A QUARTERLY REPORT OF THE MINISTRY OF HEALTH AND WELLNESS

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CORONAVIRUS VID-19 EDITION

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### **Editorial**



2020 was an extraordinary year for Jamaica and the world. The COVID-19 infection and its impact globally and on Jamaica has been life changing. This was a once-in-a-100 year experience and there was no playbook prescribing a response; we had to adjust and learn as we went along.

This public health threat tested our strength as a people, our leadership as a Government, our resilience, courage, and public health expertise and infrastructure. We all witnessed with disbelief, shutdowns and restrictions on communities, workplaces, schools and other critical gatherings.

Life in Jamaica changed dramatically on Tuesday, March 10, 2020, when the first case of COVID-19 was announced. Two years later, and the statistics continue to mount - over 3,000 deaths and close to 160,000 infections as at December 4, 2022. We express our sincere condolences to the victims of COVID-19 and their family members and friends. I am sure the country mourns with them and our prayers continue to be for their strength and guidance.

I wish to record again my thanks and applause to the approximately 37,000 healthcare workers (both private and public), and our local, bi-lateral, and international partners for the hard work and sacrifice they have made to protect all of us from this, now-not-so novel coronavirus. In appreciation and gratitude for the unwavering dedication in the fight against the COVID-19 pandemic by healthcare workers, 2021 was designated the "International Year of Health & Care Workers" by the World Health Organization (WHO). In 2022, the Government of Jamaica, through the Ministry of Health & Wellness recognized our healthcare heroes during the month of July, which was declared "Healthcare Workers Appreciation Month".

I wish to give special recognition to the National Epidemiology Team of the Ministry of Health & Wellness, who made tremendous sacrifice and showed commitment to country during the COVID-19 fight.

Thank you also to the Jamaican people, who amidst fear and uncertainty remained steadfast in their support of the Government's efforts, which resulted in the spread of the virus being less than initially predicted. COVID-19 remains a clear and present danger to our population, and indeed to the world. This Government remains committed and sincere in addressing COVID-19 and taking decisions that are in the best interest of all Jamaicans.

Dr. the Hon. Christopher Tufton, MP Minister of Health & Wellness



### **COVID-19 Statistics at a Glance**

As at October 02, 2022 there were:

151,994 Confirmed Cases 3,326 Deaths

79.3% of confirmed cases were under 60 years of age



74.7% of COVID-19 deaths were 60 years and older

57.7% of confirmed cases were female



52.1% of COVID-19 deaths were male

Source: Data from: National Surveillance Unit. Ministry of Health and Wellness, Jamaica

Images from: www.freepik.com, www.vecteezy.com

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### Introduction

Globally, as of October 2, 2022, there have been **614,385,693** confirmed cases of Coronavirus Disease 2019 (COVID-19), including **6,522,600** deaths (*WHO Coronavirus Disease (COVID-19) Dashboard – October 2, 2022*). Jamaica reported its **first case** of COVID-19 on March 10, 2020. As of October 2, 2022, there were **151,994** confirmed cases and **3,326** deaths. The country performs assessments using the World Health Organization (WHO) definition of the categories for transmission patterns. Jamaica's transmission pattern timeline is shown in the table below.

### Transmission Patterns for Jamaica, Self-assessment

Date of Transmission Pattern Jamaica	Category	WHO Definition
Up to March 9, 2020	No cases	Countries/territories/areas with no cases
March 10, 2020	Sporadic cases	Countries/territories/areas with one or more cases, imported or locally detected
March 14, 2020	Clusters of cases	Countries/territories/areas experiencing cases, clustered in time, geographic location and/or by common exposures
August 30, 2020	Community transmission	Countries/area/territories experiencing larger outbreaks of local transmission defined through an assessment of factors including, but not limited to: - Large numbers of cases not linkable to transmission chains - Large numbers of cases from sentinel lab surveillance - Multiple unrelated clusters in several areas of the country/territory/area

### REDUCE YOUR RISK OF CORONAVIRUS INFECTION



Clean hands with soap and water or alcohol-based hand rub

Cover nose and mouth when coughing with tissue or flexed elbow



Avoid close contact with anyone with cold

or flu-like symptoms

Thoroughly cook meat and eggs

Avoid contact with wild or live farm animals





#ProtectYourselFromCoronavirus #StayCoronavirusFree #KeepHealthy



### Protect yourself and others from getting sick Wash your hands

- after coughing or sneezing
- when caring for the sick
- before, during and after you prepare food
- before eating
- after toilet use
- · when hands are dirty
- after handling animals or animal waste

## **Summary of Wave Periods**

date. Wave 3, occurring in Jamaica from July 16 to November 16, 2021 had the highest number of cases (39,365) and deaths (1,444). The Delta variant Jamaica was able to delay community transmission for 157 days. Since the community transmission phase, five distinct waves have been experienced to predominated during this third wave period.

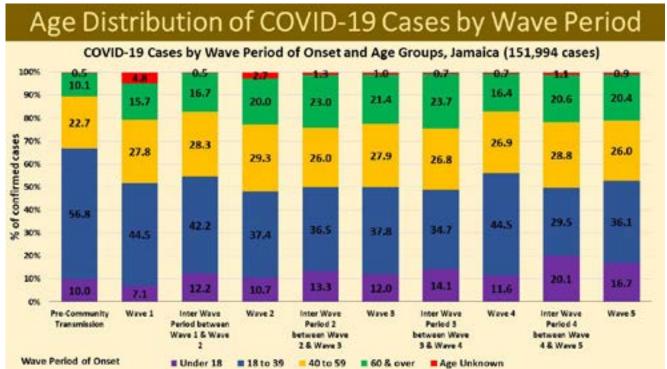
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Wave Periods	Dates for Wave	Days in Period	<b>Cases: Onset of</b>	Deaths: Onset of	Deaths: Outcome	Dominant	<b>Case Fatality</b>
	Periods		Symptoms	Symptoms	Date	Variant	Rate (%)
Pre-Community	1-Mar-2020 to 4-Aug-			ţ	ç		
I ransmission	2020	157	10/3	15	12		1.12
Wave 1	5-Aug-2020 to					Likely - Original	
	25-Oct-2020	82	7846	238	215		2.74
Inter Wave: Waves 1	26-Oct-2020 to 9-Jan-						
& 2	2021	76	5028	112	113		2.25
Wave 2	10-Jan-2021 to					Alpha	
	30-May-2021	141	34735	849	826	(95.7%)	2.38
Inter Wave: Waves 2	31-May-2021 to 15-						
& 3	Jul-2021	46	2565	127	128		4.99
Wave 3	16-Jul-2021 to					Delta	
	16-Nov-2021	124	39365	1436	1444	(74.3)	3.67
Inter Wave: Waves 3	17-Nov-2021 to 19-						
& 4	Dec-2021	33	1622	62	79		4.87
Wave 4	20-Dec-2021 to					Omicron	
	23-Feb-2022	66	35756	340	341	(98.3%)	0.95
Inter Wave: Waves 4	24-Feb-2022 to 19-						
& 5	Apr-2022	55	1460	14	31		2.12
Wave 5*	20-Apr-2022 to 4-					<b>Omicron</b>	
	Oct-2022*	166	22544	133	137	(100.0%)	0.61
Total Period	1-Mar-2020 to						
(to 2-Oct-2022)	2-Oct-2022	946	151 994	3326	3326		2.19
Source: National Surveill:	Source: National Surveillance Unit Electronic Database. Ministry of Health and Wellness, Jamaica	se. Ministry of Health :	and Wellness, Jamaica				

