COVID-19 VACCINE OVERVIEW

Note

This overview includes all vaccines in Phases 2/3, Phase 3 and Phase 4 trials. It can be used both internally and externally as educational material, as part of documents, reports, presentations etc.

The present version is update 17 and is accurate up to 22 September 2021. Yellow highlighted text indicates changes and updates since the previous version.

Important information

Only manufacturers of the grey highlighted vaccines in the table have published peer-reviewed results or detailed FDA EUA documentation from Phase 3 efficacy trials. The rest of the results are either indicative or non-peer-reviewed data from company press briefs, news stories etc. While important to understand possible efficacy levels, these *'results'* are not necessarily 100% valid.

WHO Emergency Use Listing

The WHO Emergency Use Listing Procedure (EUL) is a method for assessing and listing unlicensed vaccines, with the ultimate aim of expediting the availability of these products to people affected by a public health emergency. The EUL will help UN agencies and WHO member states determine vaccines' acceptability based on an essential set of available quality, safety, efficacy, and performance data.

Vaccine efficacy versus effectiveness

- **Efficacy**: Trial data based on perfect or near-perfect conditions measuring the relative difference in infections between a vaccinated and a placebo group.

- **Effectiveness**: Real-world data based on how well the vaccine work in non-controlled populations. Comparing the vaccination status of a group of confirmed cases with the vaccination status of a group that doesn't have the infection can determine the effectiveness.

- **Interpretation**: Efficacy and effectiveness are calculated the same way. A vaccine with an efficacy/effectiveness of 80% means the vaccine group had an 80% lower risk of developing the disease compared to placebo/non-vaccinated groups. An efficacy/effectiveness of 80% does not mean that 20% of the vaccinated group will be infected (70, 71).

Apart from the 'Efficacy/Effectiveness at a glance' table on slide 3, unless otherwise stated, the data in the tables is from efficacy trials.

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Inactivated / killed whole virus

Polio (IPV), Influenza, Hepatitis A, Japanese Encephalitis, Rabies vaccines use this technology.

These vaccines are based on the SARS-CoV-2 virus itself, which is grown in significant amounts in laboratory settings and then killed. Vaccines based on inactivated viruses are generally not as effective as vaccines based on live virus and often require multiple injections to stimulate an adequate immune response. They are however very safe and cannot replicate in the body.

Non-Replicating Viral Vector

Ebola vaccines use this technology.

This type of vaccine is based on a genetically modified virus that cannot replicate itself and therefore is not able to cause illness. Instead, the virus is injected with a piece of the SARS-CoV-2 virus that makes the virus produce a protein, resulting in an immune response by the body towards COVID-19.

mRNA and DNA vaccines

What is injected in the body is simply the genetic instructions to make a viral protein such as the spike protein. Cells in your body then use the instructions to make the protein inside the body for your immune cells to see and respond to.

The DNA is delivered as a ring of DNA called a plasmid. Best results are obtained by administration via “electroporation” (electric pulse to enhance entry into the cells).

mRNA and DNA vaccines are thought to initiate a strong cellular immunity and they can be produced and altered rapidly.

Protein subunit

A protein subunit vaccine only contain ‘dead’ parts of a pathogen, and contrary to inactivated and RNA vaccines, the protein subunit vaccine does not have any genetic material, only subunits – in this case a protein.

Virus-like Particles

These are special class of subunit vaccines, where element of proteins (peptides) are self – assembled (synthetized) into particles that are intended to look like viruses to the human immune system.

Sequential Association of Vaccines

Often referred to as “*mixed/mixing vaccines*” in the mainstream media, ‘Sequential Association of Vaccines’ is the practice of using different brands or types of vaccines to complete a vaccination regimen. In relation to preventing COVID-19, a non-replicating viral vector vaccine and a mRNA vaccine has been used for the 1st and 2nd dose in some countries. In addition to suspected adverse events from the non-replicating viral vector vaccine, there are emerging studies on improved efficacy with mixing of types and some countries are mixing due to supply issues.

