VIGICARIB NEWS

16TH JANUARY, 2021

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OVERVIEW

This issue includes:

- Case Safety Reports to VigiCarib Network
- CARICOM COVID-19 Vaccine Safety Reports in VigiBase
- Summary of Case Safety Reports from CARICOM to WHO Programme for International Drug Monitoring (PIDM)
- Global Alerts of Substandard / Falsified Medical Products
- COVID-19 Vaccines and Therapeutics: Regulatory Updates
- COVID-19 Resources for Regulation and Vigilance

Note to Reader:

The following summary presents data on case reports of adverse events following immunization (AEFIs) with COVID-19 vaccines, and suspected adverse drug reactions, based on Individual Case Safety Reports (ICRSs) in regional (CRS) and global databases (WHO). The ICSRs in the global database have been submitted by national pharmacovigilance centres in CARPHA Member States with membership in the WHO Programme for International Drug Monitoring (PIDM). The information provided is ***for descriptive purposes*** *only, e.g. reporting trends. Some of the ICSRs may not have been clinically reviewed or may be pending investigation.*

Any assessment of an association between COVID-19 vaccines and an increased risk of a given outcome requires additional investigation to get full information*.*

CASE SAFETY REPORTS TO VIGICARIB NETWORK

Between 16th December, 2021 and 15th January 2022, the CRS received three (3) case reports of suspected adverse drug reactions (ADRs), and adverse events following immunization (AEFIs) from focal a pharmacovigilance focal point:

- Suspected ADRs (1): Saint Vincent and the Grenadines
- AEFIs (1): Saint Vincent and the Grenadines.

All case reports that were received from the public or market authorization holders were submitted to the national focal points for local verification and follow-up.

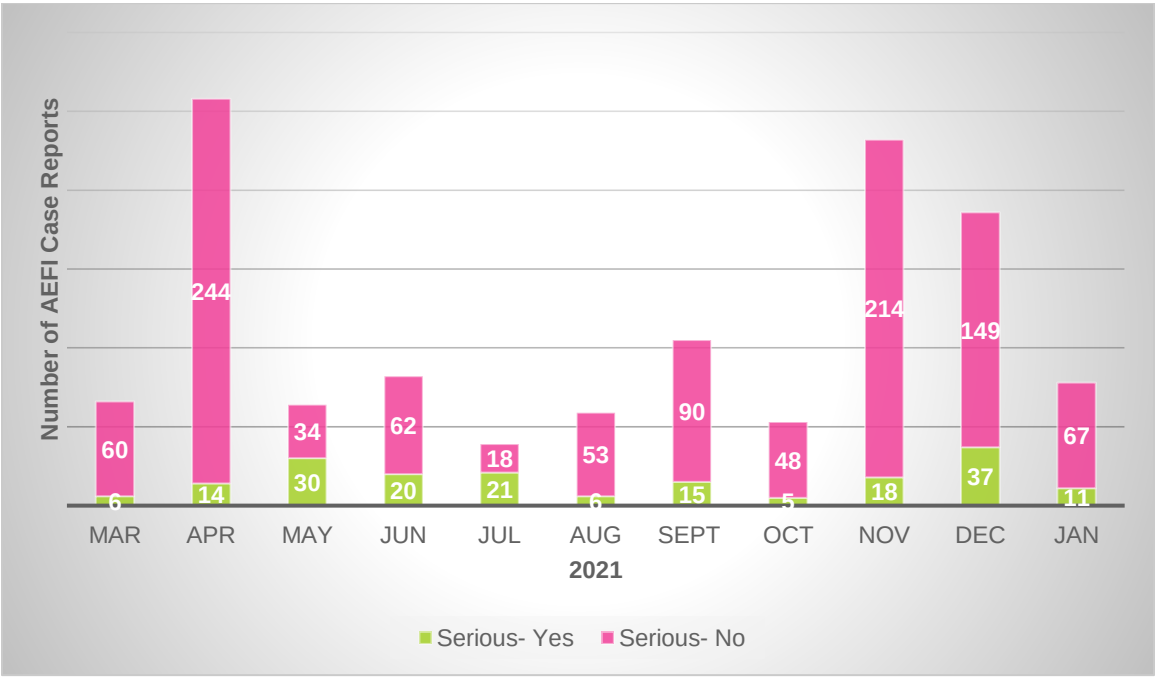
In all, 472 case reports have been shared with VigiCarib network since its inception in November 2017, consisting of suspected adverse drug reactions (297 – 62.9%), substandard / falsified medical products (98 – 20.9%), and adverse events following immunization (77 – 16.2%) – Table A1 (See Appendix I – *restricted circulation*).