### Summary of Wave Periods to Date

\*Wave 5 goes up to October 04, 2022.

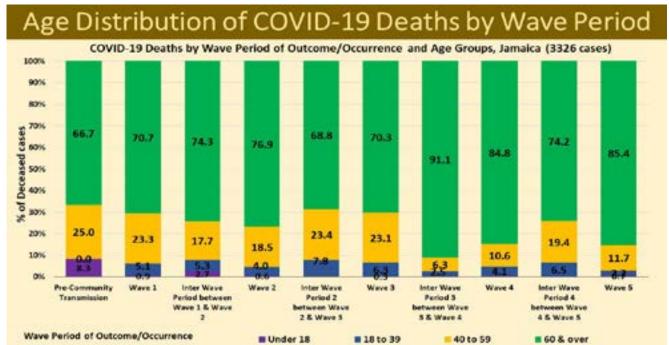
### **Summary of Wave Periods**

The age distribution of cases by wave period showed that the greatest proportion of confirmed cases in all wave periods were within the 18-39 years age group, followed by the 40-59 years and the 60 years and older age group. The lowest proportion of cases in each wave period were those under 18 years of age.



Source: National Surveillance Unit, Electronic Database. Ministry of Health and Wellness, Jamaica.

The age distribution of deceased cases by wave period showed that the greatest proportion of deaths within each wave period were in the 60 years and older age group followed by the 40-59 years age group. The lowest proportion of deaths were in the under-18 years age group. Waves 4 and 5 had a higher proportion of individuals 60 years and older dying than in waves 1, 2 and 3.



Source: National Surveillance Unit, Electronic Database. Ministry of Health and Wellness, Jamaica.

### **COVID-19 Symptoms**

The most common symptoms of COVID-19 are:

- Fever
- > Dry Cough
- Fatigue

### Other less common symptoms are:

- Loss of taste or smell
- Sore Throat
- > Headache





### Symptoms of severe COVID-19 include:

- Shortness of breath
- Loss of appetite
- Confusion
- Persistent pain or pressure in the chest,
- > High temperature (above 38°C)

Source: <u>https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19</u> Images from: www.vecteezy.com

### **COVID-19 Confirmed Cases** Age and Sex Distribution

### Age and Sex Distribution of Confirmed Cases

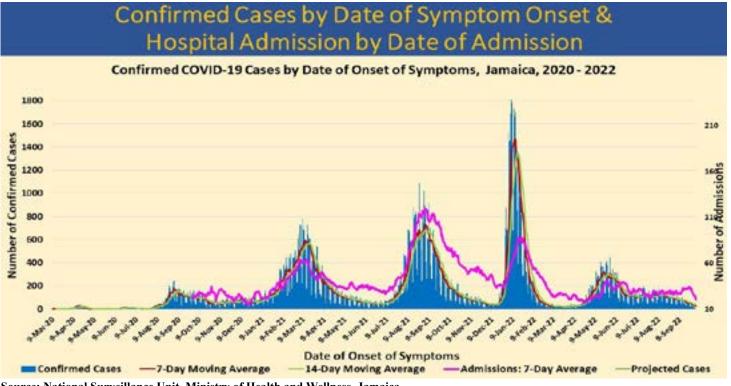
Characteristic	No.	%
Age		
0-9	9639	6.3
10-19	11967	7.9
20-29	29105	19.2
30-39	27806	18.3
40-49	21763	14.3
50-59	20242	13.3
60-69	14027	9.2
70-79	8869	5.8
80-89	4882	3.2
90-99	1408	0.9
100+	60	0.0
Unknown	2226	1.5
Total	151 994	100
Mean Age (SD)	40.5	20.4
Median Age (IQR)	38	29
Age Range	1 day to	108 years
Sex		
Female	87 737	57.7
Male	64 254	42.3
Unknown	3	0.0
Total	151 994	100

Confirmed SARS-CoV-2 cases ranged in age from 1 day old to 108 years old. The average age of cases were 40.5 years old. Most cases were in the age groups between 20 and 59 years old.

More females (57.7%) than males (42.3%)have been confirmed as having COVID-19 in Jamaica.

The epidemiology curve shows the five distinct COVID-19 waves experienced by Jamaica with substantial increase in confirmed cases and hospital admissions. Wave 5 showed a bimodal distribution with peak cases in May 2022 (epidemiological week 22). As at October 2, 2022, there was a decrease in the number of confirmed cases over the last week heralding the end of the fifth wave.

