Terry Tsang
Hong Kong Leader
Professional Liaison Department
La Leache League Asia and Middle East

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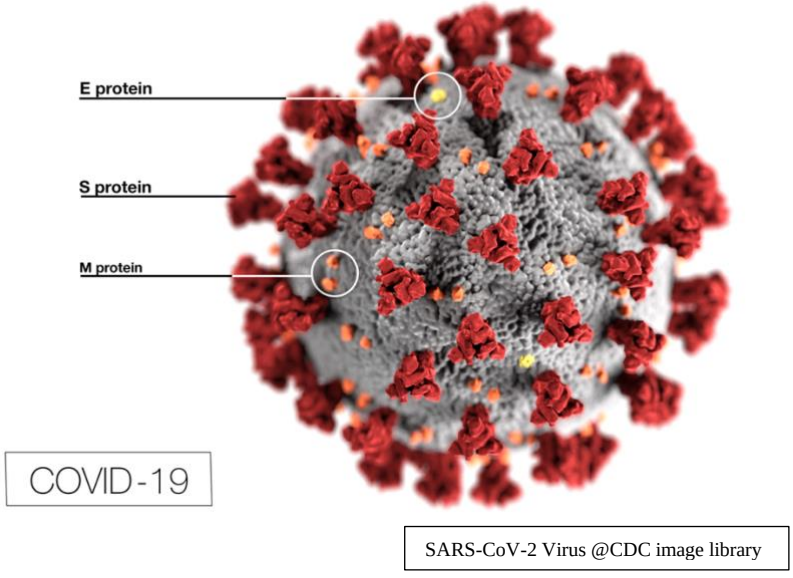
COVID-19 Vaccines and Breastfeeding

On January 30, 2020, the World Health Organization (WHO) declared the outbreak of COVID-19 to be a Public Health Emergency of International Concern. As of March 31, 2021, there are 128,940,982 confirmed COVID-19 cases and 2,808,308 deaths worldwide.

Scientists hope the pandemic can be terminated with the introduction of COVID-19 vaccines together with other protective strategies. Many countries have rolled out COVID- 19 vaccinations in phases as the vaccine supply is currently limited. Many are working towards making vaccines widely available to everyone.

Should a breastfeeding or pregnant mother receive COVID-19 vaccines? Is it safe for a baby taking breastmilk? Is it safe for a foetus? The following is information for helping mothers make an informed decision.



SARS-CoV-2 Virus @CDC image library

Information is rapidly changing and subject to revision

How does a vaccine work?

Vaccination is like a fire drill

The purpose of a fire drill is to ensure people know how to exit a dangerous fire scene fast and safely like a reflexive action without thinking why and how. Vaccination is like a fire drill; the components in a vaccine are the pretend fire; the immune response fighting an infection is like quickly exiting from the scene of a fire. The result is to save you from being burned, smoke inhalation or death. i.e. an infection and its complications.

COVID-19 Vaccines (updated March 3, 2021)

There are more than 60 COVID-19 vaccine candidates under clinical development. The following table shows the leading vaccines.
Until March 2021, the mRNA-based vaccines have had the largest amount of published data.

COVID-19 VACCINE DEVELOPMENT OVERVIEW

Platform	Name	Developer	Development status
DNA-based	INO-4800	Inovio	Phase 2/3
	AG0302-COVID-19	AnGes	
	ZyCoV-D	Zydus Cadila	Phase 3
Whole-virus	BBV152	Bharat Biotech	
	BBIBP-CorV	Sinopharm	
	Coronavac	Sinovac	
mRNA-based*	BNT162b2	Pfizer-BioNTech	
	mRNA-1273	Moderna	
	CVnCoV	CureVac	
Protein-subunit	EpiVacCorona	Vector Institute	
	NVX-CoV2373	Novavax	
Viral-vector	Gam-COVID-Vac (Sputnik V)	Gamaleya Research Institute	
	ChAdOx1	AstraZeneca-Oxford University	
	Ad26.COV2.S	Johnson & Johnson	
	GRAd-COV2	ReiThera	Phase 1
	VXA-CoV2-1 Ad5	Vaxart	

*All vaccines can be stored at refrigerator temperature except for the mRNA-based vaccines, which require freezer storage.

Non-mRNA-based Vaccines

- **Whole Virus Vaccines**

Inactivated-virus COVID-19 vaccines use heat-treated or chemically-treated SARS-CoV-2 to elicit immune responses.
The inactivated virus cannot cause an infection.

