immunity

Reinfection

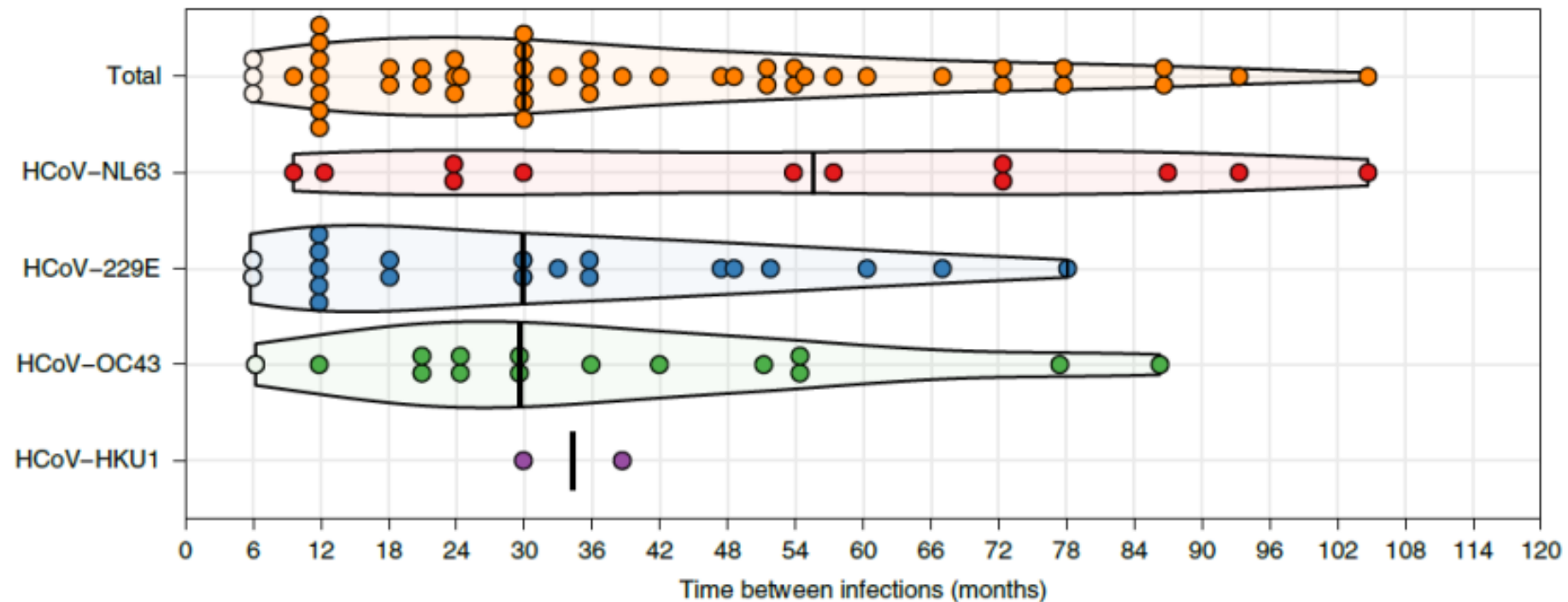
- Several cases reported consistent with reinfection by genetically distinct SARS-CoV-2 viruses
- Variable manifestations and clinical courses
- E.g., 25-year-old in Nevada:



Tillett RL, et al. *Lancet Infect Dis* 2020; [https://doi.org/10.10166/S1473-3099\(20\)30764-7](https://doi.org/10.10166/S1473-3099(20)30764-7)
(published online Oct 12, 2020)

Reinfection by Common Coronaviruses is Common

- Amsterdam cohort: 10 men followed since mid-1980s and undergoing serial blood collection every 3-6 months
- 513 samples: 101 coronavirus infections; 3-17 per person



2020



2021



For up-to-date COVID-19 vaccine information visit:

www.cdc.gov/coronavirus/2019-ncov/vaccines

The screenshot shows the CDC website's 'Vaccines' page for COVID-19. At the top, the CDC logo and navigation menu are visible. The main heading is 'Coronavirus Disease 2019 (COVID-19)' with a banner image of people wearing masks and the text 'WEAR A MASK. PROTECT OTHERS.' Below this is a navigation bar with categories like 'Your Health', 'Community, Work & School', etc. The 'Your Health' section is active, showing a list of topics on the left and a main content area on the right. The main content area features a large image of a healthcare worker vaccinating a patient, with the text 'Safety Is a Top Priority' and 'The U.S. vaccine safety system ensures that all vaccines are as safe as possible.' Below this are sections for 'Vaccine Information for You & Your Family', '8 Things to Know about Vaccination Planning', 'Related Links', and 'More Information for Healthcare Workers'. A 'Get Email Updates' form is located at the bottom left of the page.