Coronavirus Vaccine Status Worldwide & IRAN

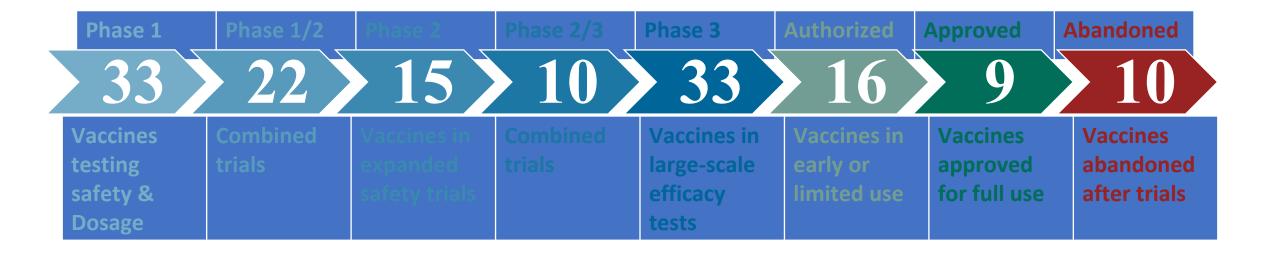
By Dr Hassan Abolghassemi

Updated Dec. 12, 2021

Index

- Coronavirus Vaccine Tracker(Total)
- Economic insight of COVID-19 vaccines
- Genetic Vaccines
- Viral Vector Vaccines
- Protein-based Vaccines
- •Inactivated or attenuated Vaccines
- Booster updates

Coronavirus Vaccine Tracker(Total)



Currently testing: 111

Preclinical: 75

Current Status (Global) Approved Viral Vector platform Vaccines

Developer	Platform	Approvals	Brand/Project name	Country of Origin
<u>CanSino</u>	Non Replicating Viral Vector	in 9 countries 11 trials in 6 countries	Ad5-nCoV	China
<u>Gamaleya</u>	Non Replicating Viral Vector	in 19 countries 4 trials in 2 countries	Sputnik Light	Russia
<u>Gamaleya</u>	Non Replicating Viral Vector Ad26, Ad5	in 73 countries 22 trials in 7 countries	<u>Sputnik V</u>	Russia
<u>Janssen</u> (Johnson & Johnson)	Non Replicating Viral Vector	in 78 countries 16 trials in 18 countries	Ad26.COV2.S	US, Israel
Oxford/AstraZeneca AZD1222	Non Replicating Viral Vector	in 125 countries 49 trials in 23 countries	<u>AZD1222</u>	UK, Sweden
Serum Institute of India Covishield (Oxford/AstraZeneca formulation)	Non Replicating Viral Vector	Approved in 46 countries 2 trials in 1 country	Covishield	UK, Sweden, India

Current Status (Global)

Approved Subunit protein platform Vaccines

Developer	Platform	Approvals	Brand	Country of Origin
Anhui Zhifei Longcom ZF2001	Protein Subunit	in 3 countries 10 trials in 5 countries	<u>ZF2001</u>	China
Center for Genetic Engineering and Biotechnology (CIGB) CIGB-66	Protein Subunit	in 4 countries 5 trials in 1 country	Abdala	Cuba
<u>FBRI</u> <u>EpiVacCorona</u>	Protein Subunit	in 2 countries 3 trials in 1 country	EpiVacCorona, Aurora-CoV	Russia, Turkmenistan
<u>Medigen</u> <u>MVC-COV1901</u>	Protein Subunit	in 1 country 8 trials in 2 countries	MVC-COV1901	Taiwan
Serum Institute of India COVOVAX (Novavax formulation)	Protein Subunit	in 2 countries 3 trials in 3 countries	Novavax, Covovax	US, India
<u>Vaxine/CinnaGen Co.</u> <u>COVAX-19</u>	Protein Subunit	in 1 country 4 trials in 2 countries	Spikogen	Australia, Iran
Instituto Finlay de Vacunas Cuba Soberana 02	Protein Subunit	in 4 country 3 trials in 2 countries	Soberana 02	Cuba
Instituto Finlay de Vacunas Cuba Soberana Plus	Protein Subunit	in 2 country 5 trials in 2 countries	Soberana Plus	Cuba
Razi Cov Pars	<u>Protein</u>	in 1 country	Razi Cov Pars	Iran ⁵

Current Status (Global)

Approved Inactivated Virus	Platform	Approvals	Brand	Country of Origin
Bharat Biotech	Inactivated	in 10 countries 7 trials in 1 country	Covaxin (also known as BBV152 A, B, C)	India
<u>Chumakov Center</u> <u>KoviVac</u>	Inactivated	in 1 country 2 trials in 1 country	<u>KoviVac</u>	Russia
<u>Kazakhstan RIBSP</u> QazVac	Inactivated	in 2 countries 3 trials in 1 country	<u>QazVac</u>	Kazakhstan
Minhai Biotechnology Co SARS-CoV-2 Vaccine (Vero Cells)	Inactivated	in 2 countries 5 trials in 1 country	KCONVAC, KconecaVac	China
Shafa Pharmed Industrial Co COVID-19 Inactivated Vaccine	Inactivated	in 1 country 6 trials in 1 country	COVIran Barekat	Iran
Sinopharm (Beijing) BBIBP-CorV (Vero Cells)	Inactivated	in 68 countries 19 trials in 10 countries	BBIBP-CorV	China
Sinopharm (Wuhan) Inactivated (Vero Cells)	Inactivated	in 2 countries 8 trials in 7 countries	Sinopharm Wuhan	China
<u>Sinovac</u> <u>CoronaVac</u>	Inactivated	in 43 countries 26 trials in 8 countries	CoronaVac (formerly PiCoVacc)	China
Organization of Defensive Innovation and Research	Inactivated	in 1 countries 3 trials in 1 countries	FAKHRAVAC (MIVAC)	lran 6

Current Status (WHO)

Apı	oroved	platform	Vacc	eines
	or o v o a	PIGGIOTIII		

Developer	Platform	Approvals	Brand	Country of Origin
Moderna mRNA-1273	RNA	in 77 countries 32 trials in 8 countries	Moderna mRNA-1273	US
Pfizer/BioNTech BNT162b2	RNA	in 107 countries 45 trials in 21 countries	Pfizer/BioNTech	US, Germany
<u>Janssen</u> (<u>Johnson & Johnson)</u>	Non Replicating Viral Vector	in 78 countries 16 trials in 18 countries	<u>Janssen</u> (Johnson & <u>Johnson)</u>	US, Israel
Oxford/AstraZeneca AZD1222	Non Replicating Viral Vector	in 125 countries 49 trials in 23 countries	<u>AZD1222</u>	UK, Sweden
Serum Institute of India Covishield (Oxford/AstraZeneca formulation)	Non Replicating Viral Vector	Approved in 46 countries 2 trials in 1 country	Covishield	UK, Sweden, India
Bharat Biotech	Inactivated	in 10 countries 7 trials in 1 country	Bharat	India
Sinopharm (Beijing) BBIBP-CorV (Vero Cells)	Inactivated	in 68 countries 19 trials in 10 countries	BBIBP-CorV	China
<u>Sinovac</u> <u>CoronaVac</u>	Inactivated	in 43 countries 26 trials in 8 countries	CoronaVac (formerly PiCoVacc)	China 7

Current Status (IRAN) Approved Vaccines and Developing platforms

Developer	Platform	Approvals	Brand	Country of Origin
Oxford/AstraZeneca AZD1222	<u>Viral Vector</u>	in 125 countries 49 trials in 23 countries	<u>AZD1222</u>	UK, Sweden
Serum Institute of India Covishield (Oxford/AstraZeneca formulation)	<u>Viral Vector</u>	Approved in 46 countries 2 trials in 1 country	Covishield	UK, Sweden, India
<u>Gamaleya</u>	<u>Viral Vector</u>	in 73 countries 22 trials in 7 countries	<u>Sputnik V</u>	Russia
Bharat Biotech	Inactivated	in 10 countries 7 trials in 1 country	Covaxin (also known as BBV152 A, B, C)	India
Sinopharm (Beijing) BBIBP-CorV (Vero Cells)	Inactivated	in 68 countries 19 trials in 10 countries	BBIBP-CorV	China
Sinopharm (Wuhan) Inactivated (Vero Cells)	Inactivated	in 2 countries 8 trials in 7 countries	Sinopharm Wuhan	China
<u>Sinovac</u> <u>CoronaVac</u>	Inactivated	in 43 countries 26 trials in 8 countries	CoronaVac (formerly PiCoVacc)	China
Shafa Pharmed Industrial Co COVID-19 Inactivated Vaccine	Inactivated	in 1 country 6 trials in 1 country	COVIran Barekat	Iran
<u>Vaxine/CinnaGen Co.</u> <u>COVAX-19</u>	<u>Protein</u> <u>Subunit</u>	in 1 country 4 trials in 2 countries	Spikogen	Australi, Iran

Current Status (IRAN) Developing Vaccines

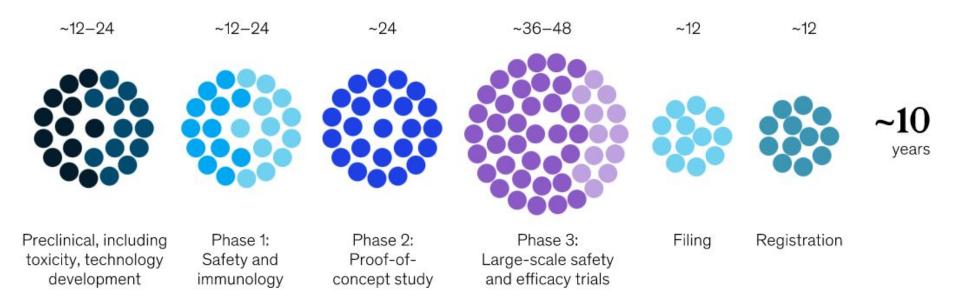
Developer	Platform	Approvals	Brand	Country of Origin
Shafa Pharmed Industrial Co COVID-19 Inactivated Vaccine	Inactivated	1 approval in Iran 6 trials in 1 country	COVIran Barekat	Iran
Vaxine/CinnaGen Co. COVAX-19	<u>Protein</u> <u>Subunit</u>	1 approval in Iran 4 trials in 2 countries	Spikogen	Australia, Iran
Finlay Vaccine Institute/ Institute Pasteur of Ieran Soberana 2, or PastoCoVac	<u>Protein</u> <u>Subunit</u>	Approved in 3 countries 4 trials in 2 countries	Soberana 2, or PastoCoVac	Cuba, Iran
Baqiyatallah University of Medical Sciences	<u>Protein</u> <u>Subunit</u>	3 trials in Iran	Noora	Iran
Razi Vaccine and Serum Research Institute	<u>Protein</u> <u>Subunit</u>	1 approval in Iran 3 trials in Iran	Razi Cov Pars	Iran
Iran's Ministry of Defence	Inactivated	1 approval in Iran 2 trails in Iran	Fakhravac	Iran

Fast-forward: Will the speed of COVID-19 vaccine development reset industry norms?

Development times for COVID-19 vaccines were highly compressed compared with standard practice.

Vaccine development then and now, months

Sample baseline scenario, (after multiple years of research)



Sample accelerated timeline,² (based on previous SARS/MERS research)

Development was simultaneous rather than sequential. Clinical phases were continued after subsequent steps were initiated.

Authorization3

McKinsey

& Company



¹Timelines can vary widely based on disease and trial designs.

https://www.mckinsey.com/indust ries/life-sciences/our-insights/fastforward-will-the-speed-of-covid-1 9-vaccine-development-reset-indu stry-norms

May 13, 2021

²Patient safety was paramount despite the condensed timeline.

³Continuation of clinical development after emergency-use authorization.

Five factors affected the speed with which COVID-19 vaccines were developed.

Potential time savings associated with five key development factors, years

Fast-forward : Will the speed of COVID-19 vaccine development reset industry norms?

May 13, 2021



Note: Time savings across acceleration categories are not cumulative and depend on critical development path.

¹For instance, other pandemic situations or areas of high unmet medical need.