- **Protein-Subunit Vaccines**

Recombinant SARS-CoV-2 spike protein when injected into a muscle. These proteins will be taken up by host antigen-present cells and presented on the cell surface. This stimulates an immune response.
It contains no SARS-CoV-2 genetic material.

- **Viral-Vector Vaccines**

A viral vector delivers genetic materials into a cell. Most COVID-19 vaccines use modified non-replicating viral vectors to infect human cells. SARS-CoV-2 spike genes are translated in human cells which then produce antigenic spike proteins. Host generate antibodies in response to the antigen.
The vectors are weakened and cannot cause infection.

- **DNA-based Vaccines**

Still early in clinical trials, not to be discussed here.

mRNA-based Vaccines

Vaccines consist of

- encoded mRNA (provide host cells the instruction to produce SARS-CoV-2 spike proteins- the antigen).
- wrapped inside lipid coat (allow uptake by correct host cells, protect mRNA against degradation).

Vaccines are injected into muscles and are taken up by myocytes, dendritic cells, T cells, B cells and macrophages in lymph nodes near the injection site. mRNA will be released into the cytoplasm, then translated into SARS-CoV-2 spike proteins by the host cells. These spike proteins will then appear on the cell surface and elicit an immune response, antibodies produced. mRNA is degraded by the host cells.

No live virus is involved; no genetic material enters the nucleus of host cells and hence, will not alter a vaccine recipient's genome.

COVID-19 Vaccines available in Asia & Middle East

The following are just a few examples of the COVID-19 vaccines available in Asia and the Middle East.

	Pfizer/ BioNTech	Moderna	Oxford/ Astra Zeneca	Sinovac/ Corona Vac	Johnson & Johnson	Sinopharm/ Beijing
Australia						
China						
Hong Kong	(Fosun Pharma/ BioNTech) 					
India						
Japan						
Lebanon						
Pakistan						
Saudi Arabia						
Singapore						
South Korea						
Taiwan						
UAE						

Vaccination source information country by country is available at https://ourworldindata.org/covid-vaccinations#source-information-country-by-country

**As information is changing rapidly, please refer to the health authority of each country for most accurate and updated information.*

None of the vaccines have shown to confidently prevent disease transmission

Other protective strategies are still necessary

Efficacy and Effectiveness of Covid 19 Vaccines

	Pfizer/ BioNTech[1]	Moderna[2]	Oxford/ Astra Zeneca[3]	Sinovac/ Corona Vac	Johnson & Johnson[4]	Sinopharm/ Beijing
No. of dose/ interval	2 21 days	2 28 days	2 12 weeks	2 28 days	1	2
Efficacy after 1st dose symptomatic infection after 1st dose moderate/ severe COVID-19 illness severe/critical COVID-19 illness Hospitalization			 100% 100%		 66.9% 76.7% 93.1%	
Efficacy after recommended doses	95%	95%	76% (85% aged 65 or above)	50.4%*[5]	pending	79-86%*[6]

** The trial results have not been published in medical journals yet. Data is only available from the news.*

Is it safe for a breastfeeding or pregnant mother to receive the COVID-19 vaccine?

COVID-19 infection during pregnancy

ICU admission, mechanical ventilation, and death are higher for pregnant women with COVID-19 compared with non-pregnant women of reproductive age who have COVID-19. Additionally, pregnant women with COVID-19

[1] Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine. F.P. Polack et al.N Engl J Med 2020; 383:2603-2615. December 31, 2020
https://www.nejm.org/doi/full/10.1056/NEJMoa2034577

[2] Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine. L.R. Baden et al. N Engl J Med 2021; 384:403-416. February 4, 2021
https://www.nejm.org/doi/full/10.1056/NEJMoa2035389

[3] AZD1222 US Phase III Primary Analysis confirms Safety and Efficacy. March 25, 2021
https://www.astrazeneca.com/content/astraz/media-centre/press-releases/2021/azd1222-us-phase-iii-primary-analysis-confirms-safety-and-efficacy.html

[4] Overview of Janssen's Single-Dose Covid-19 Vaccine Ad26.CoV2 .S
Janssen Pharmaceutical Companies of Johnson & Johnson US Centers for Disease Control and Prevention Advisory Committee on Immunization Practices. February 28, 2021
https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-02/28-03-01/02-COVID-Douoguih.pdf

[5] Sinovac: Brazil results show Chinese vaccine 50.4% effective. January 13, 2021
https://www.bbc.com/news/world-latin-america-55642648

might be at an increased risk of adverse pregnancy outcomes, such as preterm birth, compared to pregnant women without COVID-19.

