

THE LAB CYCLE



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SCIENCE SPEAKS

The Growing Threat of Emerging COVID-19 Variants

Several variants of the SARS-CoV-2 have been observed in recent researches. Data regarding their characteristics became widely available, interlinking them with a higher rate of transmissibility and a higher rate of evading the host immune response. These attributes make these variants even more challenging to control. While most emerging mutations will not have a significant impact on the spread of the virus, the news of them appearing still invoked fear within the public. *Continue at page 2.*

IN THE BLUELIGHT

Equipment Spotlight: Worldwide Installations of Cold Storage Solutions

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UP AND ABOUT

Adapt and Innovate: Esco to Launch a New Website and Product!

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The Growing Threat of Emerging COVID-19 Variants

Several variants of the SARS-CoV-2 have been observed in recent researches. Data regarding their characteristics became widely available, interlinking them with a higher rate of transmissibility and a higher rate of evading the host immune response. These attributes make these variants even more challenging to control. While most emerging mutations will not have a significant impact on the spread of the virus, the news of them appearing still invoked fear within the public. Researchers all over the world are attempting to ease public anxiety by constantly working to better understand the rate of transmissibility and the effectiveness of the currently authorized vaccines against SARS-CoV-2. They continue to provide new rapid discoveries regarding the virologic, epidemiologic, and clinical characteristics of these variants.

The discovery of the new variants of the original virus (also called the wild type) unveiled more information about the way the pathogen acts, including its alterations to its contagiousness. These viral versions are most apparent in different places such as the United Kingdom, South Africa, Brazil, and Japan (see *table 1*). In some cases, the viral versions surpassed the wild types in rapid succession. Although better surveillance and sequencing are much needed in determining the reason why these variants are emerging now, it is suggested that mutations are not random because repetitions in the patterns were documented.

Nevertheless, recent studies suggest that there is little to no evidence that proves that the discovered variants cause more severe disease or increased risk of death than the original strain found in Wuhan last 2019. Studies also imply that more information is needed to understand how these variants of viruses work with the vaccines.

Table 1. Comparison of Emerging COVID-19 Variants (As of 5 February 2021)

VARIANT		B.1.1.7	P.1	B.1.351
Other names		20I/501Y.V1 UK coronavirus variant	20J/501Y.V3 Brazilian variant	20H/501Y.V2 South African variant
First detection	Location	United Kingdom	Brazil and Japan	South Africa
	Date	December 2020	January 2021	December 2020
Earliest sample date		September 10, 2020	December 04, 2020	October 08, 2020
Notable mutations		69/70 deletion 144Y deletion N501Y A570D D614G P681H	E484K K417N/T N501Y D614G	K417N E484K N501Y D614G
Recorded changes		Increased transmissibility	Potential increased transmissibility	
Vaccine effectiveness		*Preliminary analysis shows no impact on the efficacy of currently authorized vaccines.		*A recent study showed less effectivity of the Oxford/AstraZeneca COVID jabs against the South Africa variant.
Countries with reported cases by February 5, 2021		73	11	32

*Still requires further study.

Table 1 shows the most notable coronavirus variants circulating in various parts of the world. *Source: US Centers for Disease Control and Prevention.*

B.1.1.7 variant. This mutation was first detected in the United States by the end of December 2020 but is estimated to have initially emerged in the United Kingdom in September 2020. This variant is more transmissible and associated with an increased risk of death compared to the other wild types. The CDC released a modelling study showing that this variant could become the predominant variant in the United States by March 2021.

P.1 variant. Originated and the prevailing variant in Manaus, Brazil, which caused a massive resurgence of 2 million people across the city. There is evidence that some mutations in this variant may affect the ability of antibodies to recognize and neutralize the virus. Researchers defined P.1 as the most concerning variant as it only took 1 month to dominate the outbreak in Manaus in comparison with B.1.1.7 variant in England that took 3 months. The variant was identified in Japan, where it was first discovered in travelers from Brazil during a routine airport screening, and in the United States.

B.1.351 variant. This variant was identified in samples dating back to October 2020 in South Africa. There is currently no substantial proof of its impact on disease severity, but some studies suggest that E484K (one of the spike protein mutations) may affect neutralization by some polyclonal and monoclonal antibodies. Cases were also reported to be present in the United States and Zambia.

