Getting to and Sustaining the Next Normal: A Roadmap for Living with Covid

Summary
The rapid arrival of Covid vaccines saved millions of lives. The country needs research on optimal dosing and combination of already-approved vaccines. The search for new vaccines that offer better, broader, and longer-lasting protection should be an even bigger priority. Worldwide manufacturing capacity should be strengthened and global vaccination efforts further supported. The FDA should offer clear guidance on when boosters are needed and how new vaccines prove efficacy. A media ecosystem spreading misinformation on vaccines must be confronted in innovative ways.

A Miraculous Effort
The United States developed, manufactured, and tested Covid vaccines in record time. Within 10 months of the declaration of a pandemic, this national effort created the first highly effective Covid vaccines. By February 2022, the United States had two FDA-approved mRNA vaccines (Pfizer and Moderna) and a third adenovirus-based vaccine (Johnson & Johnson) available under an Emergency Use Authorization (EUA). A fourth, protein-based vaccine (Novavax) is under review by the FDA.

These vaccines have been remarkably effective. Too often this goes unappreciated. Vaccinated people have a 1 in 34,000 chance of dying from Covid and a low hospitalization rate. According to data from Los Angeles, the unvaccinated are 23 times more likely to be hospitalized than vaccinated and boosted individuals. Uncertainties about future viral variants and waning immunity necessitate sustaining and strengthening research and development of vaccines. Variant-specific mRNA vaccines are being tested. Research to develop better or more broadly neutralizing vaccines is proceeding. Development of effective mRNA vaccines for other respiratory viruses, including influenza and respiratory syncytial virus, should be an urgent priority, with the ultimate goal of creating a single vaccine against multiple respiratory viruses. Fortunately, dozens of next-generation vaccine candidates are in preclinical or clinical development in the U.S. and hundreds globally.

Supply chain, manufacturing capacity, and approval processes must remain robust, flexible, and efficient.

The federal government successfully relied on the Defense Production Act to maximize the output of domestic vaccine manufacturing. However, the supply chain for raw vaccine ingredients and consumables remains fragile and needs bolstering. Manufacturing plants subsidized by the federal government for vaccine production have been unable to deliver quality vaccines but are critical to national biosecurity, highlighting the importance of strengthening the industrial base for domestic and near-shore vaccine manufacturing.

Despite the ample vaccine supply and a monumental effort by the Biden administration to establish broad distribution programs, about 20 percent of Americans have yet to receive a single vaccine dose and another 33% have received only one. Among Americans over 65, 66% have received a booster. Low vaccination rates are the main reason the United States has suffered unusually high Covid death and hospitalization rates.

Public messaging about vaccines has sometimes been confusing. This has been compounded by widespread vaccine misinformation. Although surveys indicate that a substantial percentage of the unvaccinated population will remain difficult to convince, any increase in vaccine uptake will help reduce overall incidence of Covid and accelerate the transition to the next normal. Programs to improve public health messaging, counter misinformation, and improve vaccine uptake at the local level must remain a priority. Consistency and transparency regarding recommendations and rationale are key to building trust. Establishing clear lanes in which policy experts provide policy guidance and scientists provide technical guidance can reinforce that trust.

The variants that partially eroded the efficacy of both vaccines and medical therapies may have emerged from areas of the world with large numbers of people living with immuno-suppressive conditions and limited access to quality vaccines. Fully 92 nations missed the WHO’s global target of vaccinating 40% of their populations by the end of 2021. Even more nations will miss the summertime goal of 70%. The United States has supplied 400 million doses of vaccines to low- and middle-income countries that lack their own vaccine production capacity. But more needs to be done. Enhancing global vaccine distribution and administration will reduce the risks of new viral variants emerging. Global vaccination efforts should largely focus on health workers and vulnerable individuals in those nations since the Omicron variant has ended the global goal of stopping infections through vaccination coverage alone.

Vaccine Research and Development Should be Sustained and Enhanced

The amazing success of the first vaccines cannot make the United States complacent on Covid vaccines. Federal funding of research on vaccines for respiratory viruses, as well as immunology and virology must be sustained. There are five main research priorities. First, optimizing scheduling and vaccine combinations. Second, identifying novel technologies to improve vaccine immunogenicity, durability, and tolerability. Researching mucosal delivery mechanisms is the third, while the fourth is developing strategies on adjuvants usage and dose-sparing. The last is improving thermostability, storage, and transport.


49 National Public Radio. The goal: At least 40% vaxxed in all nations by year-end. This map shows how we stand. Published December 30, 2021. Accessed February 21, 2022. https://www.npr.org/sections/goatsandsoda/2021/12/30/1068920127/the-goal-at-least-40-vaxxed-in-all-nations-by-year-end-this-map-shows-how-we-sta

Two major funding priorities must be to develop vaccines that protect against multiple variants and to create universal pan-sarbecovirus vaccines to protect against all coronaviruses.