CARICOM COVID-19 VACCINE SAFETY REPORTS IN GLOBAL DATABASE

As of 15th January 2022, there were 1,220 case reports of AEFIs involving COVID-19 vaccines in VigiBase from Barbados (46.1%), Jamaica (52.2%) and St Vincent and the Grenadines (1.7%), primarily involving persons under 65 years (85.1%), and females (932 reports, 76.4%) – Table 1. Most reports were submitted in April 2021 – Figure 1.

Seventy-eight (78) additional reports were submitted up to 15th January 2022, and the most commonly reported reactions were headache, fever, chills, fatigue, and myalgia – Table 3.

Figure 1: Case reports of adverse events following immunization (AEFIs) with COVID-19 vaccines from 1st March 2021 to 15th January, 2022.



One hundred and fifty-one (176) reports (14.4%) have been classified as Serious, with 34 deaths – Figure 2, Table 3. The reported ICSRs involved the following vaccines:

- COVID-19 vaccine NRVV Ad (ChAdOx1-S recombinant) AstraZeneca
- COVID-19 vaccine NRVV Ad26 (Gam-Covid-Vac – Sputnik V)
- Tozinameran (Pfizer-BioNTech COVID-19 vaccine)
- COVID-19 vaccine NRVV Ad26 (JNJ 78436735) Johnson & Johnson
- COVID-19 vaccine inact (Vero) HB02
- Elasomeran, COVID-19 Vaccine Moderna
- Covid-19 Vaccine (unspecified).

Note: *The case reports describe events that occurred after vaccination, which may include coincidental events that are not attributed to the vaccine(s).*

Data from the Pan American Health Organization's (PAHO) dashboard on COVID-19 vaccines administered in various Caribbean countries supported the estimation of the reporting rate of AEFIs per 100,000 doses for countries reporting to the global database. These estimates include coincidental and/or unconfirmed reports. Among the reporting countries, the estimated reporting rate was 75.5 AEFI reports per 100,000 doses of COVID-19 vaccines administered, with 11 serious adverse events reported per 100,000 doses. Information was not available on number of events by specific vaccine.

Table 1: Consolidated number of reported adverse events and reporting rate, by country as of 15th January, 2022

Country	Total doses administered	Total events	Events per 100,000 doses	No. of SAEs	SAEs per 100,000 doses
Barbados	302,493	562	185.8	71	23.5
Jamaica	1,251,085	637	50.9	99	7.9
Saint Vincent and the Grenadines	62,308	21	33.7	6	9.6
Total	**1,615,886**	**1,220**	**75.5**	**176**	**10.9**

Key: SAE – serious adverse event

Table 2: Patient Age Groups Reported (n=1,220)

Patient age	Count	Percentage
12 – 17 years	76	6.2%
18 - 44 years	550	45.1%
45 - 64 years	412	33.8%
65 - 74 years	87	7.1%
≥ 75 years	57	4.7%
Unknown	38	3.1%

Table 3: Top Reported Reaction Terms (n=1,220)

Top Reported terms (MedDRA)	Count	Percent
PT: Headache	399	32.7%
PT: Pyrexia	270	22.1%
PT: Fatigue	242	19.8%
PT: Chills	236	19.3%
PT: Dizziness	227	18.6%
PT: Myalgia	200	16.4%
PT: Arthralgia	184	15.1%
PT: Vaccination site reaction	155	12.7%
PT: Malaise	142	11.6%
PT: Nausea	142	11.6%

Figure 2: AEFI Case Reports by Seriousness (n=1,220)

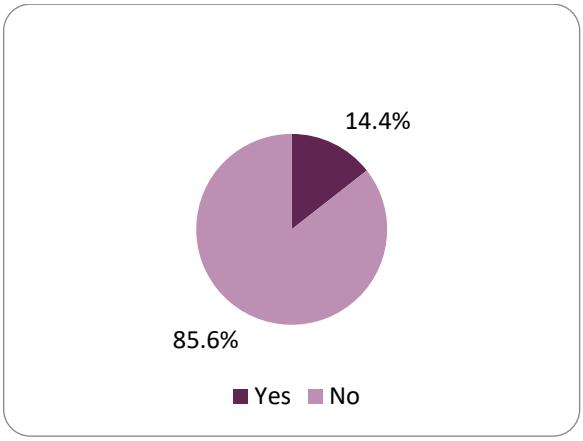


Table 4: Seriousness of Cases (n=176)