McKinsey & Company

Current Status (Global) All combined trial genetic vaccines

Developer	Platform	Brand	Country of Origin	Combined Phases
Pfizer/BioNTech BNT162b2	<u>RNA</u>	Pfizer/ BioNTe ch	US, Germany	2&3
Arcturus Therapeutics and Duke-NUS Medical School	RNA	N/A	US & Singapore	2&3
<u>Genexine</u>	DNA	N/A	South Korea	2&3
AnGes,Osaka University and Takara Bio	DNA	N/A	Japan	1&2
<u>Gennova</u> <u>Biopharmaceuticals and HDT Bio</u>	RNA	N/A	India & US	1&2
GeneOne Life Science	DNA	N/A	South Korea	1&2
Takis Biotech and Rottapharm Biotech	DNA	N/A	Italy	1&2
<u>Daiichi Sankyo and University of</u> <u>Tokyo</u>	RNA	N/A	Japan	1&2
Elixirgen Therapeutics	RNA	N/A	US	1&2
<u>Eyegene</u>	RNA	N/A	South Korea	1&2
Vaccibody	DNA	N/A	Norway	18-2

Current Status (Global) All combined trial viral vector vaccines

Developer	Platform	Brand	Country of Origin	Combined Phases
Oxford/AstraZeneca AZD1222	Non Replicating Viral Vector	AZD1222	UK, Sweden	2&3
Serum Institute of India Covishield (Oxford/AstraZeneca formulation)	Non Replicating Viral Vector	Covishield	UK, Sweden, India	2&3
ReiThera & Lazzaro Spallanzani National Institute for Infectious Diseases	Non Replicating Viral Vector	N/A	India	2&3
Israel Institute for Biological Research	Non Replicating Viral Vector	N/A	Israel	2&3
Washington University & Bharat Biotech	Non Replicating Viral Vector	N/A	US & India	2&3
Cellid & LG Chem	Non Replicating Viral Vector	N/A	South Korea	1&2
BIOCAD	Non Replicating Viral Vector	N/A	Russia	1&2

Current Status (Global) All combined trial Sub-protein vaccines

Developer	Platform	Brand	Country of Origin	Combined Phases
Clover Biopharmaceuticals & Dynavax	<u>Protein Subunit</u>	Inactivated	China & US	2&3
Shionogi & National Institute of Infectious Diseases & Kyushu University	<u>Protein Subunit</u>	Inactivated	Japan	2&3
Finlay Vaccine Institute Soberana 1	<u>Protein Subunit</u>	Inactivated	Cuba	1&2
SpyBiotech	<u>Protein Subunit</u>	Inactivated	GB	1&2
EuBiologics				1&2
VBI Vaccines	<u>Protein Subunit</u>	Inactivated	US	1&2
Akston Biosciences	<u>Protein Subunit</u>	Inactivated	US	1&2
Sinopharm	<u>Protein Subunit</u>	Inactivated	China	1&2
Icosavax & Seqirus	<u>Protein Subunit</u>	Inactivated	US & Australia	1&2
Research Institute for Biological Safety Problems	<u>Protein Subunit</u>	Inactivated	Kazakhstan	1&2
St. Petersburg Scientific Research Institute of Vaccines and Sera	<u>Protein Subunit</u>	Inactivated	Russia	1&2
HIPRA	<u>Protein Subunit</u>	Inactivated	Spain	1&2
Human Stem Cells Institute	<u>Protein Subunit</u>	Inactivated	US	1&2 ₁₄

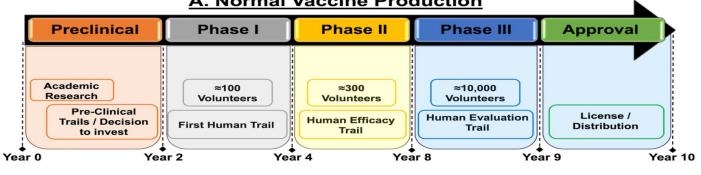
Current Status (Global) All combined trial Inactivated vaccines

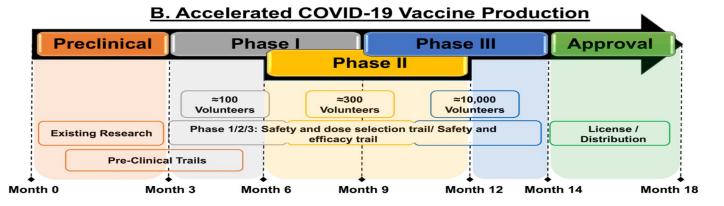
Developer	Platform	Brand	Country of Origin	Combined Phases
Chumakov Center at the Russian Academy of Sciences	Inactivated	N/A	Russia	1&2
KM Biologics	Inactivated	N/A	Janan . Normal Vaccine Pro	2&3

~ 32 studies are enjoying combined-phase developments

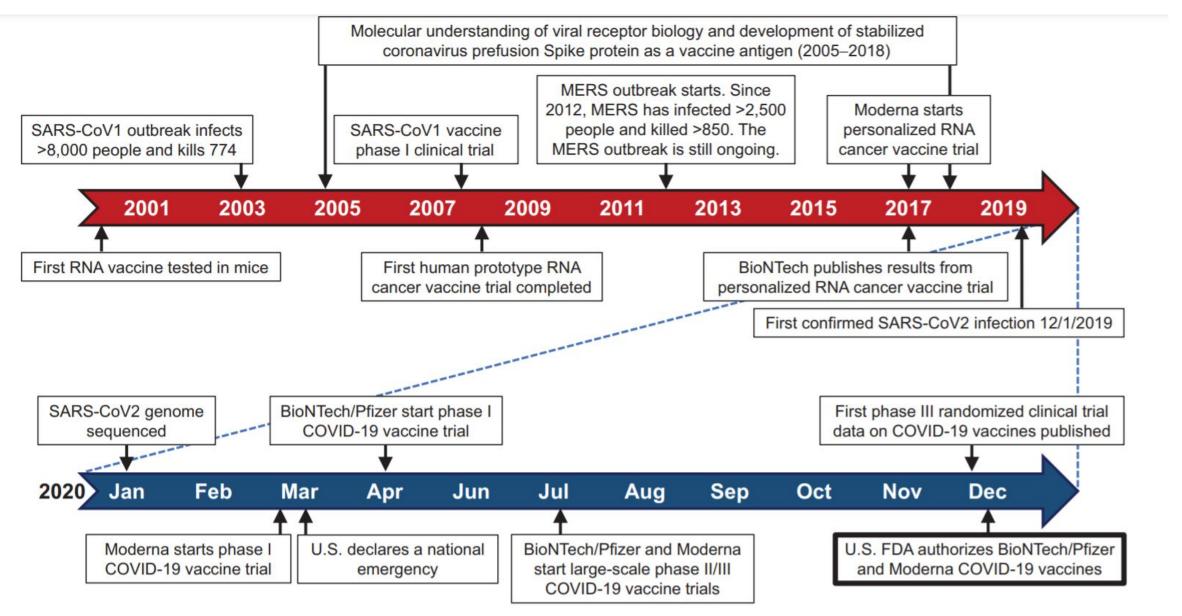
Super-rapid race for saving lives by developing COVID-19 vaccines

Journal of Integrative Bioinformatics

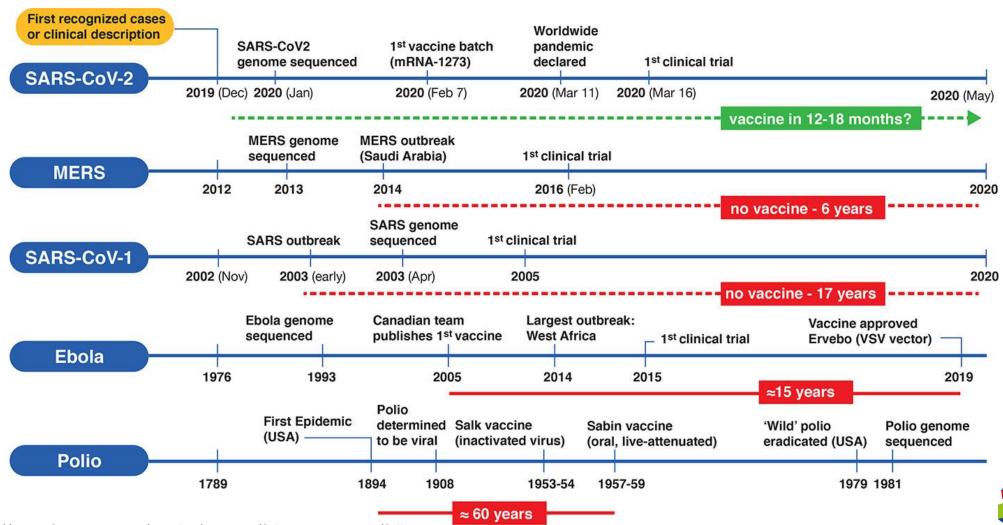




How Did We Get a COVID-19 Vaccine in Less Than 1 Year?



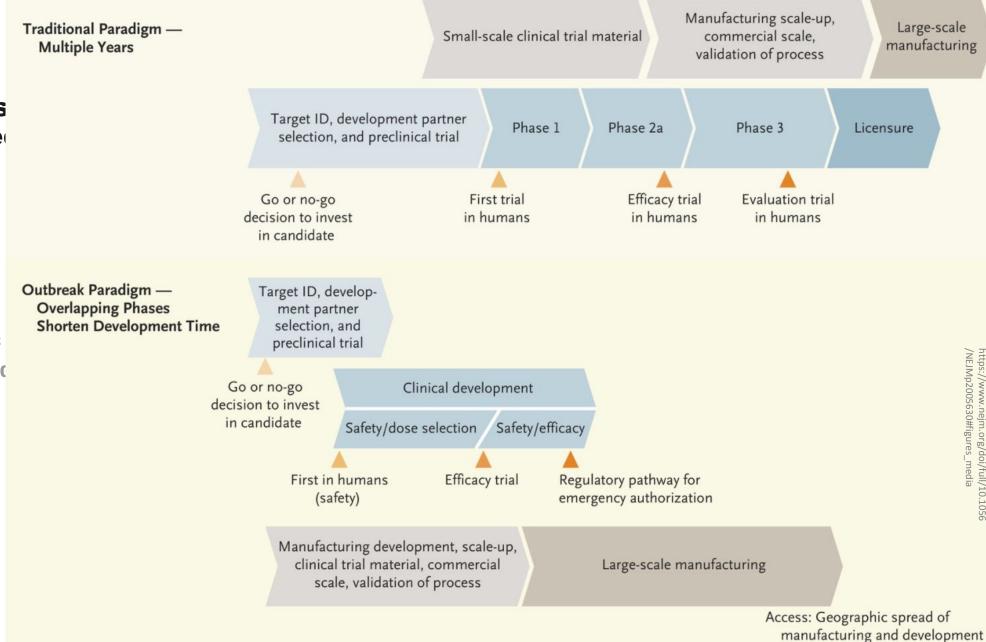
A Snapshot of the Global Race for Vaccines Targeting SARS-CoV-2 and the COVID-19 Pandemic





Developing Covid-19 Vaccines at Pandemic Spee

Difference between **Traditional Vaccine Development and Development Using a Pandemic** Paradigm. May 21, 2020



sites and pursuit & emergency authorization before licensure

Go to

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Home > Search Results > Study Record Detail

Investigating a Vaccine Against COVID-19

A

The safety and scientific validity of this study is the responsibility of the study sponsor and investigators. Listing a study does not mean it has been evaluated by the U.S. Federal Government. Read our <u>disclaimer</u> for details.

ClinicalTrials.gov Identifier: NCT04400838

Recruitment Status 1 : Active, not recruiting

First Posted 1 : May 26, 2020

Last Update Posted 6 : October 20, 2021

Sponsor:

University of Oxford

Information provided by (Responsible Party):

University of Oxford

Study Details

Tabular View

No Results Posted

Disclaimer

How to Read a Study Record

Study Description

Brief Summary:

A phase 2/3 study to determine the efficacy, safety and immunogenicity of the candidate Coronavirus Disease (COVID-19) vaccine ChAdOx1 nCoV-19 in healthy UK volunteers.

Economic insight of COVID-19 vaccines

2021 Financial Guidance⁽¹⁾

Revenues	\$81.0 to \$82.0 Billion		
Revenues	(previously \$78.0 to \$80.0 billion)		
Adjusted Cost of Salas(1) as a Decembers of Payonuse	39.1% to 39.6%		
Adjusted Cost of Sales ⁽¹⁾ as a Percentage of Revenues	(previously 39.0% to 40.0%)		
Adjusted CISA Expanses(1)	\$11.6 to \$12.1 Billion		
Adjusted SI&A Expenses ⁽¹⁾	(previously \$11.5 to \$12.5 billion)		
Adicated DRD Expanses(1)	\$10.4 to \$10.9 Billion		
Adjusted R&D Expenses ⁽¹⁾	(previously \$10.0 to \$10.5 billion)		
Adjusted Other (Income)/Deductions(1)	~\$2.3 Billion		
Adjusted Other (Income)/Deductions ⁽¹⁾	(previously approximately \$2.2 billion of income)		
Effective Tax Rate on Adjusted Income ⁽¹⁾	Approximately 16.0%		
Adinated Dilutad EDC(1)	\$4.13 to \$4.18		
Adjusted Diluted EPS ⁽¹⁾	(previously \$3.95 to \$4.05)		

Midpoint of Revenue Range Reflects 91% Op Growth Compared to 2020 Revenues; Midpoint of Adjusted Diluted EPS⁽¹⁾ Range Reflects 80% Op Growth Compared to 2020

(1) See Slides 38 and 39 for definitions and for additional information regarding Pfizer's 2021 financial guidance



Economic insight of COVID-19 vaccines

Selected 2021 Financial Guidance⁽¹⁾ Ranges Excluding Comirnaty⁽¹⁾

Revenue	\$45.0 to \$46.0 billion (previously \$45.0 to \$47.0 billion)
Adjusted Cost of Sales ⁽¹⁾ as a Percentage of Revenues	21% to 22%
Adjusted Diluted EPS ⁽¹⁾	\$2.60 to \$2.65 (previously \$2.55 to \$2.65)

Midpoint of Revenue Range Reflects ~6% Op Growth Compared to 2020 Revenues Excluding Revenue Impacts of Comirnaty⁽¹⁾; Midpoint of Adjusted Diluted EPS⁽¹⁾ Range Reflects ~12% Op Growth Compared to Prior Year

(1) See Slides 38 and 39 for definitions and for additional information regarding Pfizer's 2021 financial guidance



Economic insight of COVID-19 vaccines

2022 Outlook for Potential Comirnaty⁽¹⁾ Sales

4B

Expected doses to be produced in 2022

1.7B

Expected doses to be delivered in 2022 based on contracts signed as of mid-October 2021

~\$29B

Direct sales and alliance revenues anticipated in 2022 based on contracts signed as of mid-October 2021

We Continue to Engage with Governments Regarding Potential Additional Orders for 2022

(1) See Slides 38 and 39 for definition of Comirnaty, which is the name for the Pfizer-BioNTech COVID-19 Vaccine





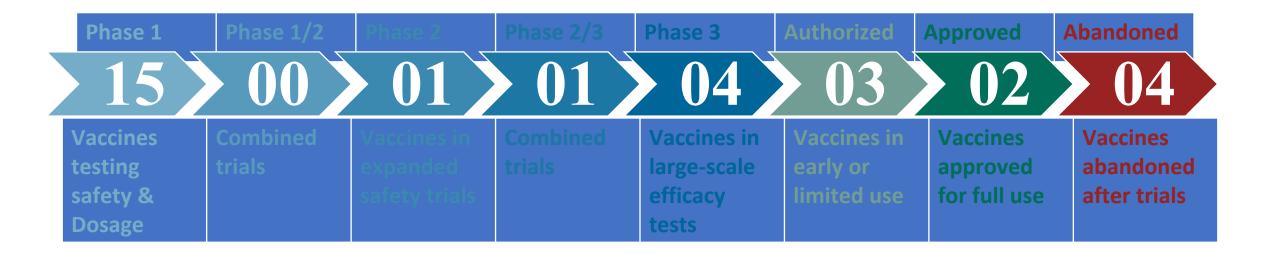
Genetic Vaccines

Vaccines that deliver one or more of the coronavirus's own genes into our cells to provoke an immune response.