COVID-19 VACCINE OVERVIEW – EFFICACY/EFFECTIVENESS AT A GLANCE

Vaccine efficacy versus effectiveness

- **Efficacy**: Trial data based on perfect or near-perfect conditions measuring the relative difference in infections between a vaccinated and a placebo group.
- **Effectiveness**: Real-world data based on how well the vaccine work in non-controlled populations. Comparing the vaccination status of a group of confirmed cases with the vaccination status of a group that doesn't have the infection can determine the effectiveness.
- **Interpretation**: Efficacy and effectiveness are calculated the same way. A vaccine with an efficacy/effectiveness of 80% means the vaccine group had an 80% lower risk of developing the disease compared to placebo/non-vaccinated groups. An efficacy/effectiveness of 80% does not mean that 20% of the vaccinated group will be infected (70, 71).

The below table summarises alle results of both efficacy and effectiveness from studies <u>without</u> variant sequencing of positive cases.

Company/vaccine name (country)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated									
	Overall	Asymptomatic disease	Symptomatic disease	Moderate to severe disease	Severe disease	Severe to critical disease	Medical assistance	Hospitalisa-tion	ICU admission	Death
Sinovac / CoronaVac® (China)			50.7% - 84%	100%			83.7%	87.5% - 100%	90.3%	86.3%
Beijing / Sinopharm / BBIBP (China)	78.1%							78%		
Bharat Biotech / Covaxin® (India)		63.6%	77.8%		93.4%					
CanSino Biologics / Beijing Institute of Biotechnology / ad5-ncov/ Convidicea® (China)			65.7%		90.98%					
University of Oxford / AstraZeneca / Vaxzevria® / AZD1222 / ChAdOx1-S (UK)	66.7% - 80%		55.1% - 90%		100%			100%		
Gamaleya / Sputnik V® (Russia)			91.6%		100%					
Gamaleya / Sputnik Light (Russia)			78.6% - 83.7%		100%					
Johnson & Johnson / Janssen Pharmaceutical (USA)			-	66.1% - 66.9%		76.7% - 85.4%		65% - 71%		91% - 96.2%
Pfizer / BioNTech / Fosun / Comirnaty® (Germany & USA)	86.1%	86% - 91.5%	86% - 95%					88% - 97.2%	97.5% - 100%	96.7%
Moderna / Spikevax / mRNA-1273 (USA)	93.3%		94.1%		100%			86% - 93%	100%	100%
Novavax / NVX-CoV2373 (USA)			96.4%					100%	-	100%

COVID-19 VACCINE OVERVIEW – VARIANT EFFICACY/EFFECTIVENESS AT A GLANCE

Variants

We have adopted the variant names and definitions as set out by the WHO:

Variants of Concern (VOC)

The definition of VOCs is a SARS-CoV-2 variant with one or more of the following traits: 1. Increase in transmissibility or detrimental change in COVID-19 epidemiology; 2. Increase in virulence or change in clinical disease presentation; or 3. Decrease in effectiveness of public health and social measures or available diagnostics, vaccines and therapeutics. So far the Alpha, Beta, Gamma and Delta variants have been classified as VOCs:

- **Alpha** (known as the B.1.1.7 variant - first documented in UK),
- **Beta** (known as the B.1.351 variant – first documented in South Africa),
- **Gamma** (known the as P.1 variant - first documented in Brazil),
- **Delta** (known as the B.1.617.2 variant – first documented in India)

Variants of interest (VOI)

The definition of VOIs is a SARS-CoV-2 variant with the two following traits: has genetic changes that are predicted or known to affect virus characteristics such as transmissibility, disease severity, immune escape, diagnostic or therapeutic escape; AND is identified to cause significant community transmission or multiple COVID-19 clusters, in multiple countries with increasing relative prevalence alongside increasing number of cases over time, or other apparent epidemiological impacts to suggest an emerging risk to global public health.

- **Eta** (known as the B.125 variant – first documented in multiple countries)
- **Iota** (known as the B.1.526 variant – first documented in USA)
- **Kappa** (known as the B.1.617.1 variant – first documented in India)
- **Lambda** (known as the C.37 variant – first documented in Peru)
- **Mu** (known as the B.1.621 variant – first documented in Columbia)

Other variants

Some variants not covered by the definitions of VOC or VOI is included in this overview for reasons such as available evidence of vaccine efficacy or effectiveness, previously assessed as either VOI or VOC by the WHO but later removed from these lists because

- **Zeta** (known as the P.2 variant – first documented in Brazil) – last sample of this variant was sequenced in the beginning of July and has since been classified as a variant under monitoring instead of VOI (75, 76).