To help the FDA, more work must be done to define surrogate markers for vaccine efficacy and the potential role for human challenge studies. The federal government should make “at risk” investments in variant-specific vaccines as an insurance policy against Omicron or other variants becoming more deadly. Informed by immune surveillance and vaccine effectiveness, the CDC and the FDA should together establish a framework for deciding if and when to recommend additional vaccine doses or revaccination, as well as when to produce and use new variant-specific, pan-variant, or other vaccines.

**Strengthen and Enhance Domestic Vaccine Manufacturing Capacity**

New or modified vaccines will not help if they cannot be produced quickly at mass scale. Using advance purchasing agreements and other financial incentives, the federal government must incentivize vaccine manufacturing infrastructure. Maintaining manufacturing capacity to meet uncertain needs will require public-private partnerships at every stage of the supply chain. The FDA should pre-inspect multiple plants to ensure that surge capacity remains ready on an ongoing basis. If done properly, the additional capacity can be used to manufacture other biologics unrelated to pandemics. Training centers and online courses should be created and their completion incentivized so the country has an adequately trained workforce for vaccine production.

**Increasing Vaccine Uptake via Targeting Programs and by Countering Disinformation**

The underlying causes for poor vaccine uptake vary, but misinformation and distrust are major factors. Five approaches need to be implemented. Early indications are that localized approaches and grassroots campaigns work best.

First, the federal government should recreate and sustainably fund the teams that vaccinated highly vulnerable residents of long-term facilities, those in congregate settings, the homeless, and other underserved groups. These teams will be useful in delivering public health interventions to these populations, especially vaccines such as influenza and pneumococcal pneumonia vaccines. The government should also expand funding for community health worker programs, to provide sustained support to these populations.

Next, CMS should reimburse clinicians for discussing vaccinations with patients insured by Medicare and Medicaid, as well as institute similar requirements for Medicare Advantage plans and plans sold on the exchanges. These reimbursement policies should also be extended into nursing homes and skilled nursing facilities.

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Additionally, misinformation on vaccines has seeped into the American discourse through cable channels, as well as social and fringe media, convincing millions to forgo vaccination. Confronting vaccine misinformation will probably require changing media laws and regulations to eliminate algorithms that preserve misinformation bubbles and making platforms responsible for the misinformation they house.

The Administration should also consider stark public service advertisements that graphically illustrate the worst outcomes of SARS-CoV-2 infections in unvaccinated people modeled on successful anti-smoking efforts and campaigns to encourage varicella and human papillomavirus vaccinations.

Fourth, both federal and local policymakers should establish partnerships with trusted community leaders and faith-based organizations to provide educational supports and address vaccine hesitancy within minority communities.

Finally, the Vaccine Adverse Event Reporting System is unreliable as an adverse event reporting system. Simultaneously, anti-vaccine groups have co-opted the data and propagated misinformation. It should be replaced with a reliable and representative system of active monitoring for vaccine adverse events.

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Vaccine Dosing and Booster Policies, and Infection-Mediated Immunity

The federal government needs to do a better job providing clear, evidence-based advice about when and for whom additional vaccine “booster” doses are needed. The NIH has not conducted studies to define an optimal dosing schedule or combination of vaccines. More insight is needed into whether prior SARS-CoV-2 infections offer protection similar to two doses of vaccine.

The time period for which proof of prior vaccination or infection should be considered protective needs to be determined based on real-world data on the decline
in protection. Similarly, combinations of infection and vaccination, especially in the wake of variants such as Omicron, should be continually evaluated to determine their impact on durable immunity. Research by NIH into these issues should be an urgent priority, with results needed before the end of 2022.

The Administration should develop a national program for serological and, if possible, cellular immunology surveillance to complement viral surveillance programs (see Chapters 3: Testing and Surveillance and 9: Health Data Infrastructure). To enable this work, the federal government should establish an interoperable, electronic, national verification system to capture vaccination data, positive SARS-CoV-2 test data (including from high sensitivity and specificity rapid at-home tests with QR codes that can be uploaded), and serology information (see Chapter 3: Testing and Surveillance).

Helping vaccinate the world is not only a moral imperative but is integral to protecting Americans from the emergence of variants such as Delta and Omicron. This goal cannot be met if millions of donated vaccine doses go unused and expire because shipments arrive in poor nations late or with little notice and inadequate resources are available to support their administration.

The White House should seek sufficient funding from Congress to support vaccine delivery and adult immunization efforts in low- and middle-income countries. The administration must improve the predictability of American vaccine donations, and work with local health officials to develop the logistics and community engagement strategies necessary to reach the vulnerable people most in need of vaccination.