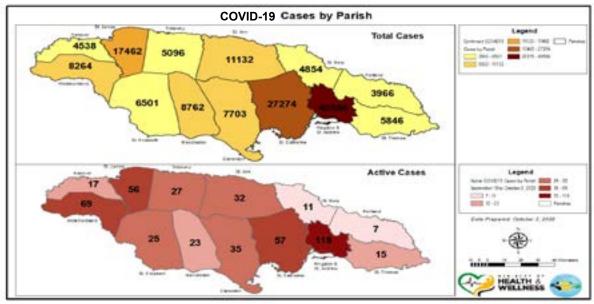
Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica as at 02<sup>nd</sup> October 2022.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

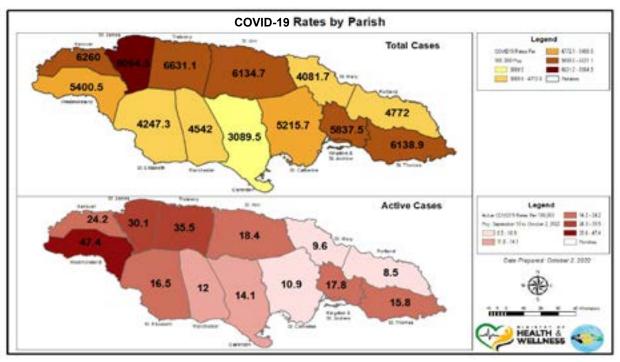
### **COVID-19 Confirmed Cases** Geographical Distribution

The majority of the 151,994 confirmed cases identified by the surveillance system as at October 2, 2022 resided in the parishes of Kingston and St. Andrew, St. Catherine and St. James. A total of 493 of the locally acquired confirmed COVID-19 cases had dates of onset of symptoms in the last two weeks and were active. Of these active cases, the greatest number of confirmed cases was among persons residing in Kingston and St. Andrew followed by Westmoreland and St. Catherine.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

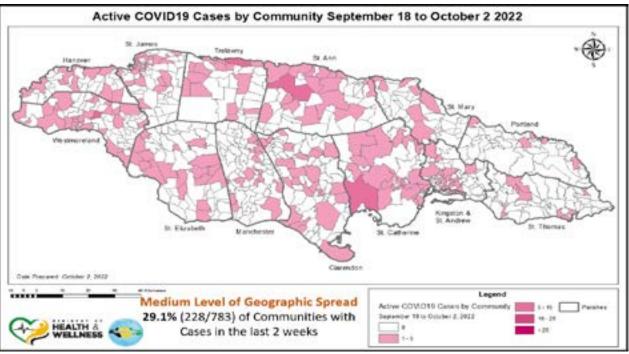
The parish with the highest cumulative rate of COVID-19 cases per 100,000 population was St. James, followed by Trelawny and Hanover. For the locally acquired cases with dates of onset in the two weeks prior to October 2, 2022, the parish with the highest rate per 100,000 population was Westmoreland followed by Trelawny and St. James.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

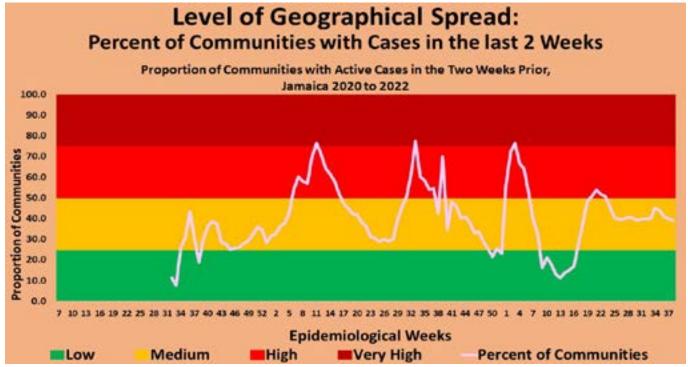
### **COVID-19 Confirmed Cases** Geographical Distribution

As of October 2, 2022 there were 493 of the locally acquired confirmed COVID-19 cases with dates of onset of symptoms in the last two weeks and were active. These persons resided in 29.1% of the communities. This is considered to be medium level of geographical spread.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

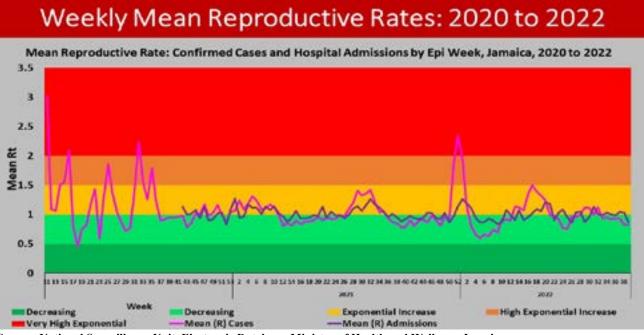
The number of communities with active cases in the last two weeks decreased as at October 2, 2022. The geographical spread was at medium level.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

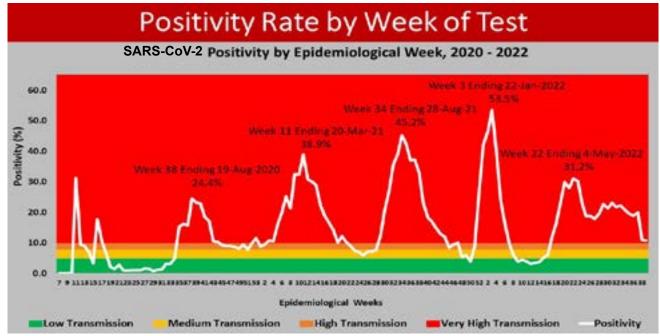
### **COVID-19 Confirmed Cases Reproductive and Positivity Rates**

Reproductive rate (Rt) is an indicator of COVID-19 transmissibility, it represents the number of new infections caused by a single case. A value of Rt which is less than 1 means that the spread of infection is decreasing. The weekly mean Rt has been variable increasing above and below 1 throughout the pandemic. As at October 2, 2022, the mean reproductive rate was 0.8 for confirmed cases and 0.9 for admissions to hospital. This reflects the decreased number of confirmed cases and admissions observed.



Source: National Surveillance Unit, Electronic Database. Ministry of Health and Wellness, Jamaica.

Positivity rate is also an indicator of SARS-CoV-2 transmission. The World Health Organization recommended a positivity rate threshold of 5%. A positivity rate above this threshold is indicative of higher transmission. As at October 2, 2022 the level of transmission was at a high level with a 7-day average positivity of 9.9%. The positivity rate over the last week has decreased to levels observed in the inter-wave periods.



Source: National Surveillance Unit, Electronic Database. Ministry of Health and Wellness, Jamaica.