RNA vaccine

DNA vaccine

Coronavirus Tracker(Genetic Vaccines)



Currently testing: 23 Abandoned: 4

Preclincal: 41

Genetic Vaccines 01- Pfizer & Biontech Comirnaty (also known as tozinameran or BNT162b2)

PHASE 2
PHASE 3
COMBINED PHASES
APPROVED IN U.S.,

ELSEWHERE EMERGENCY USE IN OTHER COUNTRIES

VACCINE NAME: Comirnaty (also known as tozinameran or BNT162b2)

EFFICACY: 91%

DOSE: 2 doses, 3 weeks apart

TYPE: Muscle injection

STORAGE: Freezer storage only at -13°F to 5°F (-25°C to -15°C)

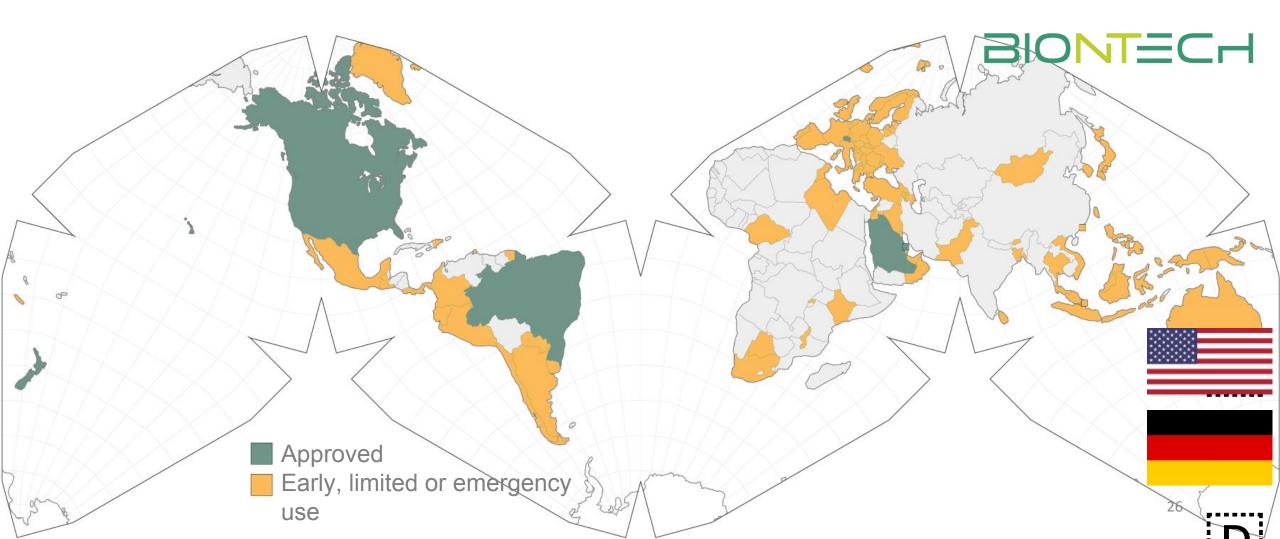
5 years and older





Genetic Vaccines 01- Pfizer & Biontech





Genetic Vaccines 02- Moderna & National Helath Institute mRNA-1273 or Spikevax



PHASE 3
APPROVED IN SWITZERLAND
EMERGENCY USE IN U.S., ELSEWHERE

VACCINE NAME: mRNA-1273 or Spikevax

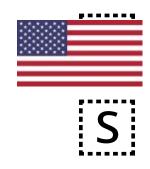
EFFICACY: Preventing Covid-19 illness: <u>93.2%</u>. Preventing severe disease: <u>98.2%</u>.

DOSE: 2 doses, 4 weeks apart

TYPE: Muscle injection

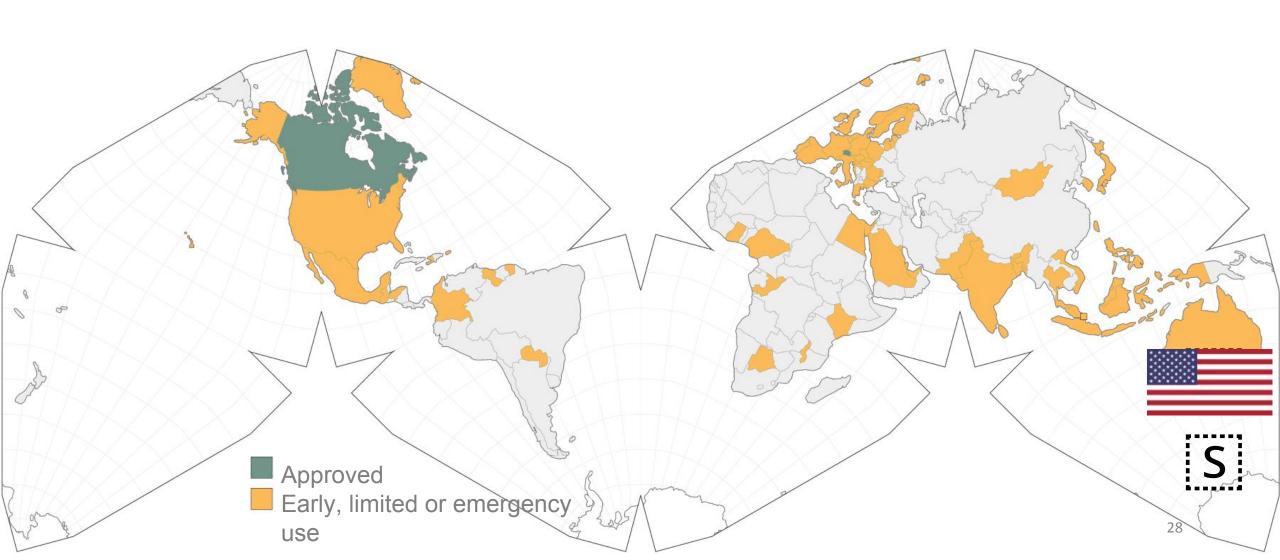
STORAGE: 30 days with refrigeration, 6 months at -4°F (-20°C)

18 years and older



Genetic Vaccines 02- Moderna & National Helath Institute





Genetic Vaccines 03- Zydus

PHASE 3 EMERGENCY USE IN INDIA

VACCINE NAME: ZyCoV-D

EFFICACY: <u>66.6%</u>

DOSE: 3 doses, 4 weeks apart

TYPE: Skin injection

STORAGE: Stable at room temperature for three months

12 years and older





Genetic Vaccines 03- Zydus





Genetic Vaccines 04- Academy of Military Medical Sciences, Suzhou Abogen Biosciences and Walvax Biotechnology

OF MILITARY SCIENCE

PHASE 3

In June 2020, Chinese researchers at the **Academy of Military Medical Sciences**, **Suzhou Abogen Biosciences** and **Walvax Biotechnology** announced they would start their country's first safety trials on an mRNA-based vaccine, called ARCoV. Earlier studies on monkeys <u>reportedly</u> showed protective effects, and in the Phase 1 trial indicated it was safe in people. On Dec. 21, Xinhua reported that China was building a factory to produce <u>120</u> million doses per year.



Researchers launched a <u>Phase 2 trial</u> for the vaccine in January 2021, and <u>registered</u> a Phase 3 trial in April. In September, Bloomberg <u>reported</u> that the trial would soon be launched in Indonesia and Mexico, with results expected by the end of the year. Updated Sept. 3



Genetic Vaccines 05- Arcturus Therapeutics and Duke-NUS Medical School

PHASE 2 PHASE 3

COMBINED PHASES

The California-based company **Arcturus Therapeutics** and **Duke-NUS Medical School** in Singapore have developed an mRNA vaccine called ARCT-021. It has a "self-replicating" design that leads to a greater production of viral proteins. <u>Tests on animals</u> showed that it protected them against infection. In August, Arcturus <u>launched</u> a <u>Phase 1/2 trial</u> at Singapore General Hospital. On Nov. 9, the company <u>announced</u> that an interim analysis of the trial showed that the vaccine produced an immune response that's in the range of responses seen in people who recovered from Covid-19. On Jan. 6 Arcturus <u>announced</u> that they had permission to start the <u>Phase</u> 2 portion of the trial in both Singapore and the United States. Singapore reached an agreement with Arcturus to spend up to \$175 million to acquire vaccines when they're ready.

In August, Arcturus received <u>approval</u> to begin testing its next-generation mRNA vaccine in Vietnam. The company <u>registered</u> a Phase 2/3 trial of the vaccine, called ARCT-154. The researchers <u>registered</u> a Phase 1/2 trial evaluating the two vaccines head-to-head with another candidate, called ARCT-165, on Sept. 8. Arcturus said it plans to file a <u>request for emergency use authorization</u> by the end of 2021.







Genetic Vaccines 06- **Genexine**

PHASE 2
PHASE 3
COMBINED PHASES

The South Korean company **Genexine** started testing the safety of a DNA-based vaccine in June 2020. In December, the Korea Biomedical Review <u>reported</u> that Genexine got disappointing results from their initial formulation and decided to restart their trials with a modified vaccine. On Jan. 20, 2021, the company <u>registered</u> a Phase 1/2 trial, and in June they registered a <u>Phase 1 trial</u> for elderly volunteers.

The Indonesian pharmaceutical company Kalbe Farma <u>pledged</u> in April to buy 10 million doses of Genexine's vaccine if it is proven to be safe and effective. In July, Indonesian regulators gave <u>the green light</u> for a late-stage clinical trial. Genexine registered <u>a Phase 2/3 clinical trial</u> in October to test their vaccine as a booster for other vaccines.







PHASE 2

VACCINE NAME: INO-4800

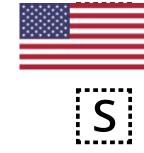
EFFICACY: Unknown

DOSE: To be determined

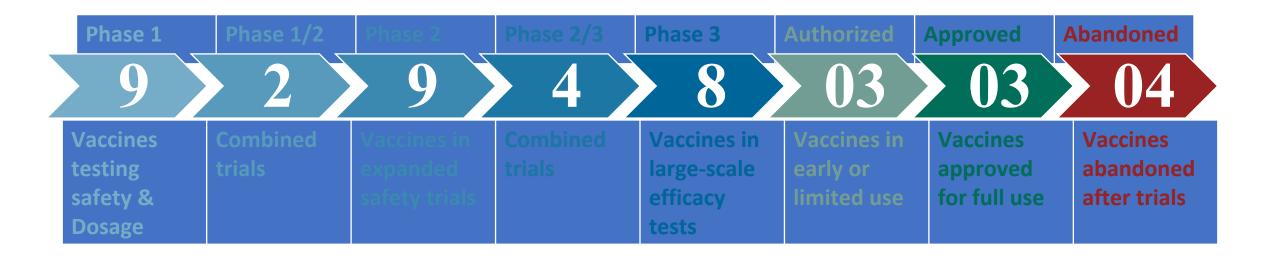
TYPE: Skin injection

STORAGE: Over a year at room temperature





Coronavirus Vaccine Tracker (Viral Vector Vaccines)



Currently testing: 20 Abandoned: 04

Preclinical: 13





PHASE 3

EMERGENCY USE IN RUSSIA, IRAN

VACCINE NAME: Sputnik V (also known as

Gam-Covid-Vac) **EFFICACY: 91.6%**

DOSE: 2 doses, 3 weeks apart

TYPE: Muscle injection

STORAGE: Freezer storage. Developing an alternative

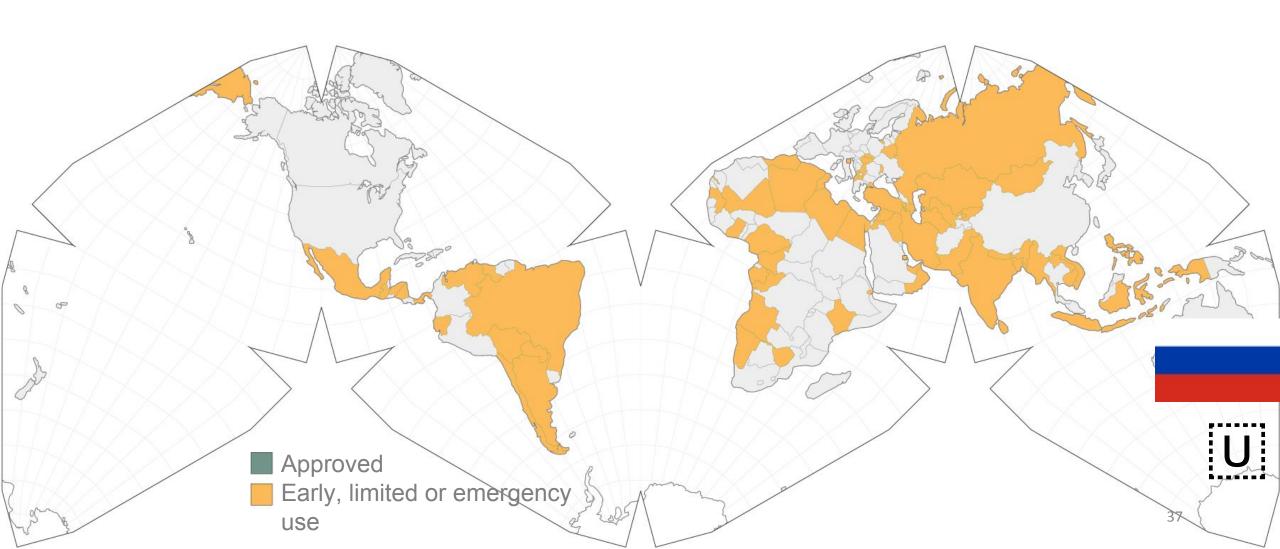
formulation that can be refrigerated.