The United States should continue to support regional manufacturing hubs in low- and middle-income nations to ensure earlier and more equitable global vaccine access in future pandemics. This might best be accomplished by having the World Bank create new mechanisms to mobilize surge financing for manufacturing in future pandemics and work with regional entities to bolster pooled procurement mechanisms, such as the African Vaccine Acquisition Trust and the Asia-Pacific Vaccine Access Facility. The United States should also support efforts at the World Trade Organization to restrict or eliminate the use of export restrictions on vaccines and other essential medical supplies during pandemics, including the present one. The U.S. government can leverage its research and licensing agreements to encourage more technology transfer to production facilities in developing countries in order to accelerate global vaccine manufacturing.
Vaccines Strategic Goals

1. Direct and fund HHS — including the NIH and FDA — to accelerate vaccine-related research and development.

   a. Dedicate additional federal funding to research on respiratory virus vaccines, immunology, and virology.
   b. Dedicate additional federal funding to correlates of protection to facilitate development of next-generation Covid and respiratory viral vaccines.
   c. Enter ‘at risk’ agreements with manufacturers to develop vaccines targeting SARS-CoV-2 variants, multiple respiratory viruses, and all coronaviruses.
   d. Incentivize manufacturers to develop innovative vaccines, including those that are easier to administer, thermostable, and mucosal vaccines.
   e. Incentivize manufacturers to evaluate the use of adjuvants to augment vaccine efficacy and durability, as well as potentially expand supply.
   f. Direct the FDA to clarify best practices for next-generation Covid vaccine clinical trials, the incorporation of biomarkers when clinical efficacy studies aren’t feasible, and the potential role for human challenge studies.

2. Direct HHS to expand domestic vaccine production capacity.

   a. Partner with commercial facilities to expand the industrial base for domestic vaccine manufacturing and establish surge capacity.
   b. Identify and contract with multiple sources for critical reagents and raw materials to ensure supply chain security.
   c. Promote resilience and flexibility in manufacturing capacity, including support of off-site construction of modular manufacturing facilities.
   d. Fund the expansion and training of the vaccine production workforce.

3. Direct and provide sufficient funds for HHS to achieve at least an 85% vaccination rate by the end of 2022.

   a. Conduct a detailed zip code-level analysis of vaccination rates, identify subgroups of unvaccinated populations, and launch tailored grass-roots efforts in partnership with community leaders and faith-based organizations to provide education on and promote vaccination.
   b. Stand up teams and utilize community health workers to vaccinate hard-to-reach populations, such as those experiencing homelessness, in long-term care facilities, or in underserved or remote areas.
   c. Fund CMS to improve vaccination rate disparities in poor-performing long-term care facilities and nursing homes with predominantly minority populations.
   d. Direct CMS to reimburse clinicians for discussing vaccinations with patients insured by Medicaid and Medicare, and institute similar requirements for Medicare Advantage plans and plans sold on the exchanges, across care settings.
   e. Delineate two separate codes (and payments) for vaccine delivery and vaccine counseling, enable counseling code to be billed on the same day as a vaccine delivery, and mandate coverage across Medicaid, Medicare, Medicare Advantage, and the exchanges.
   f. Combat misinformation via consistent and clear public health messaging, including altering VAERS so it is not a source of misinformation. Partner with social media outlets to reduce misinformation and spread factual information.
   g. Fund initiatives through CMS that expand FQHC authority to partner with community and faith-based organizations in establishing and maintaining immunization sites.
4. Direct HHS agencies to develop and publish clear, evidence-based guidelines for future vaccine doses.

a. Direct the NIH to initiate research into the impacts of previous infection and heterologous prime boost regimens (e.g., mRNA vaccine followed by J&J booster) on immune protection.

b. Direct the NIH to collaborate with vaccine manufacturers to establish optimal primary and booster vaccine schedules for the different vaccinations based on updated clinical studies and real-world data.

c. Direct the CDC to establish vaccination guidelines for different populations, depending on risk, including the need for additional “booster” dose(s).

d. Launch a national immune surveillance infrastructure to monitor longitudinal population immunity and adverse reactions, as well as identify changes that may warrant revaccination or use of different vaccines (see *Chapter 9: Health Data and Infrastructure*).

5. Direct USAID to continue to lead global vaccine efforts.

a. Direct the CDC and USAID to collaborate to determine total U.S. vaccine donations over 2022 and align on a process and timeline to allocate supply to countries in need.

b. Direct USAID to work with vaccine manufacturers to expand global vaccine manufacturing hubs.

c. Direct USAID to fund global vaccine storage capacity and vaccine administration efforts.

d. Streamline technology transfer to and intellectual property agreements with developing countries, to accelerate global vaccine manufacturing.

e. Direct USAID to engage the WHO and development banks to mobilize financing and procure supplies to support vaccinations and diminish inequalities.