The rapid evolution of SARS-CoV-2 variants is a growing threat globally. Experts say the virus can evolve into a vaccine-resistant phenotype, and if that happens, previously approved vaccines need to be updated as well. However, the increased transmissibility remains the major concern at present, and mass vaccination efforts should be implemented especially in vulnerable communities.

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The Global COVID-19 Vaccine Efforts and What We Know So Far

The global feat to develop and distribute an effective vaccine for SARS-CoV-2 prompted various promising options. Active efforts to combat the pandemic are slowly realized as the vaccines began to roll out a few months ago in some parts of the world. Presently, the immunization of a large-scale of the world population is vital for getting the pandemic leveled out. Yet, it is facing a new set of difficulties, including the emergence of notable new variants of the virus, global conflict over a limited supply of doses, and vaccine hesitancy. Logistics and inadequate cold storage facilities for vaccines also set untoward drawbacks in some countries. Despite these setbacks, as of February 2021, over one hundred million doses have already been administered worldwide. Many countries are taking eager action immunizing their citizens, while nearly all have either vaccinated only a fraction of their population or are yet to start. With more vaccines being rolled out, everyone is encouraged to work together to prevent the further spreading of the virus and follow science-based guidelines.

Table 2.1 Comparison of Leading COVID-19 Vaccines (As of 11 February 2021)

DEVELOPER	Vaccine Name	Country	Description	Clinical Phase	Efficacy	Dosage	Approved in at least one country
Pfizer/ BioNTech	BNT162b2	United States Germany	Pfizer was the first company to report positive phase 3 clinical data.	2 and 3	95%	2	Yes
Moderna	mRNA-1273	United States	Moderna and Pfizer both use a new vaccine approach involving messenger RNA.	3	95%	2	Yes
Oxford/ AstraZeneca	AZD1222	United Kingdom Sweden	Using an adenovirus-vectored technology. It is a harmless, modified version of a common cold virus that usually only spreads among chimpanzees.	3	62 to 90%*	2	Yes
Novavax	NVX-CoV2373	United States	A protein-based vaccine that also has a significant clinical efficacy against both UK and South Africa variants aside from COVID-19.	3	89%	2	<i>Pending</i>
Johnson & Johnson	Ad26.COVS.2.S	United States	The easiest to distribute requiring just one dose and standard refrigeration. J&J announced a separate trial with two doses in November.	2 and 3	57 to 85%**	1	<i>Pending</i>
Sinovac Biotech	CoronaVac	China	Sinovac's vaccine triggers an immune response using the COVID-19 virus itself, after it has been chemically inactivated.	3	50%	2	Yes
Gamaleya	Sputnik V	Russia	A variation of the Russian vaccine, known as Sputnik V. It is currently available in limited quantities.	3	92%	2	Yes
Vector Institute	EpiVacCorona	Russia	An antigen-based vaccine developed in Siberia. Wherein its immunological effectiveness is reported to be 100% in early-stage trials.	3	100%*	2	Yes
CanSino Biologics	Ad5-nCoV or Convidecia	China	This was approved for the Chinese military even before late-stage tests began. It uses a harmless cold virus to deliver its genetic payload.	3	65.7%*	1	Yes
Sinopharm	BBIBP-CorV	China	Sinopharm administered hundreds of thousands of doses before its vaccine was fully tested.	3	79%	2	Yes
Bharat Biotech	Covaxin	India	An inactivated vaccine which is made up of killed coronaviruses.	3	90%*	2	Yes

Source: Council on Foreign Relations

*Efficacy depends on dosage.

**Efficacy depends on severity of infection and on COVID-19 variant.

GUIDE TO ESCO COVID-19 VACCINE STORAGE

Pfizer/BioNTech

-  Storage temperature: -70°C
-  Trial size: 44K
-  Doses required: 2
-  Efficacy: 95%



UUS-597B-_-SS

Table 2.2 Pfizer-BioNTech BNT162b2 COVID-19 vaccine requires a storage temperature of -70°C for 6 months. The table shows estimates of **Lexicon® II Ultra-low Temperature Freezer's** vaccine storage capacity.

	MODEL	DOSES	VIALS
UUS-363	3 inner doors	58,500	11,700
	5 inner doors	52,650	10,530
UUS-480	3 inner doors	117,000	23,400
	5 inner doors	105,300	21,060
UUS-597	3 inner doors	175,500	35,100
	5 inner doors	157,950	31,590
UUS-714	3 inner doors	175,500	35,100
	5 inner doors	157,950	31,590

Figures are only an estimation and does not represent the actual storage capacity.