Viral Vector Vaccines 01- **Gamaleya Research Institute**



Viral Vector Vaccines 02- the University of Oxford and AstraZeneca Vaxzevria (also known as AZD1222, or Covishield in

India)

PHASE 3

COMBINED PHASES

APPROVED IN BRAZIL

EMERGENCY USE IN E.U., ELSEWHERE

VACCINE NAME: Vaxzevria (also known as AZD1222, or

Covishield in India)

EFFICACY: 74% against symptomatic

Covid19; 100% against severe or critical Covid-19.

DOSE: 2 doses

TYPE: Muscle injection

STORAGE: Stable in refrigerator for at least 6 months



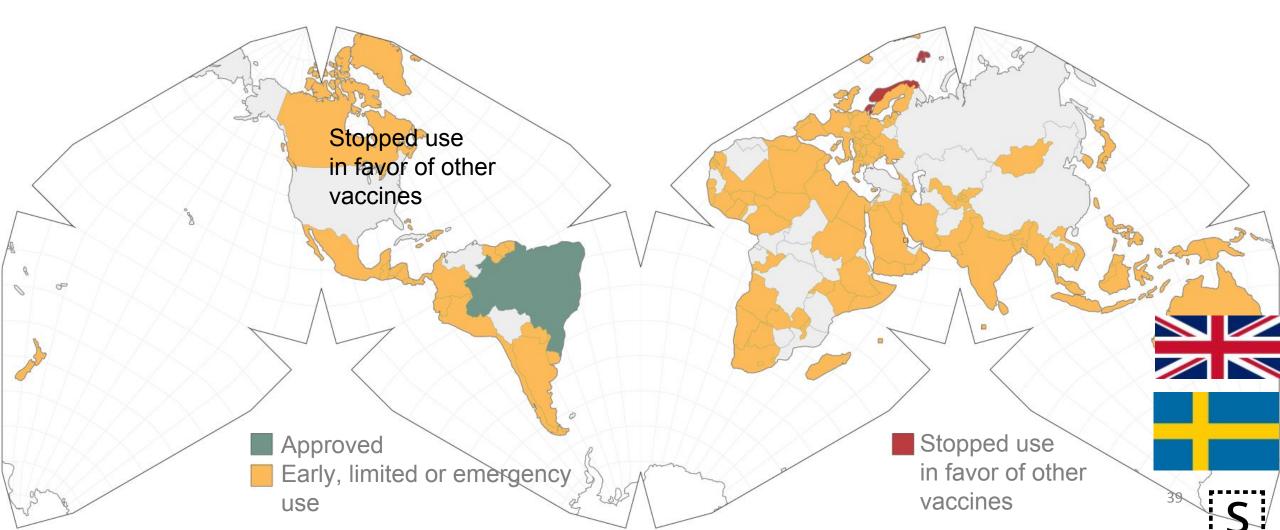
UNIVERSITY OF

AstraZeneca



Viral Vector Vaccines 02- the University of Oxford and AstraZeneca





Viral Vector Vaccines 03- CanSino Biologics and Academy of Military Medical Sciences.

PHASE 3
APPROVED IN CHINA
EMERGENCY USE IN OTHER COUNTRIES

VACCINE NAME: Convidecia (also known as Ad5-nCoV)

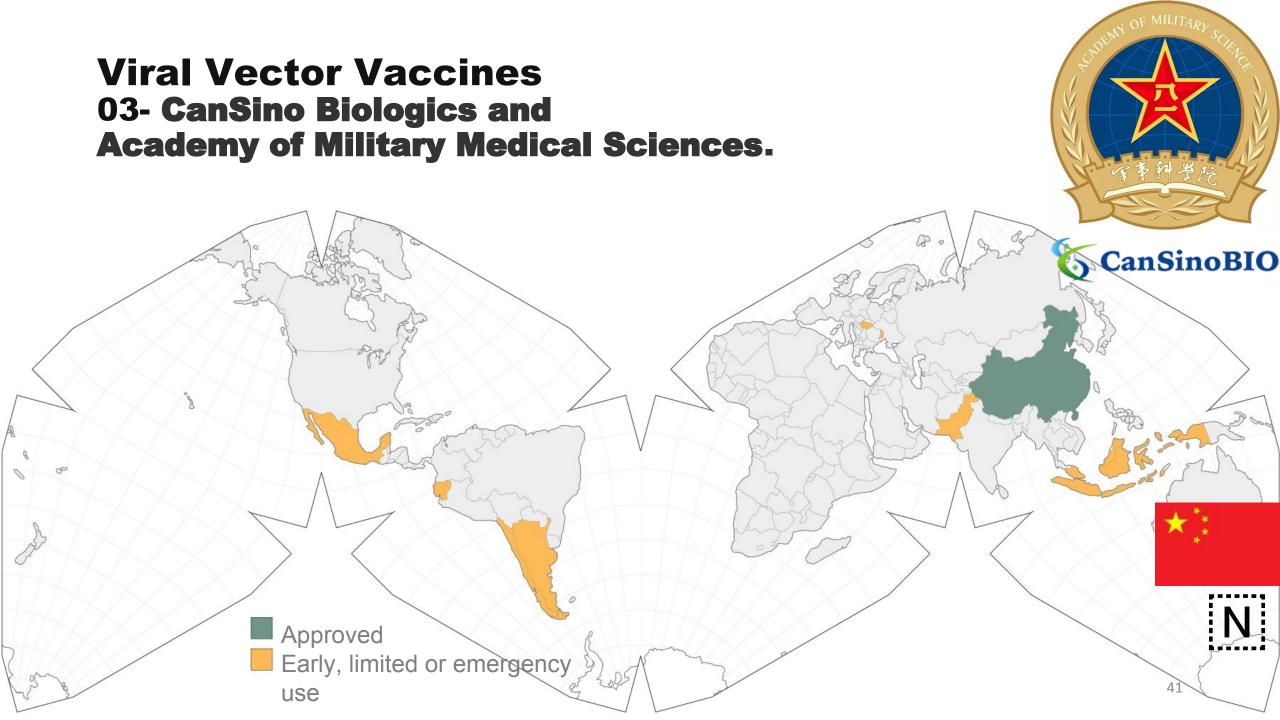
EFFICACY: 63.7% DOSE: Single dose

TYPE: Muscle injection STORAGE: Refrigerated









Viral Vector Vaccines 04- Beth Israel Deaconess Medical Center and Johnson & Johnson

PHASE 3
APPROVED IN CANADA
EMERGENCY USE IN U.S., ELSEWHERE

VACCINE NAME: Ad26.COV2.S

EFFICACY: 72% in United States, 68% in Brazil and 64% in South Africa

DOSE: 1 dose

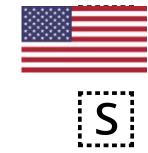
TYPE: Muscle injection

STORAGE: Up to two years frozen at -4° F (-20° C), and up to 6

months refrigerated at 36–46° F (2–8° C).

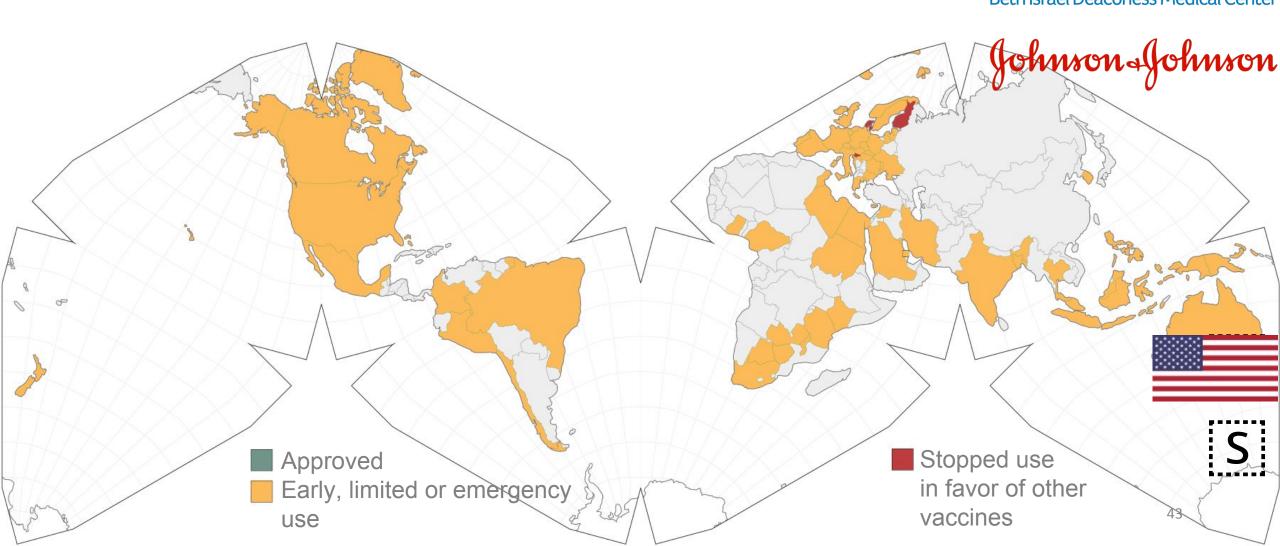






Viral Vector Vaccines 04- Beth Israel Deaconess Medical Center and Johnson & Johnson





Viral Vector Vaccines 05- University of Hong Kong and Xiamen University and Beijing Wantai Biological Pharmacy

PHASE 3

In 2019, researchers at the **University of Hong Kong** and **Xiamen University** <u>created</u> a nasal-spray vaccine for the flu based on a genetically weakened form of the influenza virus. In early 2020, they engineered the vaccine to produce part of the coronavirus spike protein as well. On Sept. 9, they received <u>approval</u> to start clinical trials in partnership with **Beijing Wantai Biological Pharmacy**. They <u>registered</u> a Phase 1 trial on March 22, 2021. At a June 11 press conference, a researcher for the Chinese Center for Disease Control and Prevention said that this vaccine has <u>completed</u>

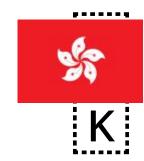
<u>Phase 2 trials</u>. And on Sept. 22, the researchers registered a <u>Phase 3 trial</u>. The researchers are receiving <u>\$5.4 million in support</u> from CEPI, the Coalition for Epidemic Preparedness Innovations.

Updated Oct. 13









Viral Vector Vaccines 06- ReiThera &

Lazzaro Spallanzani National Institute for Infectious Diseases

PHASE 2
PHASE 3
COMBINED PHASES

The Italian biotechnology company **ReiThera** has developed a Covid-19 vaccine, called GRAd-COV2, that is based on an adenovirus that infects gorillas. Working in collaboration with the **Lazzaro Spallanzani National Institute for Infectious Diseases** in Rome, they found that it produced strong levels of antibodies in <u>mice and monkeys</u>. In July 2020, they launched a <u>Phase 1 clinical trial</u>. In November, they <u>announced</u> that the vaccine was well tolerated and produced antibodies, and <u>released a report</u> on the trial.

In March 2021, researchers launched a <u>Phase 2 trial</u> of the vaccine, which delivered <u>encouraging results</u> in July. But it remained unclear if ReiThera would be able to advance to a final Phase 3 trial.

In May, Reuters reported, a court in Italy <u>struck down</u> the government's plan to fund the Phase 3 trial. The government later said it was <u>ready</u> to support the vaccine trial, but has yet to offer up the funds.



REITHERA

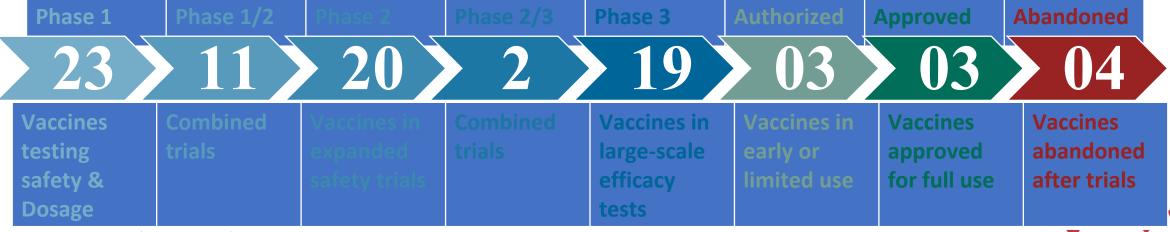
AZZARO SPALLANZAN

SISTEMA SANITARIO REGIONALE

IRCCS

Protein-based Vaccines

Vaccines that contain coronavirus proteins but no genetic material. Some vaccines contain whole proteins, and some contain fragments of them. Some pack many of these molecules on nanoparticles.



