Yale *Institute for Global Health*

Framework for prioritization of COVID-19 vaccine

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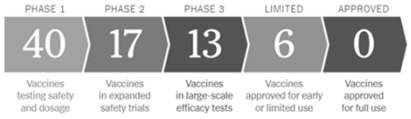
Coronavirus Vaccine Tracker

By Carl Zimmer, Jonathan Corum and Sui-Lee Wee Updated November 30, 2020



New York Times

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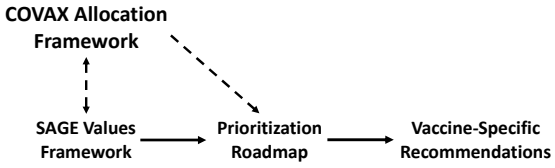
Allocation, Prioritization, and Recommendations



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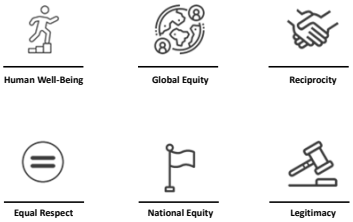
Values Framework Core Principles



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Principles	Objectives
Well-Being	**Reduce deaths and disease burden from the COVID-19 pandemic** **Reduce societal and economic disruption including strategies for containing transmission, reducing severe disease and death, or some combination** **Protect the continuing functioning of essential services, including health services**
Equal Respect	Treat the interests of all individuals and groups with equal consideration as allocation and priority-setting decisions are being taken and implemented Offer a meaningful opportunity to access vaccine to all individuals and groups who qualify for vaccine under prioritization criteria.
Global Equity	Ensure that vaccine allocation takes into account the special epidemic risks and needs of low-and middle-income countries
National Equity	**Ensure that vaccine prioritization within countries takes into account the vulnerabilities, risks and needs of groups who, because of underlying societal and/or biomedical factors, are at risk of experiencing greater burdens from the COVID-19 pandemic** Develop the immunization delivery systems and infrastructure required to ensure COVID-19 vaccines access to priority populations and to take proactive action to ensure equal access to everyone who qualifies under a priority group, particularly socially disadvantaged populations
Reciprocity	**Protect those who bear significant additional risks and burdens of COVID-19 to safeguard the welfare of others, including healthcare and other essential workers**
Legitimacy	Engage all countries in a transparent consultation process for determining what scientific, public health, and values criteria should be used to make decisions about vaccine allocation between countries Employ best available scientific evidence, expertise, and significant engagement with relevant stakeholders for vaccine prioritization between various groups within each country, using transparent, accountable, unbiased processes, to engender deserved trust in prioritization decisions

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Prioritization Roadmap

To support country planning, the Roadmap suggests public health strategies and target priority groups for different levels of vaccine availability in different epidemiologic settings.

The consensus is that currently available evidence is too limited to allow any recommendations for use of any specific vaccine against COVID-19 at this time.

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Key Assumptions

Vaccines are fully licensed and meet WHO Target Product Profiles for COVID-19 vaccines

Age-dependent efficacy unlikely to change recommendations

No substantive differences in protective immune response in subpopulations

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Key Assumptions

Vaccine is transmission-reducing sufficient to justify certain priority groups

Non-pharmaceutical interventions vary; do not lower vaccine efficacy when relaxed

Prioritization does not account for variation in population seropositivity or existing protection

Risk of severe disease not separately accounted for in prioritization, assumed to correlate with risk of death

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Prioritization Dimensions

Epidemiologic Scenario

Overall Public Health Strategy

Vaccine Supply Scenarios

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Epidemiologic Scenarios

Community Transmission

Sporadic Cases or Clusters of Cases

No Cases

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Community Transmission

Overall Public Health Strategy

Initial focus on direct reduction of morbidity and mortality and maintenance of most critical essential services; also, reciprocity.

Expand to reduction in transmission to further reduce disruption of social and economic functions.