Seriousness criteria	Count	Percent
Death	34	2.8%
Life threatening	14	1.1%
Caused/prolonged hospitalization	48	3.9%
Disabling/incapacitating	26	2.1%
Other medically important condition	77	6.3%

Note: Total exceeds 176 due to selection of multiple seriousness criteria in individual case reports

SUMMARY OF CASE SAFETY REPORTS FROM CARICOM TO WHO PIDM

A review of the Uppsala Monitoring Centre's VigiLyze identified 3,732 case reports from CARICOM countries with membership in the WHO Programme for International Drug Monitoring (PIDM) – 1,220 AEFI case reports, and 2,512 reports of suspected adverse drug reactions (ADRs). Table 5 identifies the number of case reports of suspected adverse drug reactions submitted by Member States between April 2007 and 15th January, 2022, inclusive of reports submitted by the CRS on behalf of Member States. Most of the case reports involved adults – Table 6.

Between 16th December, 2021, and 15th January, 2022, 168 case reports were submitted to VigiBase from CARICOM: 119 AEFI reports, 49 ADR reports - Appendix I.

Table 5: All VigiBase Reports from CARICOM: suspected ADRs/AEFIs

Countries	Count	Percentage
Barbados	1,329	35.6%
Dominica	14	0.4%
Guyana	14	0.3%
Haiti	18	0.5%
Jamaica	1,663	44.6%
Saint Vincent and the Grenadines	471	12.6%
Suriname	221	5.9%
Virgin Islands (British)	4	0.1%

Table 6: ICSR Patient Ages Reported

Patient age	Count	Percent
0 - 27 days	10	0.3%
28 days to 23 mth	104	2.8%
2 - 11 years	89	2.4%
12 - 17 years	119	3.2%
18 - 44 years	1,144	30.7%
45 - 64 years	1,081	29.0%
65 - 74 years	392	10.5%
≥ 75 years	271	7.3%
Unknown	**502**	14.1%

GLOBAL ALERTS OF SUBSTANDARD / FALSIFIED VACCINES AND MEDICINES

WHO Medical Product Alert

WHO advises regulatory authorities and the public to increase vigilance within the supply chains of countries and regions likely to be affected by these falsified products. Increased vigilance should include hospitals, clinics, health centers, wholesalers, distributors, pharmacies, and any other suppliers of medical products.

All medical products must be obtained from authorized/licensed suppliers. The products' authenticity and physical condition should be carefully checked. Seek advice from a healthcare professional in case of doubt.

Table 7: Medical Product Alert 2021

Alert number and date	Product	Manufacturer	Alert summary
N°8.2021 21 December 2021	Combiart (Artemether and Lumefantrine)	Strides Arcolab Ltd.	The expiry date on the packaging is 10/2021, while the expiry date on the blister is 10/2022 The falsified product has a Tanzania Reg No TZ13H260 on the blister
N° 9/2021 22 December 2022	Soliris (Eculizumab)	Alexion	Deliberately / fraudulently misrepresent their identity, composition or source

The detection and response to substandard, falsified and/or unregistered medical products is a challenge to regulatory authorities and national systems with limited capacity. The presence of substandard and/or falsified and/or unregistered medicines, vaccines or test kits for COVID-19 poses a threat to the prevention of deaths and hospitalization and undermines the needed efficacy in the treatment of the disease. Poorly treated infections also create opportunities for antimicrobial resistance, and more severe disease and death.

The following is a brief list that technical officers in regulatory divisions may keep on hand for their own use or for patient education.

Identifying a Substandard or Falsified Medical Product (WHO SF products)

Some falsified medical products are almost visually identical to the genuine product and very difficult to detect. However, many can be identified by:

- Examining the packaging for condition, spelling mistakes or grammatical errors;
- Checking the manufacture and expiry dates and ensuring any details on the outer packaging match the dates shown on the inner packaging; and
- Ensuring the medicine looks correct, is not discoloured, degraded, or has an unusual smell.

Patients or consumers should be advised to:

- Discuss anomalies with a doctor or pharmacist as soon as possible if he or she suspects the product is not working properly or he or she has suffered an adverse reaction;
- Refrain from buying, receiving or using medicines or vaccines from unauthorized or unregulated sources; and
- Report suspicious medical products to the National Medicines Regulatory Authority.