Currently testing: 50

Abandoned: 02

Preclinical: 42





Protein-Based Vaccines 01- Vector Institute EpiVacCorona, Aurora-CoV

PHASE 3
APPROVED IN TURKMENISTAN
EARLY USE IN RUSSIA

VACCINE NAME: EpiVacCorona, Aurora-CoV

EFFICACY: Unknown

DOSE: 2 doses, 3 weeks apart

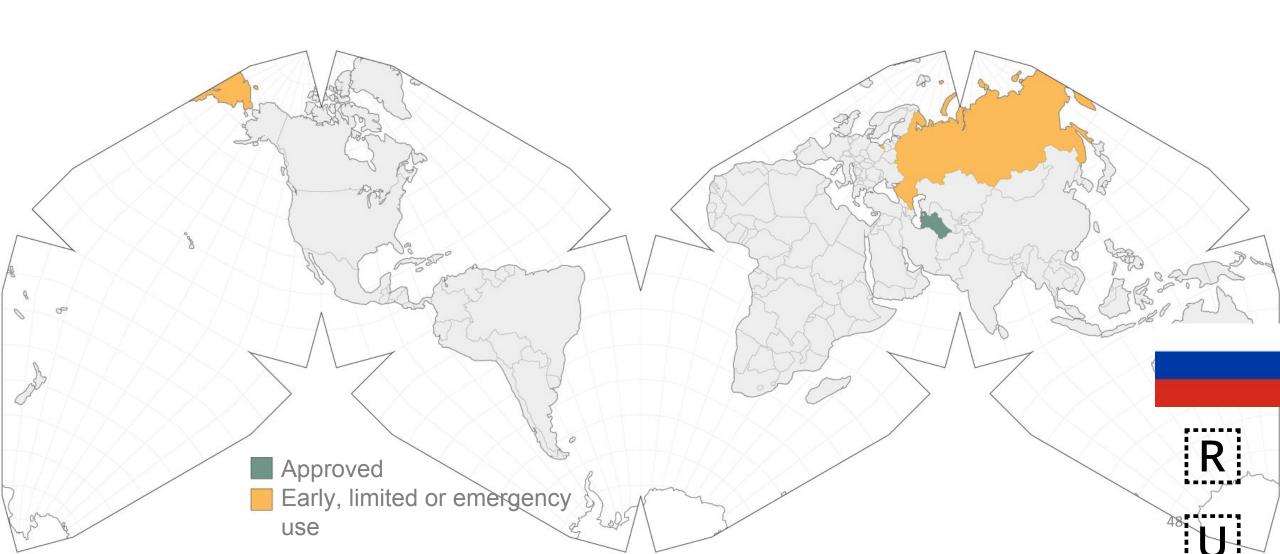
TYPE: Muscle injection

STORAGE: Stable in refrigerator for up to two years





Protein-Based Vaccines 01- **Vector Institute**





Ac C



PHASE 3

EMERGENCY USE IN SEVERAL COUNTRIES

VACCINE NAME: ZF2001,

Zifivax

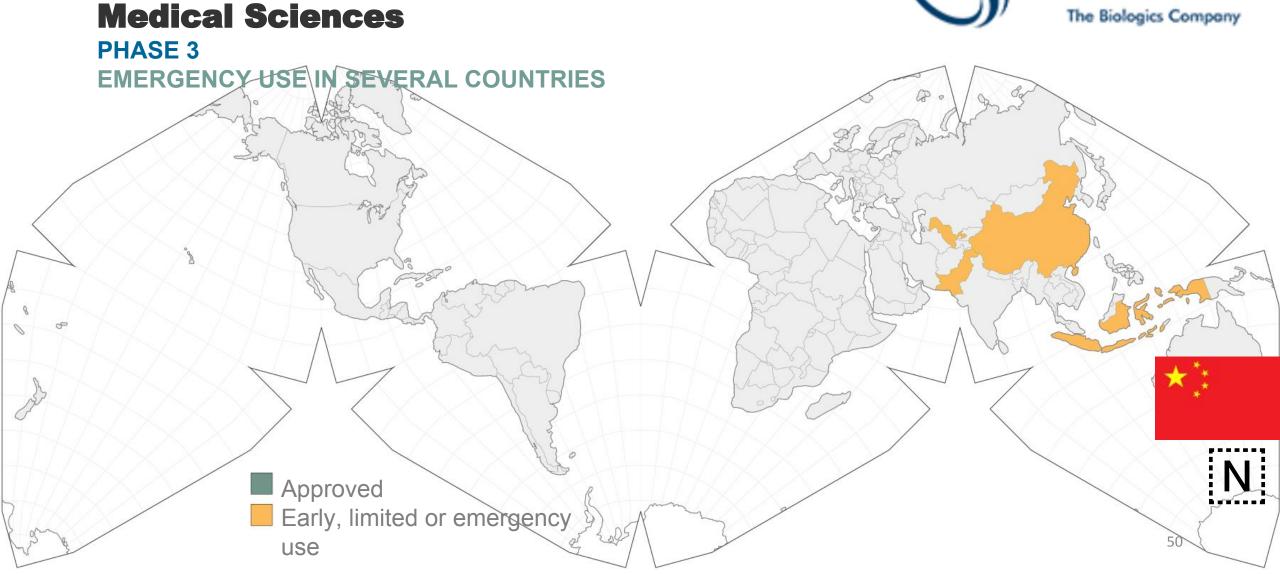
EFFICACY: <u>81.76%</u>

DOSE: 3 doses, 4 weeks apart

TYPE: Muscle injection







Protein-Based Vaccines 03- Finlay Vaccine Institute Soberana 2, or PastoCoVac (in Iran)

PHASE 3
EMERGENCY USE IN IRAN, CUBA

VACCINE NAME: Soberana 2, or PastoCoVac (in Iran)

EFFICACY: 71% with two doses, 92.4 % with Soberana

Plus booster

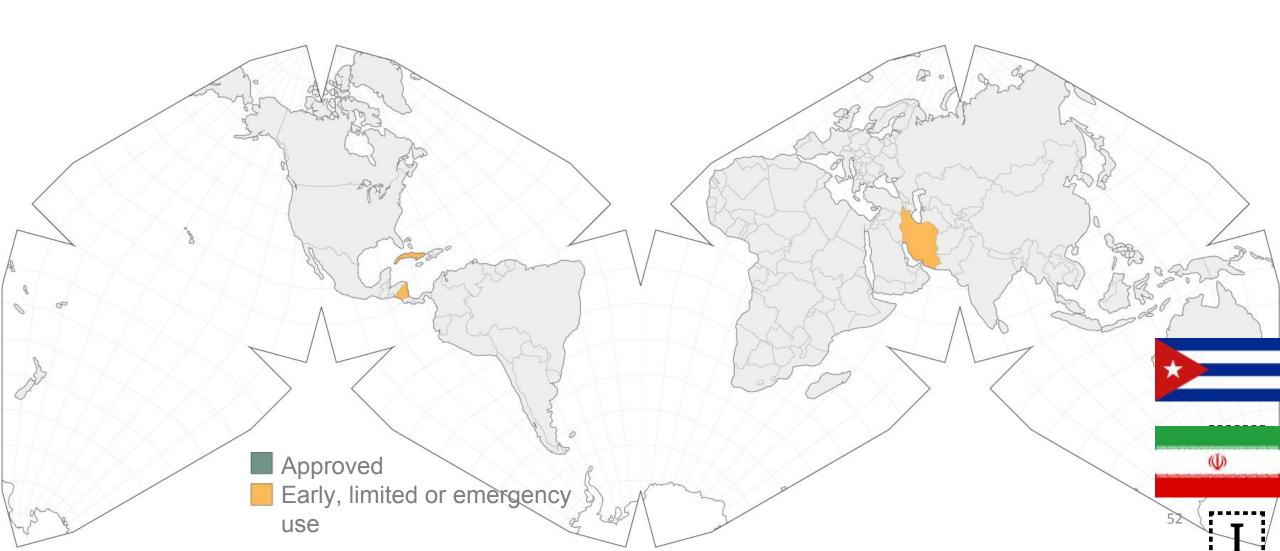














PHASE 3

EMERGENCY USE IN CUBA

VACCINE NAME: Abdala

EFFICACY: 92.28%







Protein-Based Vaccines 04- Center for Genetic Engineering and Biotechnology of Cuba



Protein-Based Vaccines 05- Dynavax & Medigen



PHASE 3 EMERGENCY USE IN TAIWAN

Taiwan-based vaccine maker **Medigen** created a vaccine containing a combination of spike proteins and an adjuvant from **Dynavax**. After a series of promising experiments on animals, they began injecting volunteers for a <u>Phase 1 trial</u> in <u>early October 2020</u>, which showed that the vaccine <u>provoked</u> strong immune responses. On Dec. 30, Medigen <u>announced</u> that it had received permission to commence a <u>Phase 2 trial</u>. The first volunteers in the trial <u>were injected</u> in late January 2021. In July, Medigen started another Phase 2 trial on <u>children between 12 and 18 years old</u>. Medigen received <u>permission</u> to begin a <u>Phase 3 trial</u> in Paraguay on July 20. And on Oct. 15, the researchers <u>registered a trial</u> to assess their vaccine's effectiveness as a booster for those who have received one dose of the Moderna shot. They <u>registered a similar trial</u> on Oct. 27 for adults with two doses of the AstraZeneca vaccine.

Taiwan granted <u>emergency use authorization</u> to the vaccine on July 19. Results from the Phase 2 trial <u>suggested</u> that volunteers were producing strong levels of antibodies and did not have serious advergactions. Taiwan <u>started administering</u> Medigen's vaccine on Aug. 23. By Oct. 22, Medigen <u>said</u> that 1,362,524 doses had been administered.

Protein-Based Vaccines 05- Dynavax & Medigen



INNOVATING IMMUNOLOGY



高端疫苗生物製劑股份有限公司 MEDIGEN VACCINE BIOLOGICS CORP



Protein-Based Vaccines 06- Vaxine & Cinnagen Spikogen

PHASE 3
EMERGENCY USE IN IRAN

VACCINE NAME: Covax-19, Spikogen

DOSE: 2 doses, 3 weeks apart

In June, 2021, Vaxine <u>launched</u> a <u>Phase 2 trial</u> in Iran, followed by a <u>Phase 3 trial</u>, <u>registered Aug. 13</u>. In October, Iran issued an <u>emergency authorization</u> for Spikogen, to be <u>produced</u> by the Iranian company CinnaGen. Official results of the Phase 3 trial are <u>expected</u> by the end of the year.





Protein-Based Vaccines 06- Vaxine & Cinnagen Spikogen









Protein-Based Vaccines 07- Novavax (also known as Covovax in India)

PHASE 3

EMERGENCY USE IN INDONESIA & Philippines

VACCINE NAME: NVX-CoV2373 (also known as

Covovax)

EFFICACY: <u>89.7%</u>

DOSE: 2 doses, 3 weeks apart

TYPE: Muscle injection

STORAGE: Stable in refrigerator

In July the U.S. government awarded Novavax another \$1.75 billion to support the vaccine's clinical trials and manufacturing.





Protein-Based Vaccines 07- Novavax



Protein-Based Vaccines 08- Medicago & gsk

PHASE 3

VACCINE NAME: CoVLP

EFFICACY: Unknown

DOSE: 2 doses, 3 weeks apart

TYPE: Muscle injection

STORAGE: Stable in refrigerator

medicago







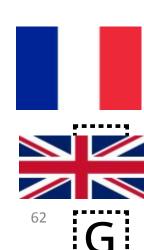
Protein-Based Vaccines gsk & Sanofi 10- Sanofi & gsk

PHASE 3

In early 2020, **Sanofi** developed a Covid-19 vaccine based on viral proteins they produced with engineered viruses that grow inside insect cells. **GSK** supplemented these proteins with adjuvants that stimulate the immune system. The vaccine, called Vidprevtyn, is based on the same design Sanofi used to create <u>Flublok</u>, an approved vaccine for influenza. The companies <u>launched</u> a Phase 1/2 clinical trial in September 2020.

Vidprevtyn was widely expected to play a major role in tackling the pandemic. In the United States, Operation Warp Speed selected it as one of six vaccines to secure in large quantities, reaching a \$2.1 billion agreement for 100 million doses. On Sept. 18 Sanofi closed another deal with the European Union for 300 million doses for an unspecified amount, and later reached an agreement with Canada for up to 72 million doses. In addition, Sanofi agreed to provide 200 million doses to COVAX, an international collaboration to deliver the vaccine equitably across the world. The company expected to move to a Phase 3 trial in December and potentially seek emergency use authorization for Vidprevtyn in the United States by spring 2021.

