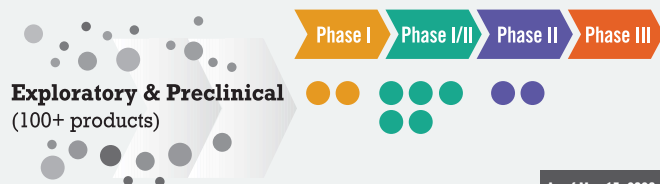


HIV vaccine research is making the search for a COVID-19 vaccine faster, safer and more inclusive.

The global COVID-19 response evolves by the day—seemingly, even, by the minute—as the world has watched the tally of experimental diagnostics, therapeutics and vaccines tick up into the hundreds. If researchers achieve their goal of making the search for a COVID-19 vaccine the fastest vaccine development effort in history, much of that success will be due to the research knowledge, vaccine platforms, trial networks and community engagement models created through HIV vaccine research.

COVID-19 Vaccine Pipeline Snapshot



We do not yet know when—or even if—a vaccine for COVID-19 might be available. The most optimistic timelines project a vaccine in 2021, but major questions remain. Will a one-time, single-dose vaccine be sufficient, or will multiple doses be required? Could a COVID-19 vaccine require seasonal dosing, as is done for the flu? Could different vaccines be required for different geographic regions or populations? (For example, is it possible that one vaccine might work better in older people, while another is more effective in younger users?) How will funders and manufacturers ensure sufficient and equitable global access? Each of these questions has implications for timelines, cost, availability, rollout and impact.

On HIV Vaccine Awareness Day 2020, the transformational changes in practice, scientific knowledge and community engagement facilitated through years of HIV vaccine research are helping to answer some of these questions—and informing every step in the search for a COVID-19 vaccine. The global effort in COVID-19 vaccine research could also have significant implications for the future of HIV vaccine research, and could exert a potentially broader impact on HIV prevention, treatment and research at-large.

Here are five things to watch as the search for a COVID-19 vaccine advances.

Platforms

HIV vaccine science gives researchers a massive head start in the search for a COVID-19 vaccine.

HIV represents one of the most challenging viruses ever encountered. Though an HIV vaccine has yet to be licensed, vaccine science has

HIV Vaccine Approaches in COVID-19 Vaccine Development



Antibodies

The AMP trials, with results due in October, are now testing an infusion of HIV-neutralizing antibody, administered every two months as a prevention method. Antibody approaches like this, including convalescent plasma, and neutralizing antibody infusions and injections, are being developed for both prevention and treatment of COVID-19.



Chimp adenovirus vector

A vaccine developed at Oxford University from a virus that infects chimpanzees is being developed for treatment and prevention trials against HIV and a number of other diseases. That chimpanzee virus platform has been adapted as a COVID-19 vaccine candidate and is now in clinical trials.



DNA

HIV vaccine approaches using a DNA platform are now being explored for COVID-19. Inovio has begun testing its DNA vaccine platform, originally developed for HIV vaccines, for use as a COVID-19 vaccine.



Human adenovirus vectors

Multiple adenovirus subtypes have been developed as HIV vaccine candidates, most notably, Janssen's Ad26 candidate, which is now in two HIV vaccine efficacy trials. Janssen is now adapting Ad26 for a COVID-19 vaccine. There are also several other adeno-based COVID-19 vaccines in development, such as the Ad5 adenovirus being tested by the Chinese military.