### **COVID-19 Confirmed Cases COVID-19 Variants: December 2020 to July 2022**

The highly contagious viral respiratory illness, COVID-19, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was declared a global pandemic on March 11, 2020. It should be noted that each time a virus reproduces there is a chance it will produce a copy that differs structurally from the original form. Six months after the pandemic declaration, changes to the structure of the SARS-CoV-2 virus' makeup occurred which led to mutant forms or variants of the virus being observed. Several of these variants of the SARS-CoV-2 virus were more successful in infecting and being transmitted than the ancestral or original strain and were designated as Variants of Concern (VoC). Many of these VoCs proved to be very virulent and lead to poor outcomes post infection.

Gene sequencing is the testing method used to identify variants. Jamaica, with the support of international partners, identified the alpha variant of the SARS-CoV-2 virus in late 2020. Since then, multiple variants have emerged with Omicron and its sub-lineages BA.4 and BA.5 currently in circulation.

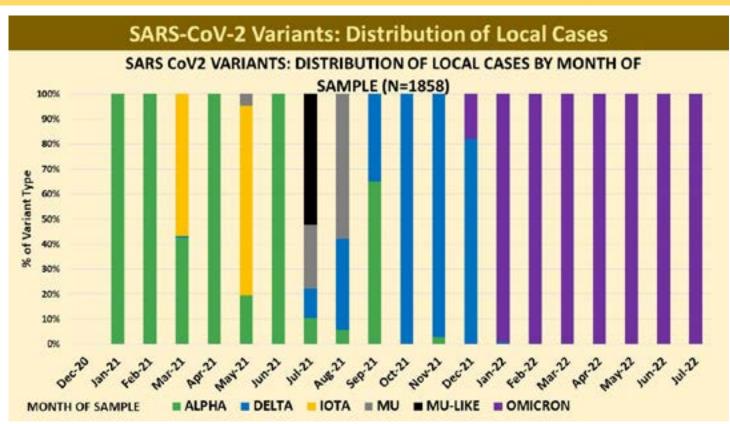


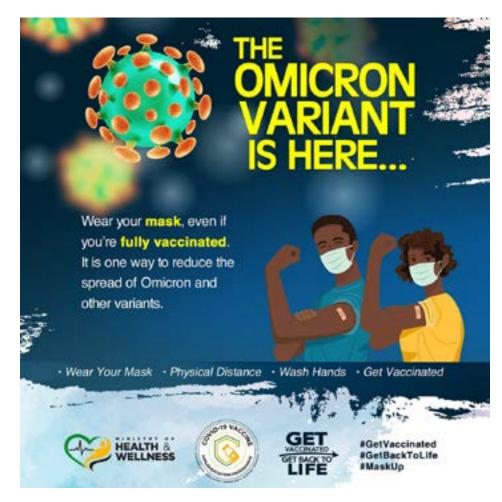
### SARS-CoV<sup>2</sup> Variants Jamaica, Cumulative Cases – December 2020 – July 2022

Transmission Classification	Alpha	Delta	ΙΟΤΑ	MU	MU-LIKE	Omicron	Total
Local Transmission	247	462	5	41	23	1080	1858
Imported	7	16	0	0	0	19	42
Total	254	478	5	41	23	1099	1900

Imported Cases – USA – 32 (3 Alpha, 13 Delta, 16 Omicron); UK – 6 (0 Delta, 4 Alpha, 1 Omicron ); Canada – 4 (3 Delta, 1 Omicron)

### **COVID-19 Confirmed Cases COVID-19 Variants: December 2020 to July 2022**



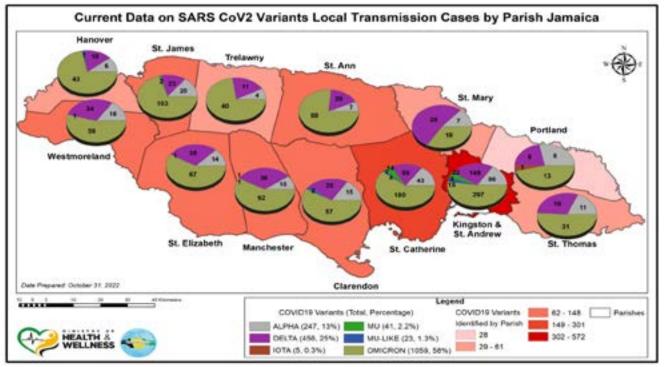


### **COVID-19 Confirmed Cases COVID-19 Variants: December 2020 to July 2022**

Samples for confirmed (PCR positive) SARS-CoV-2 cases underwent screening and gene sequencing primarily at international reference sequencing laboratories. In January 2022, Jamaica gained the capacity to perform in-country sequencing and are now members of a regional genomic surveillance network. Sequences for SARS-CoV-2 samples have been obtained from every parish.



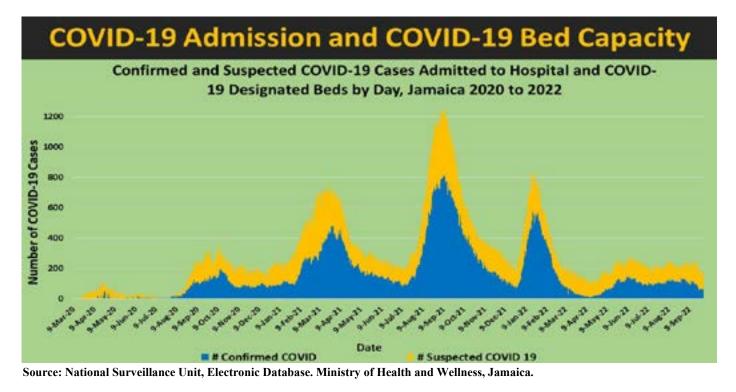
Leite JA, Vicari A, Perez E, Siqueira M, Resende F, et al. (2022) Implementation of a COVID-19 Genomic Surveillance Regional Network for Latin America and Caribbean region. PLOS ONE 17(3): e0252526. https://doi.org/10.1371/journal.gone.0252526 https://doi.org/10.1371/journal.gone.0252526



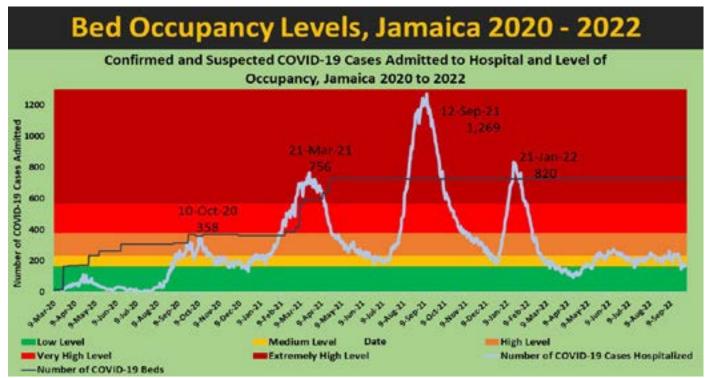
Source: National Surveillance Unit, Electronic Database. Ministry of Health and Wellness, Jamaica.