COVID-19 VACCINES AND THERAPEUTICS: REGULATORY UPDATES

Overview of COVID-19 Vaccine Development and Approvals:

- 140 candidate vaccines are in clinical development: 31 in Phase 3 trials, and 10 in Phase 4 trials; Figure in COVID-19 Vaccines and Therapeutics Regulatory Tracker (Phases tab).

- 33 vaccines have received regulatory approvals in various countries, and 22 are at various stages of engagement with WHO for emergency use listing (EUL) – Table 8.

- 11 COVID-19 vaccines that have been approved by WHO for EUL to date. CARPHA-CRS has reviewed and recommended all to Member States to date with the most recent reviews for NUVAXOVID™ by Novavax, and COVOVAX™ by Serum Institute of India: Table 7 (See full List of CRS Recommended products).

- COVID-19 vaccines' performance against variants of concern (VOC) is provided based on WHO's Weekly Epidemiology Update (11th January, 2022): Table 9.

- On 14th January, 2022, the WHO recommended two additional medicines for use in treatment of COVID-19, and issued a conditional recommendation against two medicines, in its Therapeutics and COVID-19: Living Guideline:
    - Baricitinib – strongly recommended as an alternative to interleukin-6 blockers in combination with corticosteroids in patients with severe or critical COVID-19
    - Sotrovimab – conditionally recommended for use in patients with non-severe COVID-19 for those at highest risk of hospitalization
    - Ruxolitinib and tofacitinib – conditional recommendation against use in patients with severe or critical COVID-19.

- Roche, the market authorization holder for Ronapreve™ (casirivimab and imdevimab), which has been recommended by the CRS under a different trade name, has issued a notice regarding the medicine's reduced efficacy against the Omicron variant of the SARS-CoV2 virus. This medicine has received a conditional recommendation for use under the WHO treatment guidance for COVID-19, and remains authorized by the European Medicines Agency, Health Canada and Swissmedic (Appendix II). The CRS maintains the inclusion of this medicine on its list of recommended products. The notice may be found at Roche Statement – Ronapreve.

COVID-19 RESOURCES FOR REGULATION, CAPACITY-BUILDING AND VIGILANCE

Resource	Description and Link
CARPHA COVID-19 Webpage	This page provides media releases on regional responses to COVID-19, CARPHA Situation Reports, and Technical Guidance: https://www.carpha.org/What-We-Do/Public-Health/Novel-Coronavirus.
CARPHA CRS VigiCarib Online Reporting Forms	Adverse Events Following Immunization: VigiCaribVaccine Reporting Form Adverse Drug Reactions, and Substandard / Falsified / Unregistered Medical Products: VigiCarib Reporting Form
PAHO COVID-19 Webpage	URL: https://www.paho.org/en/topics/coronavirus-infections/coronavirus-disease-covid- 19-pandemic
PAHO Technical Documents	URL: https://www.paho.org/en/technical-documents-coronavirus-disease-covid-19.
PAHO Ongoing Living Update of Potential COVID-19 Therapeutics	A summary of evidence on potential therapeutic options for COVID-19, examines 137 therapeutic options. 14th Sept. 2021 (26th edition) URL: https://iris.paho.org/handle/10665.2/52719?locale-attribute=pt
PAHO Periodic Updates on AEFIs	Consolidated regional and global information on adverse events following immunization (AEFI) against COVID-19 and other updates. 6 September 2021 (24th Edition): URL: https://covid-19pharmacovigilance.paho.org/img/recursos/6149f68feac75ba163ce2dedb.pdf
WHO Technical Guidance for evaluation of COVID-19 Vaccines	WHO guidance documents for candidate COVID-19 vaccines. URL: https://www.who.int/teams/health-product-and-policy-standards/standards-and- specifications/vaccine-standardization/
WHO Strategic Advisory Group of Experts on Immunization (SAGE)	COVID-19 Vaccine Technical Documents URL: https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/covid-19-materials
WHO Technical Documents for Vaccines and Biologicals	Relevant WHO documents for SARS-CoV-2 vaccines and other biologicals URL: https://www.who.int/biologicals/Relevant_WHO_documents_for_SARS-CoV-2_vaccines_and_other_biologicals.TZ.IK.7_Apr_2020.pdf
WHO COVID-19 Vaccines Safety Surveillance Manual	The COVID-19 vaccine safety guidance manual of Global Advisory Committee on Vaccine Safety (GACVS). URL: https://www.who.int/publications/i/item/10665338400
WHO Regulatory Updates on COVID-19	URL: https://www.who.int/teams/regulation-prequalification/eul/covid-19
WHO Guidelines for MedicineDonations	URL: https://www.who.int/selection_medicines/emergencies/guidelines_medicine_donations/en/
WHO Lot Release of Vaccines by NRAs	URL: https://www.who.int/biologicals/areas/vaccines/lot_release/en/
WHO Model packaging for COVID-19 vaccines	URL: https://www.who.int/teams/regulation-prequalification/eul/covid-19/covid-19-model-packaging