Please refer to the International SOS Pandemic site for an overview of variants: https://pandemic.internationalsos.com/2019-ncov/covid-19-variants

Vaccine efficacy versus effectiveness

- **Efficacy**: Trial data based on perfect or near-perfect conditions measuring the relative difference in infections between a vaccinated and a placebo group.
- **Effectiveness**: Real-world data based on how well the vaccine work in non-controlled populations. Comparing the vaccination status of a group of confirmed cases with the vaccination status of a group that doesn't have the infection can determine the effectiveness.
- **Interpretation**: Efficacy and effectiveness are calculated the same way. A vaccine with an efficacy/effectiveness of 80% means the vaccine group had an 80% lower risk of developing the disease compared to placebo/non-vaccinated groups. An efficacy/effectiveness of 80% does not mean that 20% of the vaccinated group will be infected (70, 71).

The below 'variant' tables summarises alle results of both efficacy and effectiveness from studies with variant sequencing of positive cases.

Company/vaccine name (country)	The %-wise lowered risk of getting the COVID-19 ALPHA VARIANT for people vaccinated compared to people not vaccinated									
	Overall	Asymptomatic disease	Symptomatic disease	Moderate to severe disease	Severe disease	Severe to critical disease	Medical assistance	Hospitalisa-tion	ICU admission	Death
Sinovac / CoronaVac® (China)			67%					85%		
University of Oxford / AstraZeneca / Vaxzevria® / AZD1222 / ChAdOx1-S (UK)	74.5%		74.6% - 80%		95%					
Pfizer / BioNTech / Fosun / Comirnaty® (Germany & USA)	89.5% - 95.3%	91.5%	90%		95%	100%		97.2%	97.5% - 100%	96.7% - 100%
Moderna/ Spikevax/ mRNA-1273 (USA)			91%		94%					
Novavax / NVX-CoV2373 (USA)			86% - 86.3%					100%		100%

COVID-19 VACCINE OVERVIEW – VARIANT EFFICACY/EFFECTIVENESS AT A GLANCE

Company/vaccine name (country)	The %-wise lowered risk of getting the COVID-19 BETA VARIANT for people vaccinated compared to people not vaccinated									
	Overall	Asymptomatic disease	Symptomatic disease	Moderate to severe disease	Severe disease	Severe to critical disease	Medical assistance	Hospitalisa-tion	ICU admission	Death
Sinovac / CoronaVac® (China)			50% - 67%		87.5%					
Johnson & Johnson / Janssen Pharmaceutical (USA)			52%	52% - 64%		73.1% - 81.7%		65-66%		91-95%
Pfizer / BioNTech / Fosun / Comirnaty® (Germany & USA)	75%		85%		98%	100%				100%
Moderna/ Spikevax/ mRNA-1273 (USA)			78%		94% (1 dose)					
Novavax / NVX-CoV2373 (USA)			51% - 60%							

Company/vaccine name (country)	The %-wise lowered risk of getting the COVID-19 DELTA VARIANT for people vaccinated compared to people not vaccinated									
	Overall	Asymptomatic disease	Symptomatic disease	Moderate to severe disease	Severe disease	Severe to critical disease	Medical assistance	Hospitalisa-tion	ICU admission	Death
Bharat Biotech / Covaxin® (India)			65.2%							
University of Oxford / AstraZeneca / Vaxzevria® / AZD1222 / ChAdOx1-S (UK)	67%		70%		95%					
Johnson & Johnson / Janssen Pharmaceutical (USA)					71%			71%		
Pfizer / BioNTech / Fosun / Comirnaty® (Germany & USA)			85%		95%					
Moderna/ Spikevax/ mRNA-1273 (USA)			70%		96% (1 dose)					
Novavax / NVX-CoV2373 (USA)			60%							