### **COVID-19 Hospitalizations** Admissions and Bed Occupancy

The majority of patients admitted for COVID-19 in the fifth wave were suspected cases and the bed occupancy showed a general plateauing with a slight decline in the past two weeks as at October 2, 2022.



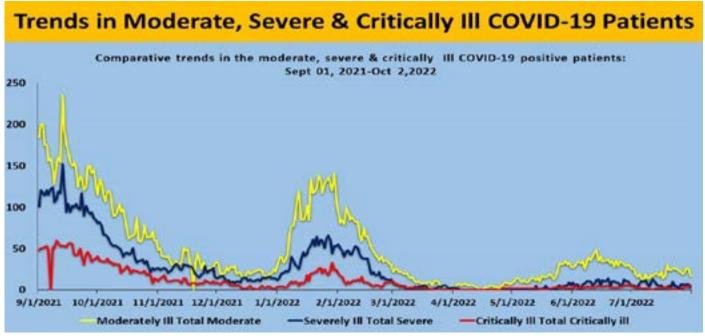
The maximum bed occupancy level was exceeded in all waves except wave 5 and was at medium level of pressure on the health system as at October 2, 2022.



Source: National Surveillance Unit, Electronic Database. Ministry of Health and Wellness, Jamaica.

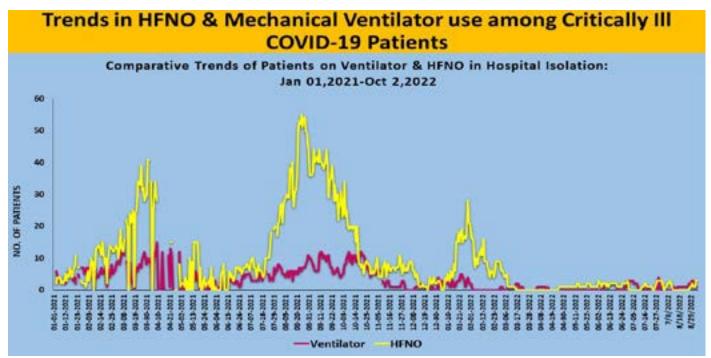
### **COVID-19 Hospitalizations** Moderately, Severely and Critically III Cases

An examination of the trends in the three categories of the more seriously ill COVID-19 confirmed cases demonstrated that there was a decline in the numbers of moderate, severe and critically ill over the three months since the apparent peak in the fourth wave.



Source: Health Services Planning and Integration (HSPI) Branch. Ministry of Health and Wellness, Jamaica.

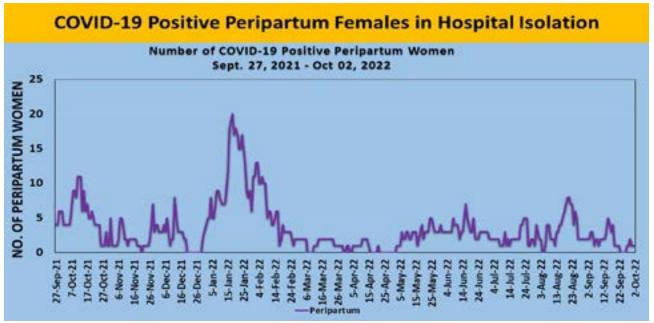
Cases requiring mechanical ventilation and the use of the High Flow Nasal Oxygen (HFNO) Device for the management of the COVID-19 positive critically ill patients have generally waned over the last seven months (March to September 2022). The use of the HFNO and mechanical ventilator usually requires a greater supply of oxygen. More often than not, the patient's care is escalated to mechanical ventilator support if there is no improvement with the HFNO therapy. The management of most patients with HFNO has been successful.



Source: Health Services Planning and Integration (HSPI) Branch. Ministry of Health and Wellness, Jamaica.

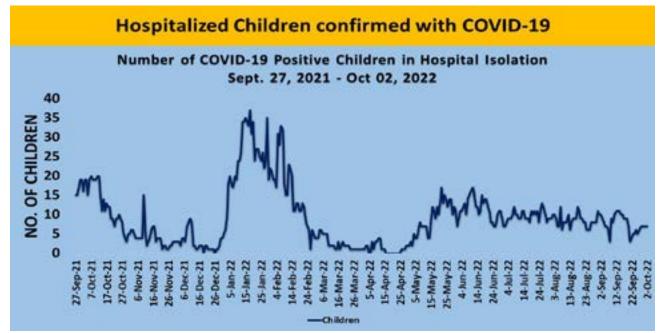
### **COVID-19 Hospitalizations Peripartum Females and Children**

Examining the trends in admission of peripartum women in hospital isolation from September 2021 showed peak admission of 20 cases in mid-January 2022. This increase began in early January 2022 in the fourth wave, and gradually declined towards the end of March 2022. There was a subsequent slight increase during the fifth wave but this is on the decline.



Source: Health Services Planning and Integration (HSPI) Branch. Ministry of Health and Wellness, Jamaica.

The number of COVID-19 confirmed children admitted to hospital peaked at 37 in early January 2022, in the fourth wave. This represented the highest number of children confirmed COVID-19 positive who were hospitalised since the start of the pandemic. There has generally been a downward trend but there was a slight increase in June 2022 with the fifth wave.



Source: Health Services Planning and Integration (HSPI) Branch. Ministry of Health and Wellness, Jamaica.