Table 8: COVID-19 Vaccines with Regulatory Approvals by WHO EUL Consideration

Vaccine/ WHO EUL Holder	Vaccine Platform	Dosing/ Storage ¥/ Approvals	NRA of record	WHO Approved Drug Product site(s)	Recommendation issued
WHO EUL status – Approved					
Recommended by CRS					
COMIRNATY®; Pfizer-BioNTech COVID-19 Vaccine COVD-19 mRNA Vaccine (nucleoside modified)/ BioNTech Manufacturing GmbH *Ready-to-Use formulation	mRNA (nucleoside modified)	2 doses I.M. -90°C to -60°C (9 mo.); 2°C to 8°C (31 days / 10 wks*) CARPHA + 134 countries Full Market authorization by US FDA (16yrs+)	European Medicines Agency	**Baxter Oncology GmbH**, Germany **BioNTech Manufacturing GmbH,** Germany **Pfizer Manufacturing Belgium NV,** Belgium **Novartis Pharma Stein AG,** Switzerland **Mibe GmbH Arzneimittel,** Germany **Delpharm Saint-Remy,** France **Sanofi-Aventis Deutschland GmbH,** Germany **Siegfried Hameln GmbH,** Germany. **Patheon Italia S.p.A**, Italy.	31st December 2020
			United States Food and Drug Administration	**Pharmacia & Upjohn Company LLC,** USA **Hospira Inc., a Pfizer company,** USA **Exelead, Inc.**, IN, United States	16th July, 2021
VAXZEVRIA® COVID-19 Vaccine (ChAdOx1-S [recombinant])/ AstraZeneca AB + SK Bioscience Co. Ltd and AstraZeneca AB	Recombinant ChAdOx1-S adenoviral vector	2 doses I.M. 2°C to 8°C (6 mo.) South Korea via COVAX / PAHO + CARPHA + 136 countries	European Medicines Agency	**SK Bioscience**, Republic of Korea **Universal Farma, S.L.** ("Chemo"), Spain **Catalent Anagni S.R.L.**, Italy. **IDT Biologika GmbH**, Germany. **Seqirus Pty Ltd.**, Australia. **CP Pharmaceuticals Limited**, UK. **Amylin Ohio LLC (AZ),** USA **Seqirus Pty Ltd.**, Australia.	15th February 2021
			European Medicines Agency	**SK Bioscience**, Republic of Korea **Universal Farma, S.L.** ("Chemo"), Spain **Catalent Anagni S.R.L.**, Italy. **IDT Biologika GmbH**, Germany. **Amylin Ohio LLC (AZ),** USA **CP Pharmaceuticals Limited**, UK.	16th April 2021
			Ministry of Health, Labour and Welfare, Japan	**Catalent Anagni S.R.L.**, Italy. **Daiichi Sankyo Biotech Co., LTD.**, Japan. **KM Biologics Co. Ltd.**, Japan. **Nipro Pharma Corporation Ise**, Japan	9th July 2021
			Therapeutic Goods Administration, Australia	**Catalent Anagni S.R.L.**, Italy. **IDT Biologika GmbH**, Germany. **Seqirus Pty Ltd.**, Australia. **CP Pharmaceuticals Limited**, UK. **Amylin Ohio LLC (AZ),** USA **Siam Bioscience Co., Ltd**, Thailand	9th July 2021
			Health Canada	**Catalent Anagni S.R.L.**, Italy. **IDT Biologika GmbH**, Germany.	27th August 2021