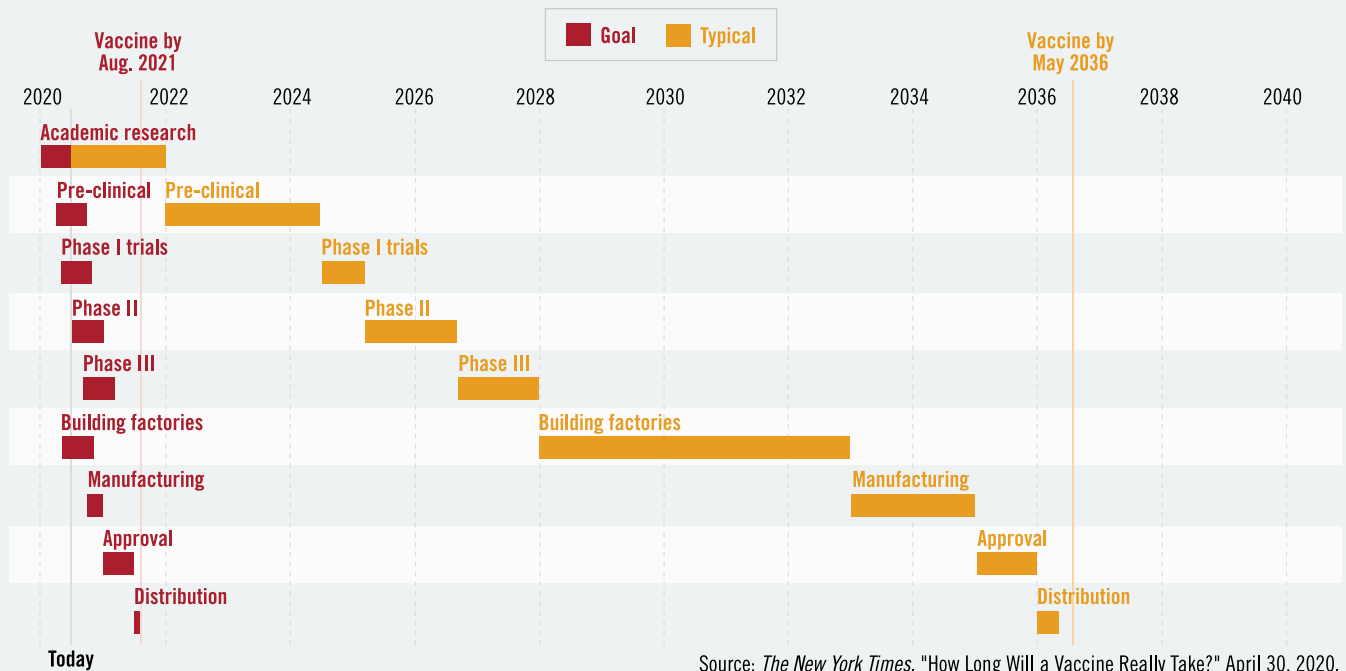
mRNA

Messenger RNA (mRNA) vaccines, potentially more potent than DNA platforms, have been developed as HIV vaccine candidates. Now, several mRNA vaccine candidates against COVID-19 are in clinical trials sponsored by Moderna, CureVac and Pfizer/BioNTech.

made enormous strides as it confronts this rapidly-mutating virus. Years of painstaking work to develop vaccines for HIV are now making possible the record-breaking timelines that researchers aspire to for the development of COVID-19 vaccines. HIV vaccine research has generated more scientific knowledge about immune function and responses than

The Race for a Coronavirus Vaccine

Will compressed and overlapping steps get a vaccine faster?



Source: *The New York Times*. "How Long Will a Vaccine Really Take?" April 30, 2020.

ever existed. And key HIV vaccine platforms are fast-tracking the development and testing of experimental vaccines for COVID-19 today.

Various DNA, messenger RNA (mRNA), viral vector and antibody-based vaccine approaches, or “platforms”, that are currently in advanced development for HIV are simultaneously being deployed in COVID-19 vaccine candidates. For example, Janssen’s Ad26 HIV vaccine, currently in two HIV vaccine efficacy trials, is being quickly adapted as a COVID-19 vaccine candidate. Several other developers are exploring vaccines based on genetic material known as mRNA, which are also being studied for HIV. As no previous licensed vaccine has ever employed this technology, the use of mRNA approaches in COVID-19 vaccine research could be an important boost for HIV vaccine science and for broader vaccine development, as well.

Process

The process for COVID-19 vaccine research may be the fastest in history...but with speed come challenges.

Historically, medical research had been a slow process, until HIV advocates advanced a research paradigm emphasizing two seemingly disparate themes: do it faster, and make it more inclusive.

Today, HIV research practices can inform COVID-19 research: embedding consistent community engagement in the effort to break records; protecting the thousands of volunteers who will participate in COVID-19 vaccine studies; and securing affordable, sustainable access to vaccines developed through user-focused research.

The innovations advocated for in HIV vaccine development that are being employed in the COVID-19 response today include: running certain clinical trials in parallel instead of sequentially; gearing up manufacturing capacity before final study results are in and negotiating public/private commitments in advance to facilitate sustainable access to new vaccines.

To further speed results, researchers are also pursuing several non-traditional study approaches. The World Health Organization (WHO) has launched two research initiatives under the name SOLIDARITY, one focused on treatment, the other on vaccines. The treatment trial, now underway, is a “pragmatic trial” that seeks to test four potential COVID-19 treatments rapidly and in real-world settings, with a single placebo arm comparison for all four. The proposed SOLIDARITY vaccine trial would involve the rapid evaluation of multiple COVID-19 candidates in an “adaptive design”, where vaccine candidates are added or dropped on an ongoing basis according to their performance against predefined safety and efficacy endpoints.

There is also a growing conversation around the potential role of “human challenge trials”, in which trial participants are vaccinated and subsequently exposed to the virus in order to more rapidly assess a vaccine’s safety and/or efficacy. WHO recently issued criteria for assessing whether such challenge studies might be appropriate for COVID-19 vaccine development, but questions remain about whether such experiments would be appropriate or ethical or even whether they would affect research timelines. In the face of intense and appropriate pressure to test COVID-19 vaccines quickly, advocates must actively

Leveraging the HIV Vaccine Enterprise for COVID-19 Vaccine Research



engage with ethicists, researchers and developers in rigorous reviews of these proposed designs. Broad stakeholder engagement and the informed consent of study volunteers must always receive top priority.