### **COVID-19 Deaths** Age and Sex Distribution

### Age Distribution of COVID-19 Related Deaths

		Percent of	Case Fatality
Age (years)	No. of Deaths	Deaths (%)	<b>Rate (%)</b>
<10	8	0.2	0.1
10-19	14	0.4	0.1
20-29	43	1.3	0.1
30-39	125	3.8	0.4
40-49	216	6.5	1.0
50-59	437	13.1	2.2
60-69	693	20.8	4.9
70-79	825	24.8	9.3
80-89	728	21.9	14.1
>=90	237	7.1	19.9
Total	3326	100.0	2.2

Source: National Surveillance Unit. Ministry of Health and Wellness,

### Sex Distribution of COVID-19 Related Deaths

Sex	Number of Deaths	Percent of Deaths (%)	Case Fatality Rate
Female	1592	47.9	1.8
Male	1734	52.1	2.7
Total	3326	100.0	2.2

Source: National Surveillance Unit. Ministry of Health and Wellness,

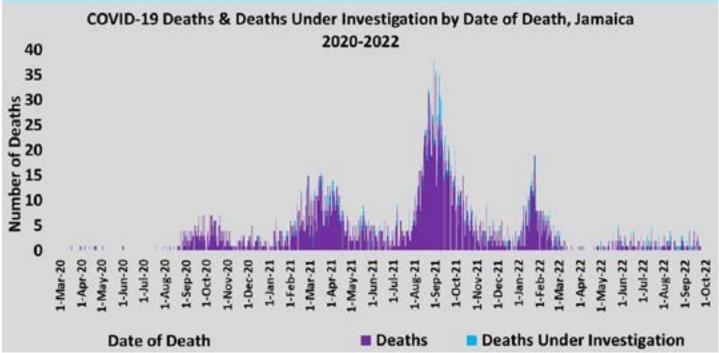
As at October 2, 2022, a total of 3,326 deaths were classified as COVID-19 related with a case fatality rate of 2.2% and 122.7 COVID-19 deaths/100,000 population. The following is the distribution of deaths by year:

- 329 deaths occurring in 2020,
- 2,500 deaths occurring in 2021 and
- 497 deaths occurring in 2022.

The case fatality rate increased as age increased with approximately one in five persons 90 years and older who have been confirmed to have COVID-19 have died.

More males than females have died from COVID-19 and the case fatality rate was 2.7% and 1.8% for males and females, respectively.

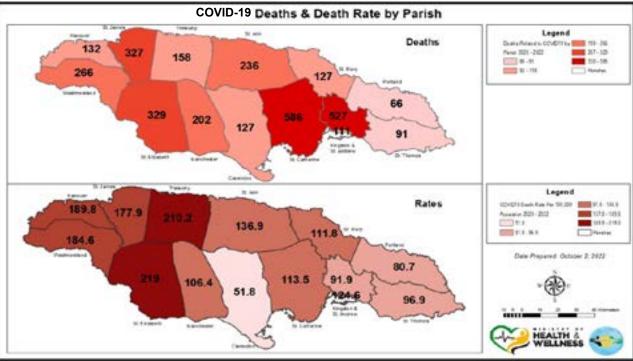
### COVID-19 Related Deaths, Jamaica, 2020 - 2022



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

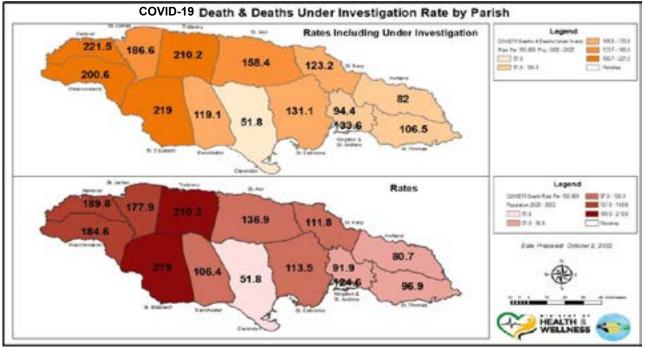
### **COVID-19 Deaths** Geographical Distribution

The parish of St. Catherine followed by St. Andrew and St. Elizabeth had the greatest number of COVID-19 related deaths classified. The parishes with the greatest number of deaths per population were St. Elizabeth followed by Trelawny and Hanover.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

As of October 2, 2022, there were 261 deaths under investigation. The inclusion of these deaths in the calculations of the rates is shown below.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

### **COVID-19 Deaths Comorbidities and Risk Factors**

### Frequency of Comorbidities and Risk Factors among COVID-19 Related Deaths

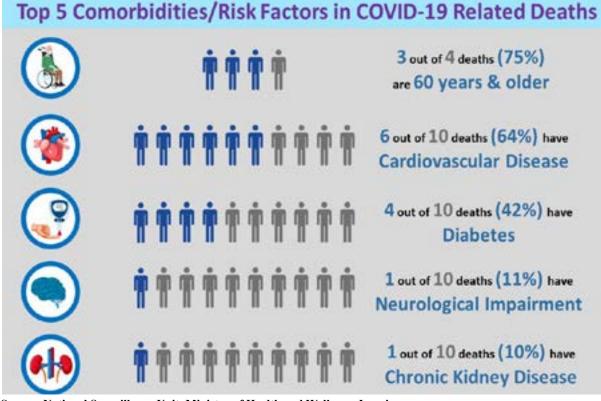
Comorbidities/Risk Factors	% of Total
	Deaths
Age 60 and Older	74.6
Cardiovascular Disease (including Hypertension)	63.5
Diabetes	42.2
Chronic neurological impairment/disease	11.0
Chronic Kidney Disease	9.5
Cancer	7.1
Chronic Lung Disease (non-asthma)	3.9
Asthma (requiring medication)	3.7
Genitourinary Disorders (including Benign Prostatic	2.9
Hyperplasia)	
Obesity	2.9
HIV or other immunodeficiency	2.4
Haematological (including Anaemia)	2.1
Other conditions	1.8
Gastrointestinal Disorders	1.5
Musculoskeletal Disorders	1.3
Mental Illness	1.2
Ulcers	1.0
Visual Impairment	0.9
Pregnancy & Post Partum	0.8
Autoimmune Condition	0.8
Endocrine Disorders	0.8
Chronic Smoking	0.5
Alcoholism	0.3

Three thousand one hundred and ninetyfive (96.1%) of the 3,326 COVID-19 related deaths up to October 2, 2022, had one or more comorbidity or risk factor.

Of the 131 COVID-19 cases without any known comorbidity or risk factor, 72 were males aged 25 to 59 years and 59 were females 0 to 59 years. The frequencies of comorbidities and risk factors among the COVID-19-related deaths are shown in the table.

The top 5 comorbidities and risk factors for the COVID-19-related deaths were: age 60 years and older (75%), cardiovascular disease (including hypertension) (64%), diabetes (42%), neurological impairment/ disease (11%) and chronic kidney disease (10%).