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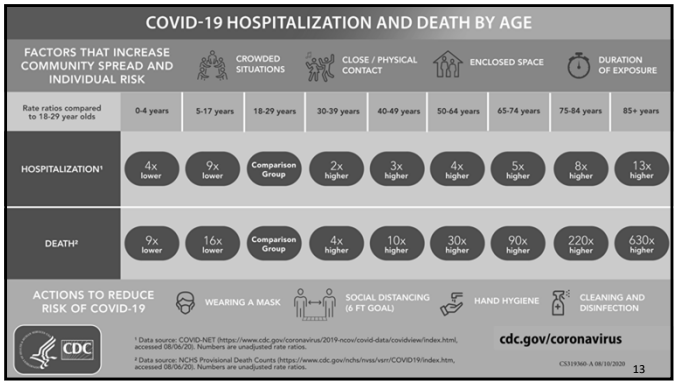

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Sporadic Cases or Clusters of Cases

Overall Public Health Strategy

Initial focus on direct reduction of morbidity and mortality and maintenance of most critical essential services; also, reciprocity.

Expand to substantially control transmission and minimize disruption of social and economic functions.

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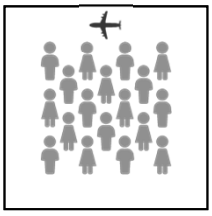
No Cases

Overall Public Health Strategy

Initial focus on prevention of community transmission; also, reciprocity.

Expand to preserve control of transmission and reduce reliance on most burdensome non-pharmaceutical interventions, as well as to protect highest risk individuals in the event of importation-associated outbreaks.



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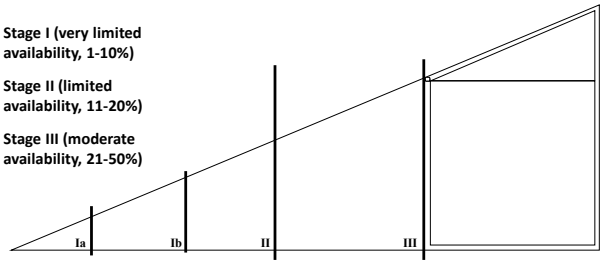
Vaccine Supply Scenarios

Stage I (very limited availability, 1-10%)

Stage II (limited availability, 11-20%)

Stage III (moderate availability, 21-50%)



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COVAX Facility Allocation Mechanism*		Roadmap of Priority Use Cases	
Phase	% country population to be covered by vaccine supply	Stage	% country population to be covered by vaccine supply
Phase 1: Proportional allocation, to cover Tier 1 target groups	Indicative initial tranche: 3% Subsequent tranches to reach 20%	Stage I	1-10%
		Stage II	11-20%
Phase 2: Weighted allocation based on risk assessment	>20%	Stage III	21-50%

*** Note: COVAX Facility Allocation Mechanism is still in draft form; further details from current draft approach available at: https://www.who.int/publications/m/item/fair-allocation-mechanism-for-covid-19-vaccines-through-the-covax-facility**

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How Supply Staging of Priority Groups Relates to Population Size

Groups are staged sequentially.

Groups *within* stages are not rank ordered. (with the exception of Stages Ia and Ib)

In some countries, the amount of vaccine for a vaccine supply stage may be insufficient.

These instances will require within-stage prioritization by countries.

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How Supply Staging of Priority Groups Relates to Population Size

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In some countries, the amount of vaccine for a vaccine supply stage may be insufficient.

These instances will require within-stage prioritization by countries.

Ia | Ib | II | III

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Scenario: Community Transmission

Strategy: Initial focus on direct reduction of morbidity and mortality and maintenance of most critical essential services; also, reciprocity. Expand to reduction in transmission to further reduce disruption of social and economic functions.