Moderna

-  Storage temperature: 2-8°C/20°C
-  Trial size: 30K
-  Doses required: 2
-  Efficacy: 95%



HR1-1500T-_-

Table 2.3 Moderna mRNA-1273 COVID-19 vaccine requires a storage temperature of 2°C to 8°C for 30 days. The table shows estimates of **HP Series Laboratory Refrigerator's** vaccine storage capacity.

	MODEL	DOSES	VIALS
HR1-140	2 shelves	8,000	800
HR1-400	4 shelves	36,000	3,600
HR1-700	4 shelves	49,500	4,950
HR1-1500	8 shelves	99,000	9,900

Figures are only an estimation and does not represent the actual storage capacity.




HF2-1500S-_-


Table 2.4 Moderna mRNA-1273 COVID-19 vaccine requires a storage temperature of -20°C for 6 months. The table shows estimates of **HP Series Laboratory Freezer's** vaccine storage capacity.


	MODEL	DOSES	VIALS
HF2-140	2 shelves	8,000	800
HF2-400	4 shelves	36,000	3,600
HF2-700	4 shelves	49,500	4,950
HF2-1500	8 shelves	99,000	9,900

Figures are only an estimation and does not represent the actual storage capacity.

Oxford/AstraZeneca

 Storage temperature: 2-8°C

 Trial size: 65K

 Doses required: 2

 Efficacy: 70%



Table 2.5 Oxford-AstraZeneca AZD1222 COVID-19 vaccine requires a storage temperature of 2°C to 8°C for 6 months. The table shows estimates of **HP Series Laboratory Refrigerator's** vaccine storage capacity.


MODEL	DOSES	VIALS
HR1-140	1 shelf	14,400
HR1-400	4 shelves	24,000
HR1-700	4 shelves	24,000
HR1-1500	8 shelves	48,000

Figures are only an estimation and does not represent the actual storage capacity.

Johnson & Johnson

 Storage temperature: 2-8°C

 Trial size: 70K

 Doses required: 1

 Efficacy: 66%



Table 2.6 Johnson & Johnson Ad26.COVS.S COVID-19 vaccine requires a storage temperature of 2°C to 8°C for 3 months. The table shows estimates of **HP Series Laboratory Refrigerator's** vaccine storage capacity.

MODEL	DOSES	VIALS
HR1-140	2 shelves	12,500
HR1-400	4 shelves	41,800
HR1-700	4 shelves	79,800
HR1-1500	8 shelves	159,600

Figures are only an estimation and does not represent the actual storage capacity.

Even with several vaccines approved for use, the tremendous challenge of producing enough for the world's population remains. And while we work to eradicate the COVID-19, let us abide by the health protocols and with deliberate efforts, establish hope amid the uncertainty.

COVID-19
Vaccines

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Equipment Spotlight: Worldwide Installations of Cold Storage Solutions

Esco is proud to take part in the global efforts to sustain the response to COVID-19. We have been providing world-leading and internationally certified equipment used in viral testing. And now that the vaccines are gradually made available in different parts of the world, we are committed to supplying efficient cold storage solutions for vaccine storage.

The cold chain, sometimes referred to as the vaccine supply chain poses great importance in keeping vaccines within their required temperatures, from the point of manufacture to the point of administration. Appropriate vaccine storage and handling practices play a vital role in protecting individuals and communities from vaccine-preventable diseases. Vaccines are sensitive biological products and their potency can reduce when exposed to inappropriate temperatures. Once lost, vaccine potency cannot be regained. Thus, vaccines must be protected from temperature extremes to maintain quality. A reliable cold storage is a key factor in maintaining the efficacy of these temperature-sensitive products.

Engineered with excellent and effective cooling technology, our wide range of cold storage solutions are exceedingly reliable and qualified to support the COVID-19 vaccine race and its challenges in cold chain management and distribution. Various institutions worldwide have chosen Esco to provide reliable cold chain solutions for vaccine storage. We are beyond grateful to spare no effort in providing support and assistance to our customers.

Here are some global installations of our cold chain solutions to help suffice the needs in vaccine storage.