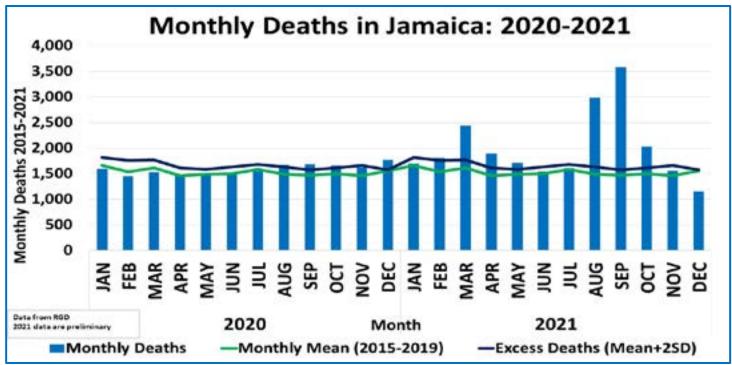
Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

### COVID-19 Deaths Excess Deaths

The impact of COVID-19 on mortality in Jamaica was examined by reviewing the deaths from all causes as reported by the Registrar General's Department (RGD). Preliminary reports for 2021, indicate that deaths from all causes (23,994) exceeded the usual number of deaths per year in 2015-2019 (19,270). This represented a 25.4% increase in deaths in 2021. The monthly deaths in 2020 and 2021 were also reviewed and compared to the monthly deaths occurring in 2015 to 2019. There were excess deaths in August to October and December 2020; February to May and August to October 2021. These periods coincided with the three COVID-19 waves experienced by Jamaica (2020/2021).



Source: Registrar General's Department (RGD).

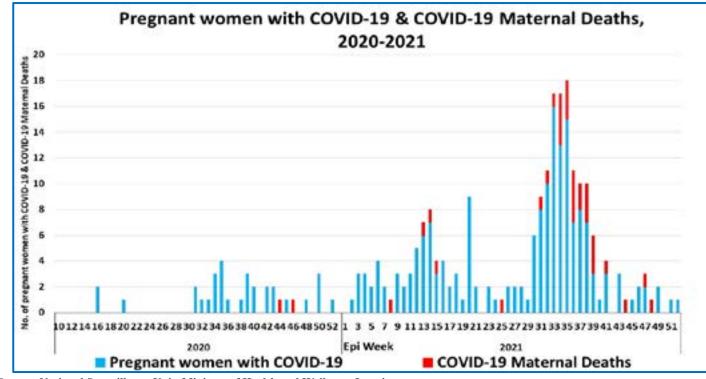
### Monthly Excess Deaths in Jamaica 2020 - 2021

Year	Month	Number of Excess Deaths	<b>Proportion of Excess Deaths (%)</b>
2020	August	39	2.4
	September	105	6.7
	October	43	2.7
	December	185	11.7
2021	February	48	2.7
	March	666	37.7
	April	276	17.1
	May	130	8.2
	August	1,353	82.9
	September	2,003	126.8
	October	412	25.5

### COVID-19 Deaths Maternal Mortality

In 2020, two pregnant or post-partum women positive for SARS-CoV-2 died. This figure increased to 31 in 2021. This represented 5% and 43.7% of maternal deaths in 2020 and 2021 respectively. The effect of COVID-19 on the maternal mortality ratio (MMR) was also substantial with the MMR increasing from 114.9 in 2020 to 215.6 per 100,000 live births in 2021.

The case fatality ratio for SARS-CoV-2 positive pregnant or post-partum women was 6.7% in 2020 and 15.8% in 2021. These figures are much greater than the overall case fatality ratio (2.2%) for the general population. Of note, none of the maternal deaths in 2020 and 2021 received the COVID-19 vaccine.



Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

When the effects of COVID-19 were examined by Health Region, COVID-19 was the cause of more than half the 2021 maternal deaths in SRHA (55.0%) and WRHA (55.6%) and almost a third of the deaths in SERHA (30.8%) and more than a quarter in NERHA (28.6%). Overall, the disease-specific MMR for COVID-19 in 2021 was 94.2 per 100,000 live births.

Health Region	No. Maternal Deaths	No. of COVID- 19 Maternal Deaths	Regional MMR (/100,000 live births)	Proportion of COVID-19 Maternal Deaths (%)	MMR due to COVID-19 (/100,000 live births)
NERHA	7	2	159.2	28.6	45.5
SERHA	26	8	178.1	30.8	54.8
SRHA	20	11	288.6	55.0	158.8
WRHA	18	10	257.0	55.6	142.8
Jamaica	71	31	215.6	43.7	94.2

### Regional COVID-19 parameters in maternal deaths, 2021

Preliminary data for 2021

NERHA - North East Regional Health Authority

SERHA – South East Regional Health Authority

SRHA – Southern Regional Health Authority

WRHA – Western Regional Health Authority

Source: National Surveillance Unit. Ministry of Health and Wellness, Jamaica.

**Non-Pharmaceutical** 

### **COVID-19 Modelling Consultancy**

Since the declaration of the outbreak, the Ministry of Health and Wellness (MOHW) undertook a number of measures to curtail disease spread. The COVID-19 Research Agenda was developed to provide an integrated framework to guide the coordination, implementation and utilization of research pertaining to COVID-19. As part of this initiative, the Essential National Health Research Committee (ENHRC) explored the use of modeling to provide data to inform the COVID-19 response.

The MOHW received technical assistance from the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) to develop a COVID-19 model that is specific to Jamaica. The overall goal of this effort was to enhance the country's capacity to effectively build and apply COVID-19 models for use in its COVID-19 response. To this end, a consultant from Howard University and support team consisting of researchers from the Centers for Disease Control and Prevention and Purdue University have worked with MOHW and the ENHRC since November 2020 to model the transmission and control of SARS-CoV-2 in Jamaica. The group was further supported by a local team comprising representatives from the MOHW, the Statistical Institute of Jamaica (STATIN), Planning Institute of Jamaica (PIOJ), University of Technology, Jamaica (UTech Ja) and the University of the West Indies (UWI).