COVID-19 VACCINE OVERVIEW – VARIANT EFFICACY/EFFECTIVENESS AT A GLANCE

Company/vaccine name (country)	The %-wise lowered risk of getting the COVID-19 GAMMA VARIANT for people vaccinated compared to people not vaccinated									
	Overall	Asymptomatic disease	Symptomatic disease	Moderate to severe disease	Severe disease	Severe to critical disease	Medical assistance	Hospitalisa-tion	ICU admission	Death
Sinovac / CoronaVac® (China)			65.9%		87.5%					
Johnson & Johnson / Janssen Pharmaceutical (USA)			52%					65-66%		91-95%
Pfizer / BioNTech / Fosun / Comirnaty® (Germany & USA)			85%		98%					
Moderna/ Spikevax/ mRNA-1273 (USA)			78%		94% (1 dose)					
Novavax / NVX-CoV2373 (USA)			60%							

Company/vaccine name (country)	The %-wise lowered risk of getting the COVID-19 ZETA VARIANT for people vaccinated compared to people not vaccinated									
	Overall	Asymptomatic disease	Symptomatic disease	Moderate to severe disease	Severe disease	Severe to critical disease	Medical assistance	Hospitalisa-tion	ICU admission	Death
Johnson & Johnson / Janssen Pharmaceutical (USA)				52% - 64%		73.1% - 81.7%				

COVID-19 VACCINE OVERVIEW

INACTIVATED VIRUS

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
Sinovac/CoronaVac® **(China)**	2 doses (day 0 & 14)	2 to 8ºC	18+	$10-$32.52	41 (-1)	yes	**Brazil Phase 3 trial (5, 25)**: symptomatic disease 50.7% - medical assistance 83.7% - moderate to severe disease 100% **Turkey Phase 3 trial (25)**: symptomatic disease 84% - hospitalisation 100% **Chile Phase 3 trial (25)**: symptomatic disease 67% - hospitalisation 85% **Indonesia Phase 3 trial (25)**: symptomatic disease 65% **Chile effectiveness real-life study (61)**: symptomatic disease 65.9% - hospitalisation 87.5% - ICU admission 90.3% - death 86.3%	**Brazil Phase 3 trial (25)**: might be effective against circulating **Gamma** variant: clinical disease 50% **Chile Phase 3 trial (25)**: might be effective against circulating **Gamma** and **Alpha** variants: symptomatic disease 67% - hospitalisation 85% **Systematic review of effectiveness against variants (78)**: sufficient efficacy established against **Beta** and **Gamma**: symptomatic infection with **Beta**: 65.9%, **Gamma**: 65.9% – severe disease with **Beta**: 87.5%, **Gamma**: 87.5%	
Beijing/Sinopharm/BBIBP **(China)**	2 doses (day 0 & 21)	2 to 8ºC	18+ 10+ (Thailand)	$15-$36	70 (+1)	yes	**UAE, Bahrain, Egypt, Jordan Phase 3 trials** expected December 2021 (7). *Interim results* from the multi-country trials suggest (26): overall 78.1% - hospitalization 78%		
Wuhan/Sinopharm **(China)**	2 doses (day 0 & 21)	4ºC	18+		3 (+0)				
Chinese Academy of Medical Sciences (China)	2 doses (day 0 & 28)		18+				**Phase 3 trial** data expected July 2022 (39)		
Shenzhen Kangtai Biological Products Co., Ltd. (China)	2 doses (day 0 & 28)		18+				**Phase 3 trial** data expected November 2022 (23)		
Bharat Biotech/Covaxin® **(India)**	2 doses (day 0 & 28)[5]	2 to 8ºC	18+	$3.02-$35	7 (-1)		**Phase 3 trial** data expected December 2022 (8) **India Phase 3 trial non-peer reviewed (62)**: asymptomatic disease 63.6% - symptomatic disease 77.8% - severe disease 93.4%	**India Phase 3 trial non-peer reviewed (62)**: sufficient efficacy established against **Delta**: symptomatic disease 65.2%	
Shifa Pharmed Industrial Co / COVIran Barakat **(Iran)**	2 doses (day 0 & 14)		18+		1 (+1)				

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INACTIVATED VIRUS

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
Research Institute/Qazcovid-In® **(Kazakhstan)**	2 doses (day 0 & 21)		18+		1 (+0)		**Phase 3 trial** data expected July 2021 (27)		
Valneva / National Institute for Health Research / VLA2001 **(France & UK)**	2 doses (day 0 & 21)	2 to 8ºC (54)	18+				**Phase 3 trial** data expected June 2022 (53)		