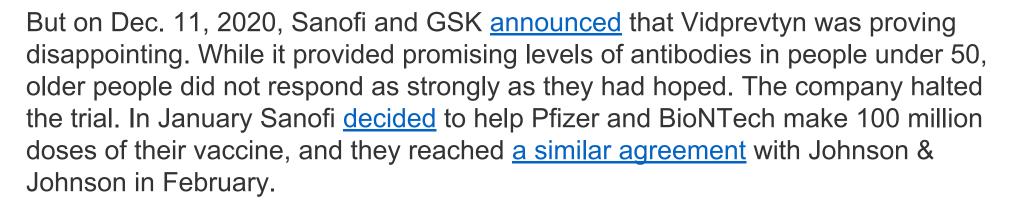






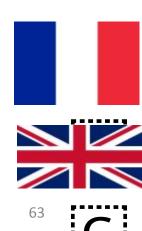
Protein-Based Vaccines gsk & Sanofi 10- Sanofi & gsk

PHASE 3



Meanwhile, Sanofi developed a stronger formulation of Vidprevtyn. On Feb. 22, the company <u>launched</u> a new <u>Phase 2 trial</u>, which showed that the new version <u>produced</u> strong immune responses. They began <u>enrolling participants</u> for their <u>Phase 3 trial</u> on May 27. On July 20, 2021, the European Medicines Agency started a <u>rolling review</u> of Vidprevtyn in advance of their application for authorization. In an earnings report on Oct. 28, Sanofi <u>said</u> it expected results from its new Phase 3 trial by the end of 2021.







Protein-Based Vaccines 11- West China Hospital of Sichuan University

PHASE 3

In July 2020, researchers at West China Hospital of Sichuan University published a study in Nature describing a vaccine made from the RBD region of the spike protein that could protect mice and monkeys from the coronavirus. To make the vaccine, researchers encoded the RBD region in a gene, which they inserted into a virus. They then infected insect cells with the virus, causing them to make the molecule in huge amounts. On Aug. 24, they launched a Phase 1 trial, and on Nov. 16 they moved to Phase 2 with a study on 960 volunteers. On Jan. 22, 2021, the researchers registered another Phase 2 trial with 4,000 volunteers. A Phase 3 trial began on June 1. **Updated June 1**





Protein-Based Vaccines 12- Nanogen Biopharmaceutical

PHASE 3

On Dec. 10, 2020, Nanogen Biopharmaceutical in Vietnam began recruiting 60 volunteers for a Phase 1 trial of their protein-based vaccine Nanocovax. Vietnam news agencies announced that Nanocovax entered a Phase 2 trial in February, 2021. Nanogen researchers reported that in these early studies, the vaccine did not cause any dangerous side effects and promising levels of antibodies. In June, Nanogen <u>launched</u> a <u>Phase 3 trial</u>. Updated Oct. 19







PHASE 3

EMERGENCY USE IN INDONESIA & Philippines

VACCINE NAME: Soberana 2, or PastoCoVac (in Iran)

EFFICACY: 71% with two doses, 92.4 % with Soberana Plus booster

On June 29, Iran's health minister announced that Soberana 2 has received emergency use approval. The **Pasteur Institute of Iran** is marketing the vaccine in the country as <u>PastoCoVac</u>.

On Aug. 20, 2021, the Cuban government <u>announced</u> the <u>emergency authorization</u> of both Soberana 2 and Soberana Plus. Just two weeks later, on September 2, Cuba authorized Soberana 2 <u>for children</u> between the age of 2 and 18. In their announcement, Cuban regulators said that the immune response in children was similar to adults who received Soberana 2.

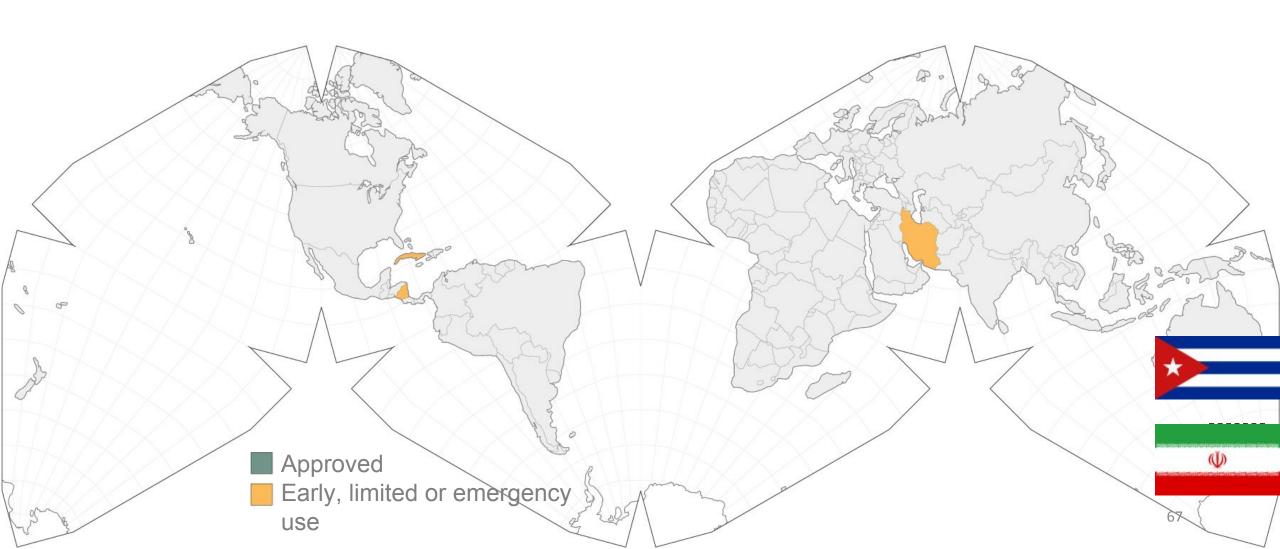
EMERGENCY USE IN: <u>Cuba</u>, <u>Iran</u>, <u>Nicaragua</u>. Updated Nov. 4













Protein-Based Vaccines 14- University of Washington & SK Bioscience & gsk

PHASE 3

Last spring, researchers at the University of Washington developed a nanoparticle studded with pieces of the coronavirus spike protein. Experiments on mice showed a strong immune response. The South Korean vaccine company **SK Bioscience** <u>licensed</u> the vaccine, called <u>GBP510</u>. After <u>partnering with GSK</u>, they launched a <u>Phase 1/2</u> trial of the vaccine in February 2021. Genetic Engineering and Biotechnology News reported that people who received the vaccines made five to eight times more antibodies than people who recovered from Covid-19. SK Bioscience has received \$210.1 million from the Coalition for Epidemic Preparedness Innovations for the development of GBP510. In August, the company launched a Phase 3 trial, comparing GBP510 to AstraZeneca's Vaxzevria vaccine. SK Bioscience expects results in the first half of 2022.

Updated Nov. 4







PHASE 3



A subsidiary of Chinese company Livzon Pharmaceutical Group has developed a protein vaccine in collaboration with the Institute of Biophysics at the Chinese Academy of Sciences. Called V-01, the vaccine completed Phase 1 and 2 trials earlier in 2021. A Phase 3 trial began in the Philippines on Aug. 25 and expanded to Russia in November. They <u>registered</u> a booster trial of the vaccine on Sept. 20, and registered another study to gauge its effectiveness as a booster in adults who received BBIBP-CorV or CoronaVac on Oct. 27.







PHASE 3
EMERGENCY USE IN IRAN

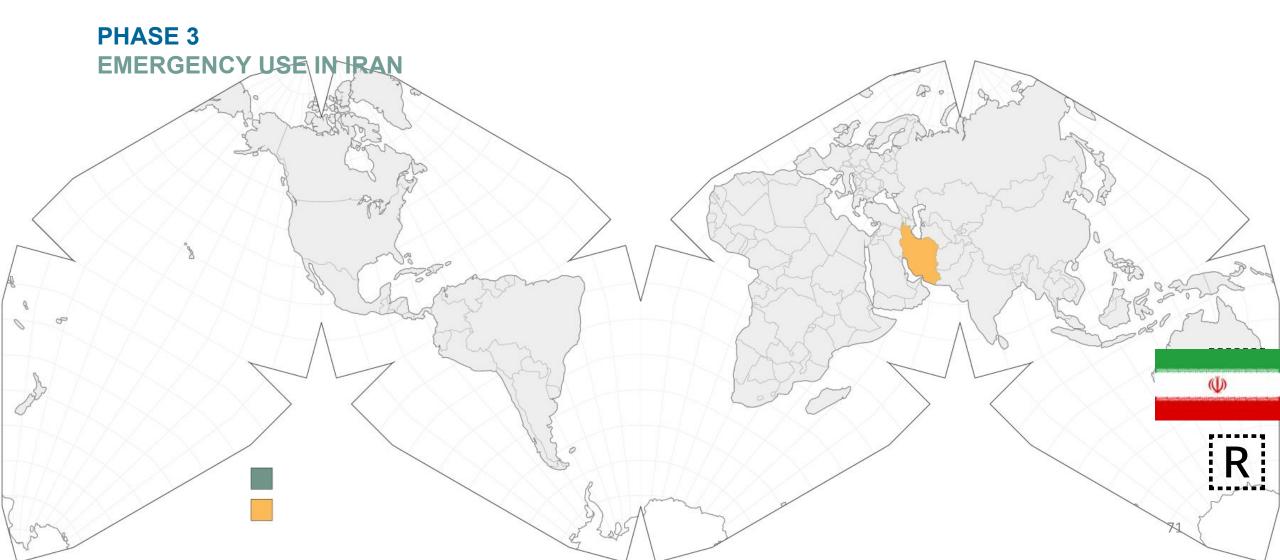
On Feb. 7, 2021, Iran <u>announced</u> that it was launching <u>a clinical</u> trial of a second vaccine, known as Cov-Pars Razi and developed by the Razi Vaccine and Serum Research Institute. The vaccine contains fragments of coronavirus spike proteins and is delivered in three doses: two injections and one nasal spray. The researchers began dosing participants for their Phase 2 trial on May 28. In July Razi officials promised that they would be able to produce at least one million doses of the vaccine every month. At the end of August, Iran rolled out a Phase 3 trial. The Tehran Times reported on Oct. 12 that a nasal dose of the vaccine reduces the transmission of the virus by as much as 90 percent.

K

Nasal phase is withdrawn

Protein-Based Vaccines 16- Razi Vaccine and Serum Research Institute





Protein-Based Vaccines 17- Zhongyianke Biotech, Liaoning Maokangyuan Biotech Academy of Military Medical Sciences

PHASE 3

Researchers at Zhongyianke Biotech, Liaoning Maokangyuan Biotech and the Academy of Military Medical Sciences are using Chinese hamster ovary cells to help create immunity in humans. They registered a **Phase 1 trial** in China last November. On March 24, they advanced the vaccine to Phase 2. The researchers registered a Phase 3 trial on Sept. 5.



LANZHOU INSTITUTE OF BIOLOGICAL PRODUCTS CO., L

Protein-Based Vaccines

18- Lanzhou Institute of Biological Products, Beijing Zhong Sheng Heng Yi Pharmaceutical Technology and Zhengzhou University

PHASE 3

Researchers at the Lanzhou Institute of Biological Products, Beijing Zhong Sheng Heng Yi Pharmaceutical Technology and Zhengzhou University are testing a vaccine that is grown in Chinese hamster ovary cells. They registered a **Phase** 1/2 trial on May 3. In October they registered a Phase 3 trial to test their vaccine as a booster for an inactivated virus vaccine.



Updated Oct. 19

Protein-Based Vaccines 19- Clover Biopharmaceuticals & Dynavax



PHASE 2
PHASE 3
COMBINED PHASES

VACCINE NAME: SCB-2019

EFFICACY: 79 percent against disease from the Delta

variant, 100 percent against hospitalization

DOSE: 2 doses, 3 weeks apart

TYPE: Muscle injection

STORAGE: Stable at 2-8 degrees C for 6 months, room

temperature for one month



Protein-Based Vaccines 20- Shionogi & National Institute of Infectious **Kyushu University**

PHASE 2 PHASE 3 **COMBINED PHASES**



SHIONOGI

Shionogi, a Japanese pharmaceutical giant, <u>launched</u> a Phase 1/2 trial of a coronavirus vaccine on Dec. 16. The company developed it in collaboration with the National Institute of Infectious Diseases and Kyushu University. The vaccine is based on a coronavirus protein which is produced in insect cells by genetically altered viruses. But according to a March report from The Japan Times, Shionogi has faced difficulties with recruiting enough participants for its trials, and it is unlikely that the vaccine will be ready by the end of 2021. In a slide deck from its Aug. 2 conference call with investors, Shionogi said that it is using a new adjuvant with its vaccine after receiving disappointing preliminary results from the original trial. A new Phase 1/2 trial began in July 2021, they said. On Oct. 21, the company announced that it had moved to a Phase 2/3 trial.



Updated Oct. 30



Protein-Based Vaccines 21- Vaxxinity

PHASE 2

Dallas-based **Vaxxinity** is testing a vaccine called UB-612 containing parts of several viral proteins. (Vaxxinity <u>formed</u> in April 2021 when the companies COVAXX and United Neuroscience combined.)

On Sept. 11, 2020, COVAXX registered a Phase 1 trial in Taiwan which led to 100 percent of volunteers producing antibodies without any serious side effects. In February COVAXX launched a Phase 2 trial, also in Taiwan, as well as a Phase 2/3 trial in Brazil, India and other countries. On Nov. 25, Covaxx announced agreements with countries including Brazil, Ecuador, and Peru to deliver more than 140 million doses for \$2.8 billion. In a June 21 press release, Vaxxinity said it expected to deliver the vaccine by the end of the summer, but in August, Taiwan regulators rejected their application for emergency authorization. In Vaxxinity's October filing for an initial public offering, the company said it was appealing the decision. The chief executive said in an interview with Fortune that same month that the company had gained permission to test the vaccine in the United States.