Stage I (1-10%)	Stage II (11-20%)	Stage III (21-50%)
Stage Ia (initial launch) - Health workers at **high to very high risk** of acquiring and transmitting infection **Stage Ib** - Older adults defined by age-based risk specific to country/region	- Older adults not covered in Stage I - Individuals with comorbidities or health states determined to be at **significantly higher risk** of severe disease or death - Sociodemographic groups at **significantly higher risk** of severe disease or death - Health workers engaged in immunization delivery - High priority teachers and school staff	- Remaining teachers and school staff - Other essential workers outside health and education sectors - Pregnant Women - Health workers at **low to moderate risk** of acquiring and transmitting infection - Personnel needed for vaccine production and other high-risk laboratory staff - Social/employment groups at **elevated risk** of acquiring and transmitting infection because they are unable to effectively physically distance

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Scenario: Sporadic Cases or Clusters of Cases

Strategy: Initial focus on direct reduction of morbidity and mortality and maintenance of most critical essential services; also, reciprocity. Expand to substantially control transmission and minimize disruption of social and economic functions.

Stage I (1-10%)	Stage II (11-20%)	Stage III (21-50%)
- Health workers at **high to very high risk** of acquiring and transmitting infection **in areas with high transmission or anticipated high transmission** - Older adults defined by age-based risk specific to country/region **in areas with high transmission or anticipated high transmission** - Emergency reserve of vaccines for utilization for outbreak response or mitigation	- Health workers at **high to very high risk** of acquiring and transmitting infection **in the rest of the country** - Older adults defined by age-based risk specific to country/region **in the rest of the country** - Groups with comorbidities or health states determined to be at **significantly higher risk** of severe disease or death **in areas with high transmission or anticipated high transmission** - Sociodemographic groups at **significantly higher risk** of severe disease or death **in areas with high transmission or anticipated high transmission**	- Primary and secondary teachers and school staff **in areas with high transmission or anticipated high transmission** - Other essential workers outside health and education sectors **in areas with high transmission or anticipated high transmission** - Social/employment groups at **elevated risk** of acquiring and transmitting infection because they are unable to effectively physically distance **in areas with high transmission or anticipated high transmission** - Health workers at **low to moderate risk** of acquiring and transmitting infection **throughout the country** - Age groups at high risk of transmitting infection by age-based risk specific to country/region - Personnel needed for vaccine production and other high-risk laboratory staff - Pregnant women

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Scenario: No Cases

Strategy: Initial focus on prevention of community transmission; also, reciprocity. Expand to preserve control of transmission and reduce reliance on most burdensome non-pharmaceutical interventions, as well as to protect highest risk individuals in the event of importation-associated outbreaks.

Stage I (1-10%)	Stage II (11-20%)	Stage III (21-50%)
- Health workers at **high to very high risk** of acquiring and transmitting infection - Essential travellers at risk for acquiring infection outside the home country and reintroducing infection upon return to home country - Border protection staff screening for imported cases and workers for outbreak management - Emergency reserve utilization for focused outbreak response	- Health workers at **low to moderate risk** of acquiring and transmitting infection - All travellers at risk for acquiring infection outside the home country and reintroducing infection upon return to home country - Emergency reserve of vaccines utilization for outbreak mitigation	- Older adults defined by age-based risk specific to country/region - Age groups at high risk of transmitting infection by age-based risk specific to country/region - Primary and secondary school teachers and staff - Other essential workers outside health and education sectors

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TABLE 2 Summary Table of the Application of the Roadmap Under Various Contingencies. Adapted from National Academies of Sciences, Engineering, and Medicine's Framework for Equitable Allocation of COVID-19 Vaccine.