NON-REPLICATING VIRAL VECTOR

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2, 65)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
ReiThera / Leukocare / Univercells / GRAd-COV2 **(Belgium, Germany and Italy)**	1 dose (day 0)	2 to 8ºC (50)	18+				**Phase 3 trial** data expected April 2022 (24)		
CanSino Biologics/ Beijing Institute of Biotechnology/ ad5-ncov/ Convidicea® **(China)**	1 dose (day 0)	4ºC	18+	$27.15	7 (+2)		**Phase 3 trial** data expected July 2021 and January 2022 (28) **Interim / non-published results (6)**: symptomatic disease 65.7% - severe disease 90.98%		
University of Oxford / AstraZeneca / Vaxzevria® / AZD1222 / ChAdOx1-S **(UK)**	2 doses (day 0 & 28-84)	2 to 8ºC	18+	$2.19-$13.27	182 (-2)	yes[1]	**Brazil and UK Phase 3 trials (16)**: overall 70.4% - symptomatic disease 60.3% (UK 2x standard doses) - symptomatic disease 90% (UK 1 low + 1 standard dose) – symptomatic disease 64.2% (Brazil 2x standard doses) **US, Chile, and Peru Phase 3 trial interim analysis (21)**: symptomatic disease 79% - severe disease and hospitalisation 100% - efficacy among >65 80% **UK pooled analysis of four phase 3 trials (68)**: overall 66.7% (>14 days after second dose) - clinical disease 76% (during days 22-90 after first dose) – clinical disease 81.3% (second dose at ≥12 weeks after first dose) – clinical disease 55.1% (second dose at <6 weeks after first dose) – severe disease 100% - hospitalisation 100%	**South Africa variant efficacy trial (19)**: sufficient efficacy not established against **Beta**: clinical disease 10.4% - mild to moderate disease 21.9% **UK variant efficacy trial non-peer reviewed (29)**: sufficient efficacy established against **Alpha**: symptomatic disease 74.6% **England effectiveness real-life study (55)**: sufficient efficacy established against **Alpha** and **Delta** with full regimen: infection with **Alpha** 74.5% - infection with **Delta** 67.0%. Sufficient efficacy not established after first dose: infection with **Alpha** 48.7% - infection with **Delta** 30.7%. **Systematic review of effectiveness against variants (78)**: sufficient efficacy established against **Alpha** and **Delta**: symptomatic infection with **Alpha**: 80%, **Delta**: 70%, - severe disease with **Alpha**: 95%, **Delta**: 95%	
└ **Serum Institute of India Pvt Ltd / ChAdOx1-S / Covishield®** **(India)**	2 doses (day 0 & 28-84)	2 to 8ºC	18+	$3-$5.25	45 (+0)	yes	Presumed to be identical to the **AstraZeneca / Vaxzevria® / ChAdOx1-S** vaccine above	Presumed to be identical to the **AstraZeneca / Vaxzevria® / ChAdOx1-S** vaccine above	