Vaccine/ WHO EUL Holder	Vaccine Platform	Dosing/ Storage ¥/ Approvals	NRA of record	WHO Approved Drug Product site(s)	Recommendation issued
				Seqirus Pty Ltd., Australia. **CP Pharmaceuticals Limited**, UK. **Amylin Ohio LLC (AZ),** USA	
			COFEPRIS (DP), Mexico ANMAT (DS), Argentina	**Liomont, S.A.,** Mexico	23rd December 2021
COVISHIELD™ COVID-19 Vaccine (ChAdOx1-S [recombinant])/ Serum Institute of India Pvt. Ltd	Recombinant ChAdOx1-S adenoviral vector	2 doses I.M. 2°C to 8°C (6 mo.) CARPHA + 47 countries	Central Drugs Standard Control Organization, India	**Serum Institute of India Pvt. Ltd,** India **SIIPL,** India	15th February 2021
COVID-19 Vaccine (Ad26.COV2-S [recombinant])/ Janssen–Cilag International NV	Viral vector (non-replicating)	1 dose I.M. -25°C to -15°C (24 mo.) 2-8°C (4.5 mo. within shelf-life) CARPHA + 105 countries Full market approval by Health Canada (23.Nov)	European Medicines Agency	**Janssen Biologics B.V**, The Netherlands **Janssen Pharmaceutica NV**, Belgium **Aspen SVP**., South Africa **Catalent Indiana LLC**., USA. **Grand River Aseptic Manufacturing Inc**., USA. **Catalent Anagni S.R.L**., Italy. **Merck Sharp & Dohme (MSD) Corp**., USA	12th March 2021;
SPIKEVAX™ COVID-19 mRNA Vaccine (nucleoside modified)/ Moderna Biotech and ModernaTX, Inc	mRNA-based in lipid nanoparticle (LNP)	2 doses I.M. -25°C to -15°C (7 mo.); 2-8°C (30d) or 9-25°C (12h) CARPHA + 85 countries	European Medicines Agency	**Rovi Pharma Industrial Services, S.A.,** Spain	30th April 2021
			United States Food and Drug Administration	**Baxter Pharmaceutical Solutions**, USA. **Catalent Indiana, LLC**, USA	6th August, 2021
			Ministry of Food and Drug Safety (MFDS), Rep. of Korea	**Samsung Biologics**, Republic of Korea	23rd December 2021
Inactivated COVID-19 Vaccine (Vero Cell)/ Beijing Institute of Biological Products Co., Ltd. (BIBP)	Inactivated virus	2 doses I.M. 2°C to 8°C (24 mo.) CARPHA + 87 countries	National Medical Products Administration, China	**Beijing Institute of Biological Products Co., Ltd**., People's Republic of China.	7th May 2021
CoronaVac™ COVID-19 Vaccine (Vero Cell), Inactivated/ Sinovac Life Sciences Co., Ltd	Inactivated virus	2 doses I.M. 2°C to 8°C (12 mo.) CARPHA + 52 countries	National Medical Products Administration, China	**Sinovac Life Sciences Co., Ltd**., P.R.China.	1st June 2021
COVAXIN® Covid-19 vaccine (Whole Virion Inactivated Corona Virus vaccine)/ Bharat Biotech International Ltd	Whole virion inactivated	2 Doses I.M. 2°C to 8°C (9 mo.) CARPHA + 13 countries	Central Drugs Standard Control Organization, India	**Bharat Biotech International Limited**, India	3rd November 2021
COVOVAX™ COVID-19 vaccine (SARS-CoV-2 rS Protein Nanoparticle [Recombinant])/ Serum Institute of India Pvt. Ltd	Protein subunit	2 doses I.M. 2°C to 8°C CARPHA + 3 countries (under CRS review)	Central Drugs Standard Control Organization, India	**Serum Institute of India Pvt. Ltd.,** India	17th December 2021
NUVAXOVID™ COVID-19 vaccine (SARS-CoV-2 rS	Protein subunit	2 doses I.M. 2°C to 8°C CARPHA + 31 countries	European Medicines Agency	**Serum Institute of India Pvt. Ltd.,** S. No. 105–110, India **Serum Institute of India Pvt. Ltd.,** 212/2, India	20th December 2021