Protein-Based Vaccines 22- Middle East Technical University and Bilkent University

PHASE 2

A team of Turkish researchers at Middle East Technical University and Bilkent University have developed a vaccine that is made up of virus-like particles. Each particle carries four of the coronavirus proteins. On March 26, they registered a small Phase 1 trial sponsored by TUBITAK, the Scientific and Technological Research Council of Turkey. The researchers registered a Phase 2 trial of the vaccine on July 15.

Updated July 15



Protein-Based Vaccines 23- Shanghai Zerun Biotechnology and Walvax Biotechnology

上海泽润生物科技有限公司 Shanghai Zerun Biotechnology Co.,Ltd.



PHASE 2

Chinese researchers at **Shanghai Zerun** Biotechnology and Walvax Biotechnology have modified the structure of the coronavirus spike protein to better stimulate an immune response from their vaccine. They registered a Phase 1 trial for their prototype vaccine, called 202-CoV, in China on July 29. On Aug. 4, they registered a Phase 2 trial. ZerunBio and Walvax announced on July 21 that they are also partnering with CEPI, the Coalition for Epidemic Preparedness Innovations, to support the development of 202-CoV and to create a variant vaccine using the same technology



Protein-Based Vaccines 24- Bavarian Nordic



PHASE 2

As part of the European Union-funded PREVENT-nCoV consortium, a team of biotechnology companies and research laboratories developed a vaccine against Covid-19. It contains a coronavirus protein called nucleocapsid. The vaccine, called ABNCoV2, uses technology from consortium members AdaptVac and ExpreS²ion, among others. After promising preclinical results in primates, Bavarian Nordic announced that it would proceed with a Phase 1/2 trial of the vaccine in the Netherlands. The first volunteers received doses of the vaccine on March 15. On Aug. 9, the researchers said that the trial showed ABNCoV2 produced high levels of antibodies without dangerous side effects. Later that month, Bavarian Nordic launched Phase 2 trials of the vaccine, both as an initial protection against Covid-19 and as a booster for other vaccines



Protein-Based Vaccines 25- University of Tubingen

PHASE 2

In early 2020, researchers at the University of **Tübingen** in Germany <u>created</u> a vaccine made of eight parts of two viral proteins, along with an immune-stimulating adjuvant. In September they launched a Phase 1 trial. On Oct. 28, the researchers announced that the vaccine was entering Phase 2 trials.

Updated Nov. 1



Protein-Based Vaccines 26- Baqiyatallah University of Medical Sciences

PHASE 2

Iranian researchers at the Baqiyatallah University of Medical Sciences developed a protein-based vaccine against the coronavirus. On June 27, 2021, the Islamic Revolutionary Guard Corps announced that the vaccine, called Noora, had entered Phase 1 trials. The researchers registered a Phase 2 trial on Oct.

Updated Oct. 20



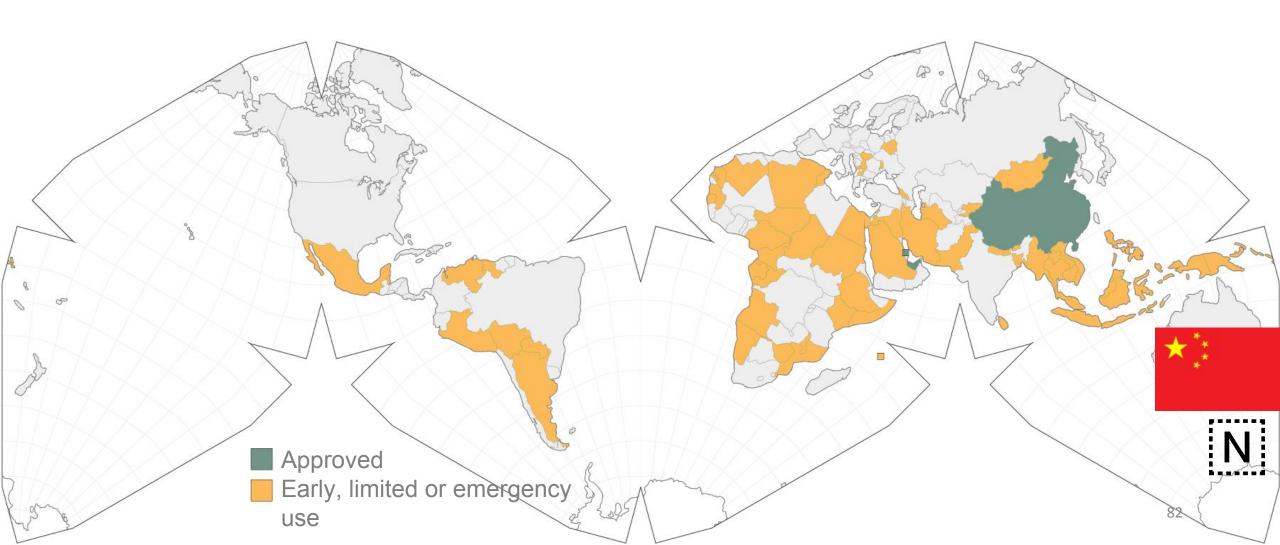


Noora Vaccine

Recombinant COVID -19 Vaccine(80µg/0.5ml)



Inactivated or attenuated Vaccines 01- Sinopharm





Inactivated or attenuated Vaccines 02- Sinovac CoronaVac (formerly PiCoVacc)

PHASE 3
APPROVED IN CHINA
EMERGENCY USE IN OTHER COUNTRIES

VACCINE NAME: CoronaVac (formerly PiCoVacc)

EFFICACY: 50.65% in Brazil trial, 83.5% in Turkey trial

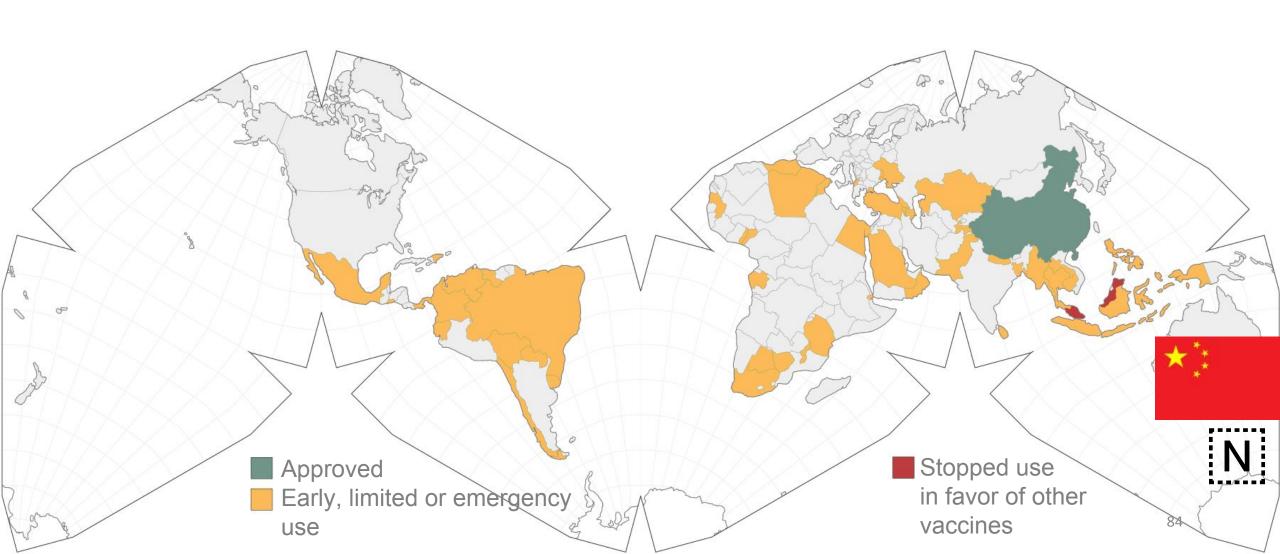
DOSE: 2 doses, 2 weeks apart

TYPE: Muscle injection STORAGE: Refrigerated





Inactivated or attenuated Vaccines 02- Sinovac



Inactivated or attenuated Vaccines 03- Sinopharm & Wuhan Institute of Biological Products



PHASE 3
APPROVED IN CHINA
LIMITED USE IN U.A.E.

EFFICACY: <u>72.8%</u>

Along with their Beijing Institute vaccine, **Sinopharm** also tested an inactivated virus vaccine by the **Wuhan Institute of Biological Products**. The Phase 1/2 trial showed the vaccine produced antibodies in volunteers, some of whom experienced fevers and other side effects. Sinopharm then launched a global Phase 3 trial of the Wuhan vaccine. In December, Peru briefly paused their trial to investigate neurological problems that one volunteer experienced, but determined that it had nothing to do with the vaccines. On Feb. 25, China announced the approval of the Wuhan vaccine for general use. In May, the vaccine researchers published the results of the Phase 3 trial, demonstrating that the vaccine has an efficacy of 72.8 percent.

APPROVED FOR USE IN: China.

LIMITED USE IN: United Arab Emirates.



Inactivated or attenuated Vaccines 03- Sinopharm & Wuhan Institute of Biological Products





Inactivated or attenuated Vaccines 04- Bharat Biotech & Indian Council of Medical Research and the National Institute of Virology

PHASE 3

EMERGENCY USE IN INDIA, ELSEWHERE

VACCINE NAME: Covaxin (also known as BBV152 A, B,

C)

EFFICACY: <u>77.8</u>%

DOSE: 2 doses, 4 weeks apart

STORAGE: At least a week at room temperature





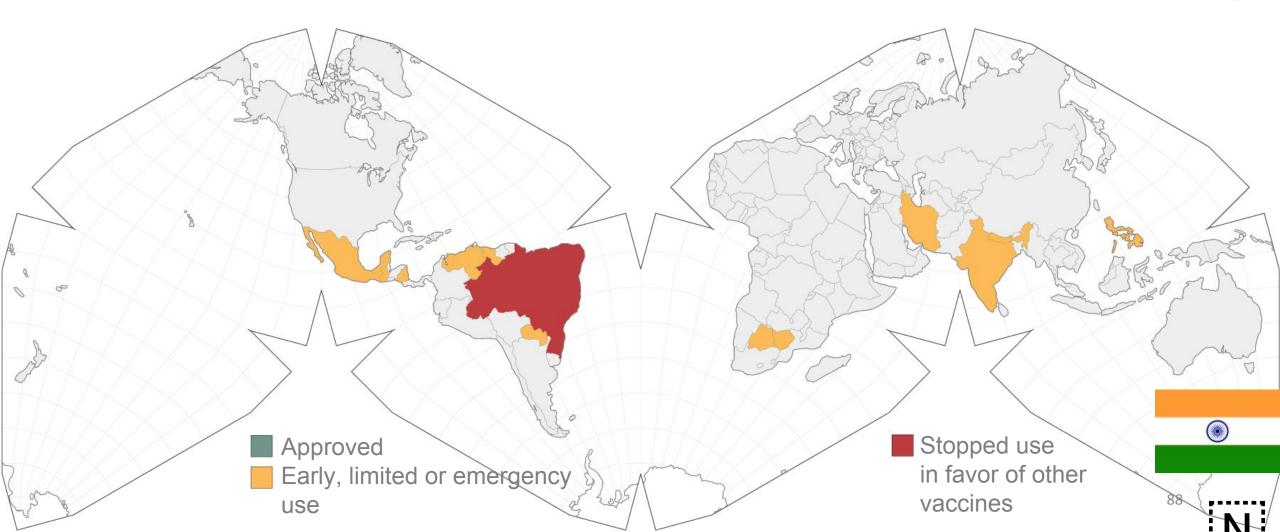


Inactivated or attenuated Vaccines 04- Bharat Biotech & Indian Council of Medical Research and the National Institute of Virology









Inactivated or attenuated Vaccines 05- Research Institute for Biological Safety QazVac



PHASE 3
EARLY USE IN KAZAKHSTAN

The central Asian nation of Kazakhstan <u>began research</u> on a vaccine made from inactivated coronaviruses over the summer. On August 28, 2020, their **Research Institute for Biological Safety Problems** <u>registered</u> a Phase 1 trial on the vaccine. On Dec. 19, Kazinform <u>reported</u> that researchers had completed the Phase 2 trial, finding that the vaccine was safe and produced a promising immune response. The researchers <u>commenced</u> a <u>Phase 3 trial</u> in March, 2021. Kazakhstan's vice minister of education and science announced that the vaccine, known as QazVac, was <u>expected</u> to be authorized in April, despite the lack of published results from the Phase 3 trial.

Kazakhstan began <u>administering its vaccine</u> to the public in late April. On July 29, governn officials <u>announced</u> that they would deliver 25,000 doses of the vaccine to neighboring country. Kyrgyzstan.

Inactivated or attenuated Vaccines 05- Research Institute for Biological Safety Problems

RIBSP



Inactivated or attenuated Vaccine 6 06- Shenzhen Kangtai Biological Products KCONVAC, KconecaVac

PHASE 3
EMERGENCY USE IN CHINA

Shenzhen Kangtai Biological Products is a Chinese company that makes vaccines for diseases such as hepatitis B and measles. In August 2020, AstraZeneca reached an agreement with Shenzhen to supply China with their adenovirus vaccine, despite the reports of corruption and scandals that have plagued the company. In October Shenzhen Kangtai launched a Phase 1 trial on 180 volunteers of its own vaccine, based on inactivated coronaviruses. In February 2021 the company ran a Phase 2 trial, followed by a Phase 3 trial launched in May, with an expected completion in November 2021. In May, the company also announced that the Chinese government had given it emergency use approval, despite the lack of Phase 3 results. The first volunteers in the trial received injections on June 21 in Malaysia.