Bangladesh



Chattogram Veterinary and Animal Sciences University (CVASU)
- 1 unit of Laboratory Freezer and Ultra-low Temperature Freezer

Bangladesh Institute of Nuclear Agriculture (BINA)
- 2 units of Laboratory Freezer



Department of Livestock Services (DLS)
- 2 units of Laboratory Freezer

National Institute of Cancer Research and Hospital (NICRH)
- 8 units of Laboratory Refrigerator

Indonesia



PT Genetika Science Indonesia in Tangerang, Banten Province
- 1 unit of Laboratory Freezer and Ultra-low Temperature Freezer

Philippines



Research Institute for Tropical Medicine, Muntinlupa
- 1 unit of Ultra-low Temperature Freezer

Photo courtesy of Department of Health FB page

Malaysia



Research Lab in UCSI Hospital, Port Dickson
- 1 unit of Ultra-low Temperature Freezer and 3 units of Laboratory Refrigerator



Inpatient Pharmacy in IIUM hospital
- 1 unit of Ultra-low Temperature Freezer

Thailand



Faculty of Pharmacy, Chiang Mai University, Chiang Mai Province
- 1 unit of Ultra-low Temperature Freezer

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Adapt and Innovate: Esco to Launch a New Website and Product!

In the past year, the company shifted from Esco Group of Companies to Esco Lifesciences Group and launched a new tagline “Improving Lives through Science.” The transformation of the company name and brand signifies Esco’s vigor in keeping up, responsive, and adaptive with the fast-changing world while keeping focused on its mission to deliver enabling technologies and provide service all over the world. In line with the change, a new and improved website — www.escolifesciences.com is about to launch!

The website’s new look and exciting features will showcase how the company continuously strives to provide innovative solutions from equipment production to technological advances.

Here are some of the new features to watch out for:

- **A-Z product list** – shows the complete list of products across all business units, arranged alphabetically for easy navigation.
- **Product Filters** – provides a hassle-free process of determining the best standard model based on the provided specifications.
- **Frequently Asked Questions** – lists commonly asked queries regarding an equipment.
- **Resource Posters** – infographics about product applications, do’s and don’ts, safety tips and more.
- **Solutions Tab** – displays a workflow process per specific industry and recommends the suitable equipment.
- **Service Tab** – showcases the general service procedures per laboratory equipment and the list of services Esco offers.
- **Improved News section** – articles can easily be sorted per type (press releases, product announcement, events, etc.) and brand (Esco Scientific, Esco Medical, Esco Pharma, Esco TapeStleRx, Esco VacciXcell, and Esco Aster).
- **Simple and Intuitive User Interface**



Introducing Esco Ceiling Air Purifier

As an advocate of safety and a pioneer of clean air technology, Esco Lifesciences Group proudly launches **Esco Ceiling Air Purifier**. This new product is equipped with a plasma air purification technology that effectively reduces dust, disinfects, and deodorizes — the ideal solution for providing cleaner air indoors!

Main Features:

- Low Noise Operation – prevents distraction and creates a serene environment.
- Energy-saving – low power consumption translates to more savings.
- Effective Filter System – options of carbon and HEPA filters for the removal of dust, particles, and odors.

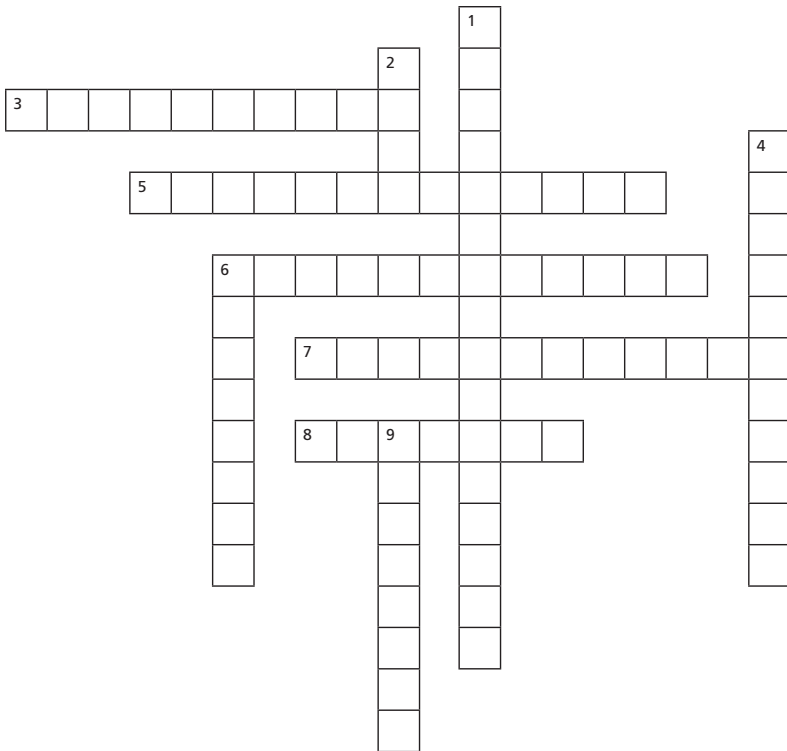
Key Benefits:

- Reduces allergens
- Provides clean air
- Removes odors and VOCs
- Disinfects and sterilizes



Esco Ceiling Air Purifier

The Search for the COVID-19 Vaccine



Answers will be revealed on the next issue.

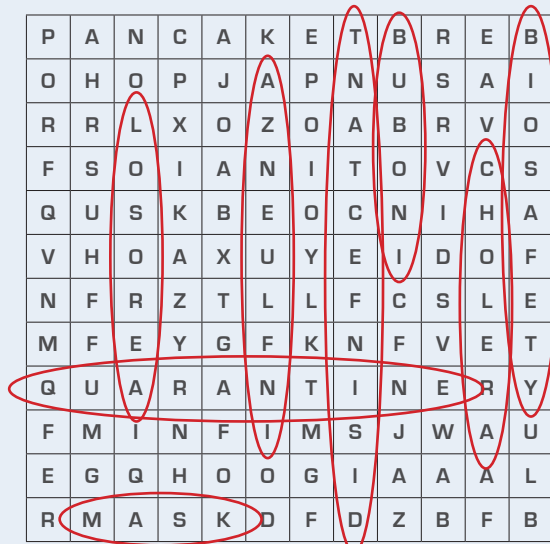
DOWN

1. An added dose of vaccine administered to support the previously injected vaccine dose
2. Moderna and Pfizer/BioNTech vaccine type
4. It is a process of injecting the vaccine into the body
6. A Russian vaccine developed by Gamaleya Research Institute of Epidemiology and Microbiology that uses adenoviral vector
9. A protein produced as a reaction of the body to a foreign substance

ACROSS

3. Provides up to -80°C storage temperature, ideal storage for RNA-based vaccines
5. A study conducted to test the vaccine's efficacy and effects on people
6. A protein that allows SARS-CoV-2 to penetrate host cells and cause infection
7. A process done to develop a resistance to a disease wherein the body is exposed to a weakened type of the virus to trigger an immune response
8. A test substance that doesn't affect the body; an inactive drug

Here is the solution to last issue's SLAY THAT PANDEMIC!



Quick Guide to Proper Vaccine Storage



Vaccines make a substantial contribution to global health. It works by training the immune system to recognize and fight off the targeted pathogens such as viruses or bacteria. It gives us the immunity to avoid contracting a disease. To guarantee the viability of these temperature-sensitive products, it is vital to know their proper storage and preservation from the time they are manufactured until they are administered.

Here are some Do's and Don'ts of Vaccine Storage:



USE A PURPOSE-BUILT COLD STORAGE

It is highly recommended to purchase or use a laboratory-grade refrigerator and freezer to avoid unexpected equipment failures that can lead to sample spoilage and wastage.



FIRST TO EXPIRE, FIRST OUT

Always follow proper sample arrangement and stock vaccines according to the expiration date. The First to Expire, First Out or FEFO, is an inventory management method that allows for products with the shortest shelf-life to be distributed or used first.



EQUIP YOUR COLD CHAIN WITH DATALOGGERS

Digital data logger allows vaccine providers to set alarms when there are temperature fluctuations. It also provides more accurate monitoring as compared to chart recorders and secures the vaccine's storage conditions.



NEVER STORE LOOSE VIALS

Always store vaccines in their original packaging until ready for use. Loose vials may increase the risk of administration errors and vaccines' exposure to light.



DO NOT STORE FOOD

Do not place food or beverages in the same storage unit as the vaccines. Never use your cold storage equipment in the laboratory as storage for products intended for consumption.



PROPER LABELING AND ARRANGEMENT

Arrange vaccines and diluents in rows and allow space between each row to promote airflow. Avoid overcrowding and arrange all products properly. Allow space between each row to promote uniform airflow.



STORE AT APPROPRIATE TEMPERATURES

Exposure to temperatures outside required ranges may result in reduced vaccine potency and increased risk of vaccine-preventable diseases.

Vaccines save lives.
Do your part and store them properly.



SCAN HERE