COVID-19 VACCINE OVERVIEW

NON-REPLICATING VIRAL VECTOR

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2, 65)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
University of Oxford / AstraZeneca / AZD2816 (based on the Beta variant) (UK)	Booster: 1 dose (≥ 3 mths. after full regime with Vaxzevria® or an mRNA vaccine) Full regime: 2 doses (day 0 & 28/84) or on day 28 after first dose with Vaxzevria®	2 to 8ºC	18+				**Phase 2/3 trial** data expected June 2022 (72)	**Phase 2/3 trial** with booster ongoing (72): the vaccine is based on the Beta variant	EU approved manufacturing sites: Belgium, United States, United Kingdom, Republic of Korea, Netherlands, China, Italy, Germany and Spain. Ministry of Health, Labour and Welfare, Japan approved manufacturing sites: United States, Japan and Italy. Therapeutic Goods Administration, Australia approved manufacturing sites: Belgium, United Kingdom, Australia, Italy, Germany and Australia.
Gamaleya/Sputnik V® (Russia)	2 doses (day 0 & 21)	-18.5ºC (liquid) 2 to 8ºC (dry)	18+	$3-27.15	51 (+1)		**Russia Phase 3 trial (18)**: symptomatic disease 91.6% - severe disease 100%		
Gamaleya/Sputnik Light (Russia)	1 dose (day 0)	-18.5ºC (liquid) 2 to 8ºC (dry)	18+	$3-27.15	14 (+1)		**Argentina Phase 3 trial interim / non-published results (69)**: clinical disease 78.6-83.7% - severe disease 100% **Phase 3** trial data expected January 2022.		
Johnson & Johnson/ Janssen Pharmaceutical (USA)	1 dose (day 0)	-20ºC (shipping) 2 to 8ºC (3 mhts)	18+	$8.50-$10	51 (+3)	yes	**Multi-country Phase 3 trial (9, 30)**: moderate to severe disease 66.9% (overall after day 14) - moderate to severe disease 66.1% (overall after day 28) - severe to critical disease 76.7% (overall after day 14) severe to critical disease 85.4% (overall after day 28) **South Africa Phase 3b real world trial interim / non-published effectiveness results (SISONKE) (74)**: hospitalisation 65-66% – death 91-96.2% **USA effectiveness real-life study (77)**: hospitalisation 71%	**Multi-country Phase 3 trial (31)**: sufficient efficacy established against **Beta** and **Zeta**[6]: moderate to severe disease 52% (after day 14) - moderate to severe disease 64% (after day 28) severe to critical disease 73.1% (after day 14) severe to critical disease 81.7% (after day 28) **South Africa Phase 3b real world trial interim / non-published effectiveness results (SISONKE) (74)**: sufficient effectiveness established against hospitalisation from **Beta** and **Delta**: hospitalisation with **Beta** 67% - hospitalisation with **Delta** 71% **Systematic review of effectiveness against variants (78)**: sufficient efficacy established against **Delta, Beta** and **Gamma**: symptomatic infection with **Beta**: 52%, **Gamma**: 52% – severe disease with **Delta**: 71% - hospitalisation with **Beta**: 65-66%, **Gamma**: 65-66% - mortality with **Beta**: 91-95%, **Gamma**: 91-95%	**1-4 months follow-up of the South Africa Phase 3b real world trial interim / non-published effectiveness results (SISONKE) (74)**: hospitalisation 28-90 days after vaccination 65% – hospitalisation 90-120 days after vaccination 65%