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EMERGENCY USE IN: China. Updated Oct. 30

Inactivated or attenuated Vaccines 06- Shenzhen Kangtai Biological Products







Inactivated or attenuated Vaccines 07- Shafa Pharmed Pars COVIran Barekat

PHASE 3

EMERGENCY USE IN IRAN

Shafa Pharmed Pars, an Iranian pharmaceutical company, developed a vaccine made of inactivated coronaviruses. Results from preclinical trials showed that the vaccine was safe and effective in animals. Known as COVIran Barekat, it entered a Phase 1 trial at the end of December, becoming the first vaccine developed in Iran to go into clinical testing. COVIran Barekat began a Phase 3 trial on April 25, 2021, and on June 14, the Iranian government announced it had authorized the vaccine, despite the fact that many volunteers in the Phase 3 trial had not yet received their second dose. On June 25, Ayatollah Khamenei received the COVIran Barekat vaccine on television. Tehran Times reported that COVIran would begin a clinical trial on adolescents in November.

EMERGENCY USE IN: Iran.

Inactivated or attenuated Vaccines 07- Shafa Pharmed Pars

Shafa Pharmed Pars



Coronavirus (COVID-19) Update: FDA Takes Additional Actions on the Use of a Booster Dose for COVID-19 Vaccines



More Press Announcements

For Immediate Release:

October 20, 2021

Español

Today, the U.S. Food and Drug Administration took action to expand the use of a booster dose for COVID-19 vaccines in eligible populations. The agency is amending the emergency use authorizations (EUA) for COVID-19 vaccines to allow for the use of a single booster dose as follows:

- The use of a single booster dose of the Moderna COVID-19 Vaccine that may be administered at least 6 months after completion of the primary series to individuals:
 - o 65 years of age and older
 - o 18 through 64 years of age at high risk of severe COVID-19
 - 18 through 64 years of age with frequent institutional or occupational exposure to SARS-CoV-2
- The use of a single booster dose of the Janssen (Johnson and Johnson) COVID-19
 Vaccine may be administered at least 2 months after completion of the single-dose primary regimen to individuals 18 years of age and older.

Content current as of:

10/20/2021

Regulated Product(s)

Biologics

Health Topic(s)

Infectious Disease Coronavirus

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Coronavirus (COVID-19) Update: FDA Expands Eligibility for COVID-19 Vaccine Boosters





For Immediate Release: November 19, 2021

Español

Today, the U.S. Food and Drug Administration amended the emergency use authorizations (EUA) for both the Moderna and Pfizer-BioNTech COVID-19 vaccines authorizing use of a single booster dose for all individuals 18 years of age and older after completion of primary vaccination with any FDA-authorized or approved COVID-19 vaccine. The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices will meet later today to discuss further clinical recommendations.

"Throughout the course of the COVID-19 pandemic, the FDA has worked to make timely public health decisions as the pandemic evolves. COVID-19 vaccines have proven to be the best and highly effective defense against COVID-19. Authorizing the use of a single booster dose of either the Moderna or Pfizer-BioNTech COVID-19 vaccine for individuals 18 years of age and older helps to provide continued protection against COVID-19, including the

Content current as of:

11/19/2021

Regulated Product(s)

Biologics

Health Topic(s)

Infectious Disease Coronavirus

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Coronavirus (COVID-19) Update: FDA Expands Eligibility for COVID-19 Vaccine Boosters

Prior to today's authorizations, a single booster dose of the Moderna and Pfizer-BioNTech COVID-19 vaccines was authorized for administration to individuals 65 years of age and older, individuals 18 through 64 years of age at high risk of severe COVID-19 and individuals 18 through 64 years of age with frequent institutional or occupational exposure to SARS-CoV-2. Today's action expands the use of booster doses of both vaccines to include all individuals 18 years of age and older at least six months after completion of the primary vaccination series of the Moderna COVID-19 Vaccine or Pfizer-BioNTech COVID-19 Vaccine or at least two months after completion of primary vaccination with the Janssen COVID-19 Vaccine.





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COVID-19 Vaccine Booster Shots

Updated Nov. 29, 2021

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NEW Everyone ages 18 and older should get a booster shot

Everyone Ages 18 and Older Should Get a Booster Shot

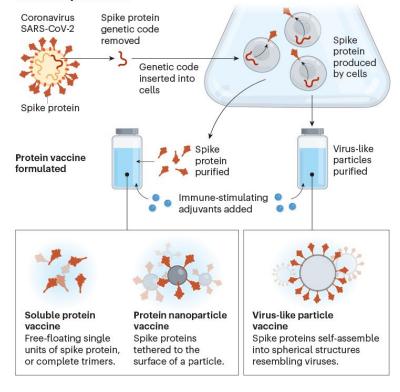
nature How protein-based COVID vaccines could change the pandemic

ONES TO WATCH: VACCINE MAKERS WITH PROTEIN JABS IN LATE-STAGE CLINICAL TRIALS				
Company	Location	Vaccine type	Cell manufacturing system	
Biological E	Hyderabad, India	Soluble protein	Microbial cells (yeast)	
Clover	Chengdu, China	Soluble protein	Mammalian cells (hamster ovary)	
Medicago	Quebec City, Canada	Virus-like particle	Plant cells (tobacco-like <i>Nicotiana</i> benthamiana)	
Novavax	Gaithersburg, Maryland	Protein nanoparticle	Insect cells (fall armyworm)	
Sanofi/GSK	Paris/Brentford, UK	Soluble protein	Insect cells (fall armyworm)	
SK bioscience	Seongnam, South Korea	Protein nanoparticle	Mammalian cells (human)	

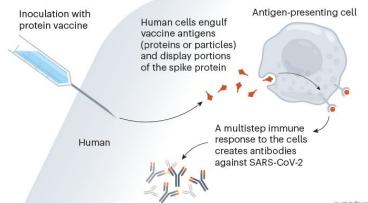
PROTEIN VACCINES 101

There are a number of ways to formulate a protein-based COVID-19 vaccine, including using free-floating protein or tethering protein to a nanoparticle. Many vaccines are based on the coronavirus's spike protein, but some use only a key part of the protein, called the receptor-binding domain.

1. Vaccine production



2. Vaccine administration



Location 0	Total doses per 100 residents >	Percent vaccinated (at least one dose) \$	Percent fully vaccinated \$	Total doses given \$	Latest update \$
Cuba	252.0	89.9		28.5m	Dec 3
UAE	221.1			21.9m	Nov 30
Chile	216.1	88.3		41.3m	Dec 3
Uruguay	196.0	79.2		6.8m	Dec 3
Malta	187.1	84.5	83.8	1m	Dec 2
Iceland	181.5	78.0	76.8	0.7m	Dec 2
China	180.0			2.5bn	Dec 2
Singapore	177.3	89.2	88.2	10.1m	Nov 5
Israel	176.0	68.9	62.7	16.2m	Dec 2
UK	174.3	76.1	69.3	116.9m	Dec 2
Qatar	173.4			5m	Dec 2
Bahrain	173.3	69.9	68.2	2.9m	Dec 2
Cambodia	172.5	84.7	80.2	28.8m	Dec 2
Brunei	172.0	92.3	79.7	0.8m	Dec 1
Puerto Rico	170.9	85.3	74.3	5.5m	Dec 3
Portugal	170.8	88.3		17.6m	Nov 28
Denmark	169.3	78.5	76.5	9.9m	Dec 1
Malaysia	166.7	79.9	78.6	54m	Dec 3
Ireland	166.2	77.3	76.0	8.3m	Dec 1
South Korea	165.9	82.3	79.6	85.9m	Dec 2
northern Cypru	165.7	76.3	74.1	0.6m	Nov 26
Italy	163.6	79.4	74.1	97.4m	Dec 2
Spain	162.9	81.1	79.5	77.2m	Dec 2
Canada	162.5	86.0	76.5	61.8m	Dec 3
Norway	162.3	78.9	71.4	8.7m	Dec 1
Austria	159.1	71.5	67.3	14.2m	Dec 2
France	158.8	77.2	70.2	107m	Dec 2
Japan	156.9	79.4	77.5	197.4m	Dec 2
Sweden	154.4	73.4	69.2	16m	Dec 2
Kuwait	154.0	77.4	74.1	6.6m	Nov 30
Australia	153.7	78.1	73.6	39.5m	Dec 2
Argentina	152.7	81.2	66.1	69.3m	Dec 2
G7	151 0	74 3	66.9	1 2hn	Dec.3

• At least **8.12bn** doses of coronavirus vaccines have been administered around the world, data from 233 locations show.

Dec 04, 2021

FINANCIAL TIMES

Location 0	Total doses per 100 residents v	Percent vaccinated (at least one dose)	Percent fully vaccinated \$	Total dose give	
Saudi Arabia	136.3	70.7	64.5	47.4m	Dec 1
Sri Lanka	135.4	72.7	62.7	29.7m	Dec 2
Greece	135.3	66.1	61.9	14.5m	Dec 2
Taiwan	134.8	77.4	57.4	31.8m	Dec 1
Mongolia	134.6	69.0	65.7	4.4m	Dec 2
Thailand	134.3	69.5	59.8	93.8m	Dec 2
Lithuania	133.9	67.1	63.9	3.7m	Dec 2
Morocco	132.4	66.4	61.7	48.9m	Nov 29
Peru	129.7	69.1		42.8m	Dec 3
New Caledonia	128.8	66.6	62.2	350.4k	Nov 30
Slovenia	128.6	58.7	55.0	2.7m	Dec 2
Vietnam	128.6	74.4	54.2	125.2m	Dec 1
Czech Republic	128.0	62.4	59.8	13.7m	Dec 2
Dominican Republic	127.6	63.4		13.8m	Dec 3
Hong Kong	126.7	63.7	60.7	9.5m	Dec 2
Turkmenistan	125.7	72.5	53.2	7.6m	Aug 29
Iran	124.7	68.3	55.4	104.8m	Nov 28
Latvia	116.2	67.3	63.1	2.2m	Dec 2
Oman	116.2	64.8	55.4	5.9m	Nov 23
Serbia	114.4	47.2	45.2	7.9m	Nov 30
Colombia	113.8			57.9m	Dec 3
French Polynesia	113.5	58.0	55.5	318.8k	Nov 30
Estonia	111.5	62.3	59.4	1.5m	Dec 2
Poland	111.3	55.1	53.9	42.2m	Dec 2
Azerbaijan	104.9	50.3	45.3	10.6m	Dec 2
Belize	103.6	57.5		412k	Dec 3
Mexico	103.4	60.0		133.3m	Dec 3
Croatia	103.3	54.2	48.2	4.2m	Dec 1
Barbados	101.1	53.5		290.7k	Dec 3
Uzbekistan	99.9	51.7		34.2m	Dec 2
Cabo Verde	97.9	53.4	44.4	0.5m	Nov 26
Nicaragua	96.3	61.2		6.4m	Dec 3
Venezuela	92.5	57.7		26.3m	Dec 3
1946 200 0	Control of the Control	72.7		7.2	120 120

• IRAN:

- Total doses given per 100: 125
- Percent vaccinated(at least one dose): 70%
- Percent fully vaccinated: 58.5%
- Total doses given: 110m

FINANCIAL TIMES

Dec 04, 2021

Location 0	Total doses per 100 residents \$	Percent vaccinated (at least one dose) \$\displaystyle{\pi}\$	Percent fully vaccinated \$	Total doses given ✓	Latest update \$
China	180.0			2.5bn	Dec 2
India	91.0	57.6	33.4	1.3bn	Dec 2
G7	151.0	74.3	66.9	1.2bn	Dec 3
European Union	145.0	70.9	67.3	648.8m	Dec 3
US	138.8	69.9	59.0	460.2m	Dec 3
Brazil	147.2			312.8m	Dec 3
Indonesia	87.6	51.7	35.8	239.5m	Dec 2
Japan	156.9	79.4	77.5	197.4m	Dec 2
Mexico	103.4	60.0		133.3m	Dec 3
Russia	89.1	46.7	40.0	128.4m	Dec 2
Germany	150.8	71.6	68.7	125.5m	Dec 2
Vietnam	128.6	74.4	54.2	125.2m	Dec 1
Pakistan	56.5	36.7	23.2	124.8m	Dec 2
Turkey	143.0	66.8	59.9	120.6m	Dec 2
UK	174.3	76.1	69.3	116.9m	Dec 2
France	158.8	77.2	70.2	107m	Dec 2
Iran	124.7	68.3	55.4	104.8m	Nov 28
Bangladesh	60.6	38.0	22.6	99.9m	Dec 2
Italy	163.6	79.4	74.1	97.4m	Dec 2
Thailand	134.3	69.5	59.8	93.8m	Dec 2
Philippines	82.3		34.1	90.2m	Dec 2
South Korea	165.9	82.3	79.6	85.9m	Dec 2
Spain	162.9	81.1	79.5	77.2m	Dec 2

Total doses given

FINANCIAL TIMES

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Hong Kong	126.7	63.7	60.7	9.5m	Dec 2
Turkey	143.0	66.8	59.9	120.6m	Dec 2
Hungary	146.5	62.8	59.9	14.3m	Nov 29
Thailand	134.3	69.5	59.8	93.8m	Dec 2
Czech Republic	128.0	62.4	59.8	13.7m	Dec 2
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Poland	111.3	55.1	53.9	42.2m	Dec 2
Turkmenistan	125.7	72.5	53.2	7.6m	Aug 29
Croatia	103.3	54.2	48.2	4.2m	Dec 1
Azerbaijan	104.9	50.3	45.3	10.6m	Dec 2

Percent fully vaccinated

FINANCIAL TIMES

Thank you