Breastfeeding and pregnancy are not an absolute contraindication to receiving COVID-19 vaccine

A mother should make an informed choice with available information

There is no evidence the COVID-19 vaccine is unsafe if a woman is pregnant or breastfeeding. As clinical trials on breastfeeding and expecting mothers are lacking, more evidence will be needed before vaccination is routinely offered. A trial of Pfizer vaccine in pregnant women is planned[7].

A cohort study[8] showed that COVID-19 mRNA vaccines protect pregnant, lactating women and newborns. Vaccine generated antibodies are present in maternal blood, umbilical cords and breastmilk samples.

Recommendations from professional bodies

***** *Please note that these professional bodies in the UK and USA are referring to the vaccines available in their countries i.e. Pfizer/ Biontech, Moderna, Johnson & Johnson, AstraZeneca/ Oxford. Their recommendations are not automatically applicable to other brands of vaccines.*

Considerations include:

- the level of activity of the virus in the community
- the potential efficacy of the vaccine
- the risk and potential severity of maternal disease, including the effects of disease on the foetus and newborn
- the safety of the vaccine for the pregnant patient and the foetus

World Health Organization (WHO)
Does not recommend the routine vaccination of pregnant women with Pfizer mRNA vaccine[9] at this time. In case a pregnant woman has an unavoidable high risk of exposure (e.g. a health worker), vaccination may be considered. Vaccination can be offered to breastfeeding mothers. There is no need to discontinue breastfeeding after vaccination.

National Health Scheme (NHS), UK[10]
If a pregnant woman is at risk of COVID-19 infection or with clinical conditions which put them at risk of serious complications for COVID-19, she may discuss with her healthcare provider about receiving the protection from the vaccine. Vaccination can be received during breastfeeding.

[6] Covid: What do we know about China's coronavirus vaccines. January 14, 2021
https://www.bbc.com/news/world-asia-china-55212787

[7] Pfizer and Biontech commence global clinical trial to evaluate Covid 19 vaccine in pregnant women. February 18, 2021
https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-commence-global-clinical-trial-evaluate

[8] COVID-19 Vaccine response in pregnant and lactating women: a cohort study. American Journal of Obstetrics and Gynecology. March 25, 2021
https://www.ajog.org/article/S0002-9378(21)00187-3/fulltext

[9] Who can take the Pfizer-Biotech Covid 19 vaccine. January 8, 2021
https://www.who.int/news-room/feature-stories/detail/who-can-take-the-pfizer-biontech-covid-19--vaccine

[10] COVID-19 vaccination: women of childbearing age, currently pregnant or breastfeeding. February 2021
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/965391/PHE_COVID-19_vaccination_guide_on_pregnancy_English_v3.pdf

Centre for Disease Control and Prevention (CDC) USA[11]
People who are breastfeeding or pregnant may choose to be vaccinated.

Department of Health. Australian Government[12]
A breastfeeding mother can receive the vaccine at any time. There is no need to stop breastfeeding. Routine vaccination for pregnant women is not recommended. A pregnant woman and her health professional can consider the vaccination if the potential benefits outweigh any potential risk.

National Health Commission of the People's Republic of China[13]
Pregnancy is contraindicated for vaccination. If vaccinated while pregnancy is unknown, termination of pregnancy is not recommended.
Vaccination can be offered to lactating women who are at high risk of infection. e.g. medical staff. Breastfeeding should be continued after vaccination.

[11] Vaccination Considerations for People who are Pregnant or Breastfeeding. March 18, 2021
https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/pregnancy.html

[12] COVID-19 vaccination decision guide for women who are pregnant, breastfeeding, or planning pregnancy. February 10, 2021
https://www.health.gov.au/sites/default/files/documents/2021/02/covid-19-vaccination-covid-19-vaccination-decision-guide-for-women-who-are-pregnant-breastfeeding-or-planning-pregnancy.pdf

[13] 新冠病毒疫苗接种技术指南（第一版）发布时间： 2021-03-29 来源: 疾病预防控制局
http://www.nhc.gov.cn/xcs/yqfkdt/202103/c2febfd04fc5498f916b1be080905771.shtml