Contingency	Change in the Application of the Roadmap
Fewer vaccine courses available than expected	The Roadmap is unchanged. Some individuals receive vaccination later than they would otherwise.
Vaccine requires two doses, rather than one	The Roadmap is unchanged, but some individuals receive vaccination later.
Low vaccine efficacy among older adults or other population subgroup	Current modelling suggests that (given the many-fold higher mortality rate among older individuals) age-dependent vaccine efficacy would not significantly change the recommendations for priority use cases in older populations). If vaccine efficacy in older adults relative to other age groups was so low that the prioritization of older adults was expected to lead to substantially worse overall outcomes in number of lives saved, the older age group individuals in each scenario would likely be moved to a lower rank. Similar considerations apply for individuals with comorbidities.
Low vaccine efficacy in preventing transmission	The importance of high coverage of the most vulnerable groups is increased.
Unanticipated vaccine adverse events	Only prioritize individuals or groups for whom vaccine benefits continue to outweigh the risks.
Vaccine acceptance and uptake is lower than expected	The Roadmap is unchanged. The community engagement and risk communication are enhanced.
More than one vaccine type available	The Roadmap is unchanged, but which vaccines are allocated to which population groups must take into account the benefits and risks of the vaccine for each population group. As authorized vaccines become available, SAGE will make vaccine-specific recommendations.
Epidemic spread is continuing when the vaccine becomes available	The Roadmap is unchanged. Public health messages must continue to stress the need for personal protective measures (e.g., masks, social distancing, hand washing, ventilation).
Risk profile of a previously identified high-risk group changes (e.g. due to high infection rate in earlier waves)	The general structure of the Roadmap is unchanged. The relevant consideration is high-risk, and if a group is no longer high-risk it should be lowered in priority. However, due to equity concerns, many of these groups are likely to be disadvantaged, the evidentiary basis for any change in priority status must be high and the burden of proof should be on the immunization programme/government to meet.
Some countries mandate vaccination of select groups	The Roadmap is unchanged, but countries mandating vaccination of select groups might allocate the vaccine in a manner different from the Roadmap.
Some employers require proof of vaccination	The Roadmap is unchanged, but such requirements could change rates of vaccine uptake, and would pose hazards for those individuals for whom the vaccine is medically contraindicated and could raise issues around discrimination against those unable to obtain the vaccine and therefore unable to work.
Some countries do not provide free vaccine access to non-citizens or people without documentation of legal status	The Roadmap is unchanged. This practice violates the principle of equity and the goals of public health. However, in such cases, other sources of financial support (e.g. philanthropy, civil society organizations, pharmaceutical companies) should be sought to provide vaccination for those individuals.

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National Equity Considerations

Ensure that vaccine prioritization within countries takes into account the vulnerabilities, risks and needs of groups who, because of underlying societal, ethnic/racial, geographic or biomedical factors, are at risk of experiencing greater burdens from the COVID-19 pandemic.

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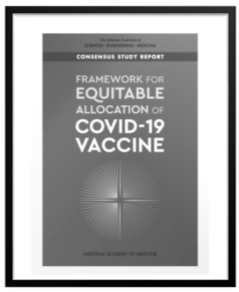

National Academies of Sciences, Engineering, and Medicine 2020. *Framework for Equitable Allocation of COVID-19 Vaccine*. Washington, DC: The National Academies Press. https://doi.org/10.17226/25917.

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Elements of Framework

GOAL	Reduce morbidity and mortality and negative societal impact due to transmission of SARS-CoV-2
RISK-BASED CRITERIA	1) Risk of acquiring infection; 2) Risk of severe morbidity and mortality; 3) Risk of negative societal impact; 4)Risk of transmitting infections to others
PHASES	4 phases

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Reduce severe morbidity and mortality and negative societal impact

Reasons for this approach

- Death is irreversible
- Social consensus preventing severe morbidity and mortality
- Vaccinating critical mass
- Trials not designed to assess impact on transmission
- Limited transmission data on risk groups

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Ethical Principles

- Maximum benefit
- Equal concern
- Mitigation of health inequities

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Procedural Principles

- Fairness
- Transparency
- Evidence-based

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Phases

Phase 1	Phase 2	Phase 3	Phase 4
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	• 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	• 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	• 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.

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Social vulnerability scale

Based on 15 census track variable

Can be calculated at the census track


Race/Income


Transportation


Crowding


65 yrs +

ASTDR, 2018

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Triggers for COVID-19 vaccine mandate


Inadequately contained


ACIP recommended


Adequate supply


Transparent communication


Infrastructure present


Inadequate voluntary response

Mello, Silverman, Omer 2020, NEJM

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Thank You!

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