COVID-19 VACCINE OVERVIEW

mRNA

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2, 65)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
Academy of Military Science (AMS)/ Walvax Biotechnology/ Suzhou Abogen Biosciences (China)	2 doses (day 0 & 14 OR day 0 & 21)	2 to 8ºC (50)	18+				**Phase 3 trial** data expected May 2023 (49)		
Curevac (Germany)	2 doses (day 0 & 21)	4ºC	18+	$11.84			**Phase 3 trial** data expected April, June and September 2022 (32)		
Pfizer/ BioNTech/ Fosun/ Comirnaty® (Germany & USA)	2 doses (day 0 & 21-84)	-80 to -60ºC (6 mths) -25 to -15ºC (2 wks) (15)	16+ 12+ (Australia, Canada, EU & USA)	$6.75-$23.15	129 (+5)	yes	**Argentina, Brazil, South Africa and the US Phase 3 trial (13)**: symptomatic disease 95% **England effectiveness real-life study (pre-print) (34)**: asymptomatic and symptomatic disease 86% **Israel effectiveness real-life study (health care workers) (33)**: symptomatic disease 90.5% - symptomatic disease 89-91% (during days 15-28 after first dose) **Israel effectiveness real-life study (general population) (34)**: overall effectiveness 95.3% - symptomatic disease 97% - asymptomatic infection 91.5% - hospitalisation 97.2% - severe/critical hospitalisation 97.5% - deaths 96.7% **USA effectiveness real-life study (3)**: infection 86.1% - hospitalisation 88.8% - ICU admission 100% **USA effectiveness real-life study (77)**: hospitalisation 88%	**Israel effectiveness real-life study (general population) (34)**: sufficient efficacy established against **Alpha**: overall effectiveness 95.3% - symptomatic disease 97% - asymptomatic infection 91.5% - hospitalisation 97.2% - severe/critical hospitalisation 97.5% - deaths 96.7% **Qatar effectiveness real-life study (35)**: sufficient efficacy established against **Alpha** and **Beta**: infection with Alpha 89.5% - infection with Beta 75% - severe, critical or fatal disease with **Alpha** or **Beta** 100% **England effectiveness real-life study (55)**: sufficient efficacy established against **Alpha** and **Delta** with full regimen: infection with **Alpha** 93.7% - infection with **Delta** 88%. Sufficient efficacy not established after first dose: infection with **Alpha** 48.7% - infection with **Delta** 30.7%. **Systematic review of effectiveness against variants (78)**: sufficient efficacy established against **Alpha, Delta, Beta** and **Gamma**: symptomatic infection with **Alpha**: 90%, **Delta**: 85%, **Beta**: 85%, **Gamma**: 85% – severe disease with **Alpha**: 95%, **Delta**: 95%, **Beta**: 98%, **Gamma**: 98%	**6-month follow up analysis non-peer reviewed (12)**: overall effectiveness 91.3% - severe disease 95.3/100%
Arcturus Therapeutics, Inc. (USA)	2 doses (day 0 & 28)		18+				**Phase 3 trial** data expected August 2023 (79)		
Moderna/ Spikevax/ mRNA-1273 (USA)	2 doses (day 0 & 28)	-25 to -15ºC	18+ 12+ (Thailand)	$15-$37	73 (+2)	yes	**The US Phase 3 trial (17)**: symptomatic disease 94.1% - severe and fatal disease 100% **USA effectiveness real-life study (3)**: infection 93.3% - hospitalisation 86% - ICU admission 100% **USA effectiveness real-life study (77)**: hospitalisation 93%	**Booster efficacy trial non-peer reviewed (10)**: preliminary results suggest sufficient efficacy against **Beta** and **Gamma**: no efficacy results available. The trial evaluates a booster shot based on the Beta variant strain, a multi-strain version, and the original vaccine. **Systematic review of effectiveness against variants (78)**: sufficient efficacy established against **Alpha, Delta, Beta** and **Gamma**: symptomatic infection with **Alpha**: 91%, **Delta**: 70%, **Beta**: 78%, **Gamma**: 78% – severe disease with **Alpha**: 94%, **Delta**: 96% (1 dose), **Beta**: 94% (1 dose), **Gamma**: 94% (1 dose)	**6-month follow-up analysis (14)**: overall effectiveness 94%

COVID-19 VACCINE OVERVIEW

mRNA

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2, 65)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
Moderna/ National Institute of Allergy and Infectious Diseases/ mRNA-1273.351 (based on the Beta variant) (USA)	Booster: 1 dose (6 mths. after full regime withmRNA-1273) Full regime: 3 doses (day 0, 28/56 & 6 mths later)	-25 to -15ºC	18+				**Phase 4 trial** with booster dosing ongoing (56)	**Phase 4 trial** with booster ongoing (56): the vaccine is based on the Beta variant	
Moderna/ mRNA-1273.211 (USA)	Booster: 1 dose (6 mths. after full regime with mRNA-1273)	-25 to -15ºC	18+				**Phase 3 trial** data expected June 2022 (57)	**Phase 3 trial** with booster ongoing (57): the vaccine is based on the Moderna mRNA-1273 and mRNA-1273.351 vaccines	

PROTEIN SUBUNIT

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2, 65)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
Anhui Zhifei Longcom / RBD-Dimer (ZF2001) (China)	2 or 3 doses (day 0 & 28 / 0, 28 & 56)		18+		2 (+2)				
Clover Biopharmaceuticals Inc./GSK/Dynavax (China, UK & USA)	2 doses (day 0 & 21)		18+				**Phase 3 trial** data expected July 2022 (38)		
Clover Biopharmaceuticals Inc. / SCB-2020S (China)	2 doses (day 0 & 21)		18+				**Phase 2 trial** data expected April 2022 (73)	**Phase 2 trial** with booster ongoing (73): the vaccine is based on the **Beta** variant	
Sinocelltech Ltd. (China)	1 dose (booster) at least 6 mths. since last vaccine		18+				**Phase 2/3 trial** data expected October 2022 (80)	**Phase 2/3 trial** with booster ongoing (80): the booster vaccine might be effective against the **Alpha**, Beta, **Gamma** and **Delta** variants	
Center for Genetic Engineering and Biotechnology (CIGB) / Abdala (CIGB-66) (Cuba)	3 doses (day 0, 14 & 28 / 0, 28 & 56)		19+		2 (+1)				