Vaccine/ WHO EUL Holder	Vaccine Platform	Dosing/ Storage ¥/ Approvals	NRA of record	WHO Approved Drug Product site(s)	Recommendation issued
Recombinant, adjuvanted])/ Novavax CZ a.s.					
WHO EUL status – Pending/Not under review yet *(Not eligible for CRS review)*					
Gamaleya Research Institute & Russian Health Ministry (Sputnik V)	Adenovirus Viral vector (non-replicating)	2 doses I.M. 2°C to 8°C 74 countries	Russian NRA	Not applicable	Anticipated date pending
CanSino Biological Inc + Beijing Institute of Biological Products (Convidicea (Ad5-nCoV))	Adenovirus; Viral vector (non-replicat)	1 dose I.M. 2°C to 8°C 10 countries	National Medical Products Administration	Not applicable	Status of assessment-Ongoing
Sinopharm + China National Pharma. Group + Wuhan Institute of Biol. Products	Inactivated virus	2 doses I.M. 2°C to 8°C 2 countries	National Medical Products Administration	Not applicable	Status of assessment-Ongoing
CureVac (Zorecimeran: CVnCoV/CV07050101)	mRNA-based in lipid nanoparticle	2 doses I.M. 2°C to 8°C	European Medicines Agency	Not applicable	Application withdrawn by manufacturer
Vector State Research Ctre of Virology and Biotech. (EpiVacCorona)	Peptide vaccine	2 doses I.M. 2°C to 8°C 2 countries	Russian NRA	Not applicable	Pending expression of interest
Anhui Zhifei Longcom Biopharmaceutical, China + IMBCAMS (ZF2001)	Recombinant (protein subunit)	2 or 3 Doses I.M. 2°C to 8°C 3 countries	National Medical Products Administration	Not applicable	2 Pre-submission meetings held
Sanofi Pasteur CoV2 preS dTM-AS03 vaccine	Recombinant, adjuvanted	2 Doses I.M. 2°C to 8°C	European Medicines Agency	Not applicable	Status of assessment-Ongoing
Clover Biopharmaceuticals Inc. + GSK + Dynavax (SCB-2019)	Protein subunit	2 doses I.M. 2°C to 8°C	National Medical Products Administration	Not applicable	Status of assessment-Ongoing
BioCubaFarma – Cuba (Soberana 01, Soberana 02 Soberana Plus, Abdala)	SARS-CoV-2 spike protein	2 doses I.M. 2°C to 8°C	Center for State Control of Medicines, Equipment and Medical Devices	Not applicable	In discussion on submission

¥ - Storage information is provided primarily for sealed vials. See product information for additional details on storage and handling.

References:

McGill COVID19 Vaccine Tracker. **COVID-19 Vaccines**. Updated 21st January, 2022. Available at: https://covid19.trackvaccines.org/.

World Health Organization. **Status of COVID-19 Vaccines within WHO EUL/PQ evaluation process**. Updated 23rd December 2021. WHO, Geneva, 2020. Available at: https://www.who.int/teams/regulation-prequalification/eul/covid-19.

World Health Organization. **Draft landscape of COVID-19 candidate vaccines**. WHO, Geneva, 21st January, 2022. Available at: Draft landscape of COVID-19 candidate vaccines (who.int).

World Health Organization. **Emergency Use Listing Procedure for Vaccines**. WHO, Geneva 2021. Available at: https://www.who.int/teams/regulation-prequalification/eul/eul-vaccines.

Table 9: Summary of vaccine performance against variants of concern (VOC) relative to ancestral stains (as at 8th Jan, 2022)

	AstraZeneca - Vaxzevria/ SII – Covishield	Beijing CNPG - BBIBP-CorV	Janssen-Ad26.COV 2.5	Moderna - mRNA-1273	Pfizer BioNTech-Comirnaty	Sinovac - CoronaVac	Bharat-Covaxin	Novavax-SII, Covovax	Gamaleya-Sputnik V	Anhui ZL - Recombinant
Alpha (B.1.1.7)										
Summary of VE*	Protection retained against all outcomes									
Severe disease	↔2			↔2	↔6					
Symptomatic disease	↔ to ↓5			↔1	↔4			↓1		
Infection	↔ to ↓4			↔3	↔3					
Neutralization	↔ to ↓9	↔1	↔5	↔ to ↓15	↔ to ↓48	↔ to ↓↓8	↔2	↓2	↔ to ↓4	↔2
Beta (B.1.351)										
Summary of VE*	Protection retained against severe disease; reduced protection against symptomatic disease; limited evidence									
Severe disease			↔1	↔1	↔3					
Symptomatic disease	↔ to ↓↓↓2		↔1	↔1	↔2			↓↓↓1		
Infection				↔1	↓1					
Neutralization	↓ to ↓↓11	↓3	↓ to ↓↓9	↓ to ↓↓26	↓to↓↓57	↓to↓↓↓7	↓2	↓↓to↓↓↓2	↓↓to↓↓↓5	↔ to ↓3
Gamma (P.1)										
Summary of VE*	Unclear impact; very limited evidence									
Severe disease	↔1			↔1	↔2					
Symptomatic disease	↔1			↔1	↔1					
Infection	↔1			↔1	↔1	↔1				
Neutralization	↔ to ↓4		↔ to ↓5	↓10	↔ to ↓28	↓5		↓1	↓ to ↓↓3	↔1
Delta (B.1.617.2)										
Summary of VE*	Protection retained against severe disease; possible reduced protection against symptomatic disease and infection; limited evidence									
Severe disease	↔3		↓1	↔3	↔6					
Symptomatic disease	↓ to ↓↓6			↔2	↔ to ↓5		↓1			
Infection	↔ to ↓4		↓↓↓1	↔3	↔ to ↓3					
Neutralization	↓13	↓2	↔ to ↓↓9	↔ to ↓14	↔ to ↓39	↓to↓↓↓8	↔ to ↓3	↓1	↓ to ↓↓3	↔ to ↓2
Omicron										
Summary of VE*	Reduced protection against infection and symptomatic disease; possible reduced protection against severe disease; limited evidence									
Severe disease					↓↓/↓↓↓1					
Symptomatic disease	↓↓↓1			↓↓1	↓↓↓1					
Infection				↓↓↓1	↓↓↓2					
Neutralization	↓↓↓3		↓↓1	↓↓↓12	↓↓↓20	↓1		↓↓1		