Developing effective COVID-19 vaccines in record time is only part of the challenge ahead. The scale of production required for a COVID vaccine will dwarf any previous vaccine effort, as every person in the world is at risk. Producing billions of doses, transporting them safely to every corner of the world, offering enough provider and patient education for safe and widespread use, paying for the entire undertaking and ensuring that the distribution of any effective vaccine is guided by equity rather than nationalism—all of this will require greater global collaboration than has ever been marshalled before.

Partnerships

Collaborative research models, the backbone of HIV vaccine development, are ushering in new approaches to scientific discovery.

In many ways, the collaborative research movement grew up around HIV vaccines. Thanks in large part to HIV advocacy, out-of-date research models that were competitive and closed-door are increasingly yielding to more transparent and collaborative research and development efforts—in both the HIV and COVID-19 responses.

Building on big science partnerships, data sharing and collaboration pioneered over the last 15 years of HIV vaccine research and development, global initiatives such as the Coalition for Epidemic Preparedness Innovation (CEPI) are marshalling the talents,

experiences and resources of key stakeholders. Through CEPI, Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV), the Access to COVID-19 Tools (ACT) Accelerator, and the COVID-19 Clinical Research Coalition, researchers from the global North and South, academic research institutions, the pharmaceutical industry, philanthropy, governments and—crucially—affected communities are working together to speed the development and future distribution of COVID-19 vaccines.

Just as HIV laid the foundation for more effective partnerships in research, lessons from the COVID-19 experience can also inspire greater collaboration and broader involvement by a range of players in the HIV vaccine research effort.

Payers

As funding for COVID research grows, advocates can lead efforts to ensure lasting benefits for the broader field of vaccine research.

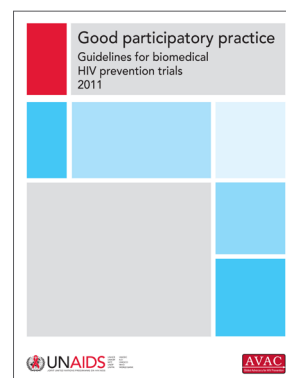
Funding commitments for COVID-19 vaccine research jumped from nothing at the start of the year to more than \$3 billion by May 2020, according to the Policy Cures Research COVID-19 R&D Tracker. This broad-based cash infusion is designed to stop a pandemic that has already caused untold human suffering along with historic economic damage.

The financial response to COVID-19 vaccine research is laudable not only for its size, but also for the speed with which it was committed and the diversity of funders involved—including organizations that have never before supported vaccine research.

HIV vaccine advocates will be watching to link the lessons from this massive boost in vaccine funding to stronger and diversified funding for future HIV vaccine research, and vaccines for epidemics yet to come. Advocates and researchers must seize this moment to develop long-term, sustainable vaccine development and deliver for global health generally—not just for one-off vaccines.

Participatory Practices

Rapid research is essential. So is engaging, informing and protecting the communities where research takes place.



Before HIV, public health research was usually designed and conducted with little or no input from the communities it would impact. Because of the HIV advocacy movement, however, communities have assumed a central and pivotal role in research design, implementation and the translation of results.

As potentially dozens of COVID-19 vaccine research studies move forward in the months ahead, it's critical to apply one of the greatest contributions of the HIV research advocacy movement: the Good

Participatory Practice (GPP) Guidelines developed by AVAC and UNAIDS. The Guidelines also informed the WHO's Good Participatory Practice for Trials of Emerging Pathogens (GPP-EP).

Stakeholder engagement, guided by GPP, is a cornerstone of biomedical HIV prevention research. Expedited research timelines for COVID-19 cannot be allowed to shortchange essential, robust engagement across a broad range of stakeholders. A global community advisory mechanism that would work with the WHO, vaccine developers, researchers and research sponsors, is one important avenue to help ensure COVID-19 research happens to the highest possible scientific, ethical and public health standards.

Civil society advocates also have a vital role to play in countering stigma and misinformation. Already, we have seen world leaders distort the severity of the COVID-19 pandemic, promote false cures and underestimate the research timelines for developing treatments and a vaccine.

Informed advocates can be the best responders to misinformation, whatever its source. As the field moves forward to address two simultaneous global health challenges, nearly 40 years of battling HIV shows that advocates have the expertise to understand the science, the skills to communicate it effectively and the networks to get the facts to those who need them most.

A Global Pandemic Requires an Unprecedented Response

Meeting the ambitious timelines for a COVID-19 vaccine will require an unprecedented multi-faceted, coordinated global response including governments, industry, academic researchers, delivery partners, donors and civil society. This graphic represents the pillars of this landscape — with those organizations mentioned by name representing just a small fraction of the growing number of contributors in the global response to the COVID-19 pandemic.



About AVAC

AVAC is a non-profit organization that uses education, policy analysis, advocacy and a network of global collaborations to accelerate the ethical development and global delivery of new HIV prevention options as part of a comprehensive response to the pandemic. For more information, visit www.avac.org.