COVID-19 VACCINE OVERVIEW

PROTEIN SUBUNIT

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2, 65)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
Instituto Finlay de Vacunas / SOBERANA 02 (Cuba)	2 doses (day 0 & 28)		19+		1 (+0)				
Sanofi Pasteur / GSK / VAT00002 (France & UK)	2 doses (day 0 & 21)	4ºC (46)	18+	$9.30-$10.50	-		**Phase 3 trial** data expected April 2022 and January 2023 (44, 45)		
FBRI[3] / EpiVacCorona / Vector Institute (Russia)	2 doses (day 0 & 21)		18+	$5.51	2 (+0)				
Vaxxinity /UB-612 (USA)	2 doses (day 0 & 28)	2 to 8ºC (48)	18+	$20			**Phase 3 trial** data expected March 2023 (47)		
Novavax / NVX-CoV2373 (USA)	2 doses (day 0 & 21)	2 to 8ºC	18+	$3-$20.90			**Phase 3 trial** data expected January 2022 and June 2023 (36) **England Phase 3 trial (20, 60)**: overall (original+variant strains) symptomatic disease 89.7% - symptomatic disease 96.4% (original strain) - hospitalisation 100% - deaths 100%	**England Phase 3 trial (20, 60)**: preliminary results suggest sufficient efficacy against **Alpha**: symptomatic disease 86.3% - hospitalisation 100% - deaths 100% **South Africa Phase 1-2 trial (37)**: non-efficacy trial results suggest efficacy against **Beta**: symptomatic disease 51% **Systematic review of effectiveness against variants (78)**: sufficient efficacy established against **Alpha, Delta, Beta** and **Gamma**: symptomatic infection with **Alpha**: 86%, **Delta**: 60%, **Beta**: 60%, **Gamma**: 60%	

VIRUS LIKE PARTICLE

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2, 65)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
Medicago Inc. / CoVLP (Canada)	2 doses (day 0 & 21)	2 to 8ºC (51)	18+				**Phase 3 trial** data expected April 2022 (52)		

COVID-19 VACCINE OVERVIEW

DNA

Company/vaccine name (country)	Doses (1)	Storage temperature & shelf-life (2, 65)	Age suitability	Wholesale price in US dollars (58)	Implemented in # of countries (4)	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
Inovio / International Vaccine Institute / Advaccine (China & USA)	2 doses (day 0 & 28)		18+				**Phase 3 trial** data expected December 2022 (40)		
Zydus Cadila / ZyCoV-D (India)	3 doses (day 0, 28 & 56)	2 to 8ºC (42)	18+				**Phase 3 trial** data expected 2022 (43)		
AnGes / Takara Bio / Osaka University (Japan)	2 doses (day 0 & 14)	Room temp.	18+				**Phase 3 trial** data expected March 2022 (41)		

SEQUENTIAL ASSOCIATION OF VACCINES

Company/vaccine name (country) 1st dose	Company/vaccine name (country) 2nd dose	Age suitability	WHO EUL (11)	The %-wise lowered risk of getting COVID-19 for people vaccinated compared to people not vaccinated	The %-wise lowered risk of getting a COVID-19 VARIANT for people vaccinated compared to people not vaccinated	Lasting immunity: length and efficacy / effectiveness
University of Oxford/AstraZeneca/ Covishield® (UK)	**Pfizer/BioNTech/Fosun/ Comirnaty® (Germany & USA)**			**Efficacy trials ongoing (59):** interim analysis of immunogenicity indicate promising efficacy. **Safety and immunogenicity trials (64)**: Preliminary results suggest good overall immune response following mRNA booster shot.	**Safety and immunogenicity trials (64)**: Preliminary results suggest good overall immune response towards the **Alpha**, **Beta** and **Gamma** variants following mRNA booster shot.	
University of Oxford/AstraZeneca/ Covishield® (UK)	**Moderna / mRNA-1273 (USA)**			**Safety and immunogenicity trials (63)**: Preliminary results suggest good overall immune response following mRNA booster shot.	**Safety and immunogenicity trials (63)**: Preliminary results suggest good overall immune response towards the **Beta** variant following mRNA booster shot.	

COVID-19 VACCINE OVERVIEW

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Foot notes

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