VE refers to vaccine effectiveness and vaccine efficacy. *Summary of VE: indicates the general conclusions but only for the vaccines evaluated against the specific variant. Arrows generalize the magnitude of reduction in VE or neutralization: "↔" <10% reduction in VE, or VE >90% with no comparator, or that there was a <2-fold reduction in neutralization; "↓" 10 to <20% reduction in VE, or 2 to <5-fold reduction in neutralization; "↓↓" 20 to <30% reduction in VE, or 5 to <10-fold reduction in neutralization; "↓↓↓" ≥30% reduction in VE, or ≥10-fold reduction in neutralization. When more than one neutralization study is available, the interquartile range (25th and 75th percentiles) of fold-reductions across all studies for specific vaccine/variant was used. "Moderna-mRNA-

1273/Pfizer BioNTech-Comirnaty" indicates that both vaccines were evaluated together in study. The number of studies is shown as subscripts: vaccine effectiveness and neutralization studies informing this table can be found on the VIEW-hub Resources Library. References indicated by superscripts next to VOC name in column 1 are vaccine efficacy results from randomized controlled trials informing this table.

Annex 1. Additional notes on VOC impacts on vaccines

• Reductions in VE do not necessarily mean loss of protection, as indicated by the absolute VE estimate. For example, a 10-percentage point reduction in VE against symptomatic disease for mRNA vaccines would still mean high vaccine effectiveness of ~85%. Likewise, vaccines have shown higher VE against severe disease; thus, small reductions in VE against severe disease due to VOCs may still mean substantial protection.

• Table 3 summarizes the impact of VOCs on COVID-19 vaccine performance in the absence of waning, and, therefore, does not include studies that only assess VE greater than 4 months post final dose.

• Studies reporting VOC-specific VE estimates for full vaccination (≥7 days post final dose) are assessed against a comparator VE estimate for that vaccine product to determine level of reduction in VE. For symptomatic disease, VOC VE is compared against phase 3 RCT results from non-VOC settings. For severe disease and infection, due to instability or lack of phase 3 RCT estimates, VOC VE is compared to non-VOC VE estimates from the same study when available (or to Alpha VE from same study when assessing Beta, Gamma, or Delta); with an exception for AstraZeneca-Vaxzevria for infection (when a phase 3 estimate of VE against infection due to non-VOC is available and used as comparator). In some instances, a study may be included for severe disease or infection outcome even without a comparator if a very high VE estimate is reported against a VOC (i.e., >90%).

• It is also important to note that studies vary in population, outcome definitions, study design and other methodological considerations, which may in part explain differences when comparing VE estimates for a product between different studies. In addition, the reductions summarized in the table represent VE point estimates and do not represent the uncertainty intervals around these estimates which vary substantially across studies. The reductions in VE noted should be interpreted with these limitations in mind.

• Neutralization studies that use samples collected >7 days and < 6 months after complete vaccination and that use an ancestral strain as the reference are included.

Extracted from WHO Weekly Epidemiological Update: Edition 74, published 11th January, 2022. Available at: https://www.who.int/publications/m. *No table or updated information was published in the supplement dated 18th January 2022.*

INFORMATION

This newsletter is produced by the technical team of the CARPHA Caribbean Regulatory System **for the focal points of CARPHA Member States, drug safety officers, immunization programme managers, public health administrators and CARPHA staff** with an interest in the safety and quality of medicines and vaccines. A public version may be posted, however not all content shared with focal points will be publicized.

Technical Officer: Kerrine Ottley

Editor: Dr. Rian Marie Extavour

Email: VigiCarib@carpha.org