### **Key Points**

Evidence gleaned since the beginning of the COVID-19 pandemic indicates that the disease can be transmitted by asymptomatic or mild cases, that disease severity and case fatality is highest amongst the older population, but young persons are likely contributors to disease spread.<sup>1</sup> Risk factors for transmission include 'closed, poorly ventilated spaces, crowded settings and close-contact settings between individuals'.<sup>1</sup> Governments used this knowledge to adopt and enforce interventions to curtail transmission.

Compartmental (SEIR) models were used to assess the effectiveness of government policies/interventions, and vaccinations. Models were also built to reproduce reported symptomatic infections during specific periods of time.

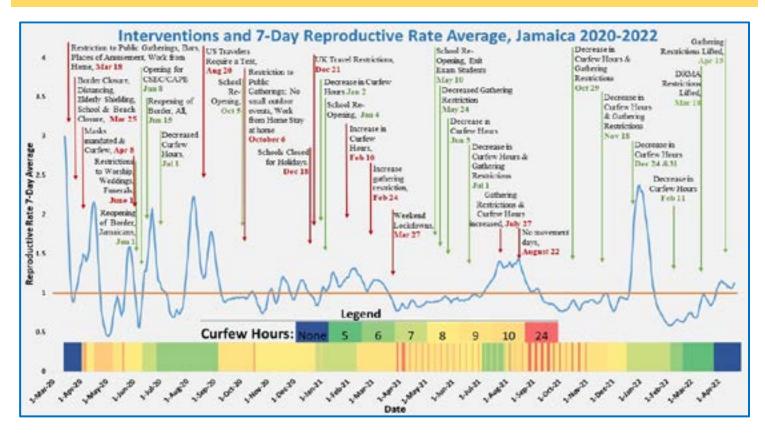
Time Period	Rε
Mar 18-24	1.18
Mar 24-Apr 19	1.26
Apr 19-Jun 7	0.43
Jun 7-Aug 4	1.42
Aug 4-Sep 21	1.67
Sep 21-Oct 5	0.51
Oct 5-Nov 5	0.60
Nov 5-Dec 18	1.51
Dec 18-Jan 3	0.43
Jan 3 +	1.72

There appeared to be spikes in infections during or after celebrations/special events/in-person schooling/periods of relaxation of interventions. More stringent measures appeared to be successful in reducing the RE to below one. RE is the effective reproduction number, defined as the expected number of new infections caused by an infectious case.

As next steps, the effectiveness of individual interventions and the economic impact will be further explored.



### COVID-19 Interventions Non-Pharmaceutical



### Non-pharmaceutical interventions (NPIs)

Summary of Enforcement Measures in the Disaster Risk Management Act:

- General Curfew Hours/Restrictions
- Closing of Borders/Ports of Entry
- Public Gathering Restrictions
- Physical Distancing
- Mask Wearing
- Elderly Shielding
- Closure of Educational Institutions
- Workplace Interventions: Work from Home
- Public Transportation Measures

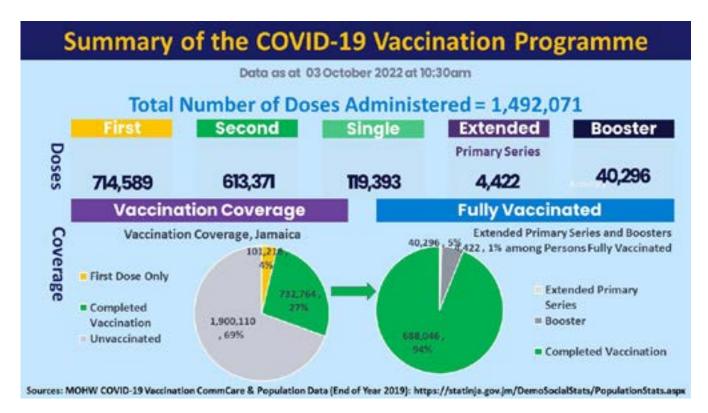
### Most effective non-pharmaceutical interventions:

A modelling consultancy which assessed the effectiveness of ten non-pharmaceutical interventions in Jamaica revealed that all the measures assessed were effective. The effectiveness ranking was as follows (rank # 1 was the most effective):

- 1. Gathering restrictions
- 2. Curfews and special geographic restrictions
- 3. Border closure
- 4. Physical distancing
- 5. Public transportation measures
- 6. Elder shielding
- 7. Work from home
- 8. Barber & salon closure
- 9. General work hour restriction
- 10. School restriction

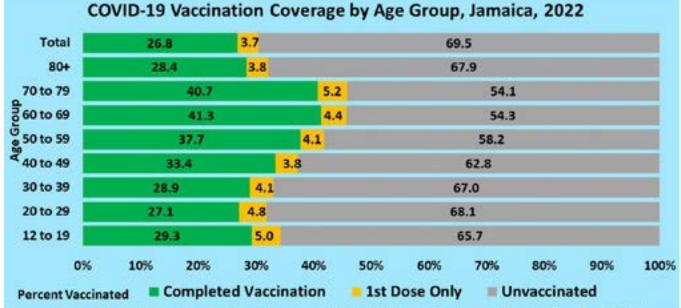
Source: Modelling Consultancy (May 2021)

Since the inception of the COVID-19 vaccination programme, 1,492,071 doses were administered as at October 3, 2022. Of the fully vaccinated, approximately 5% have received a booster.



COVID-19 vaccination coverage was greatest in the 60-69 years age group and the 70-79 years age group, while the lowest coverage was in the 20-29 and 80 years and over age groups.

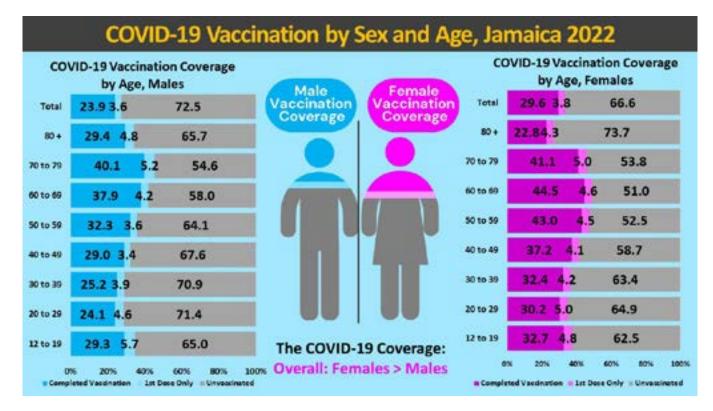
### **COVID-19 Vaccination Coverage by Age**



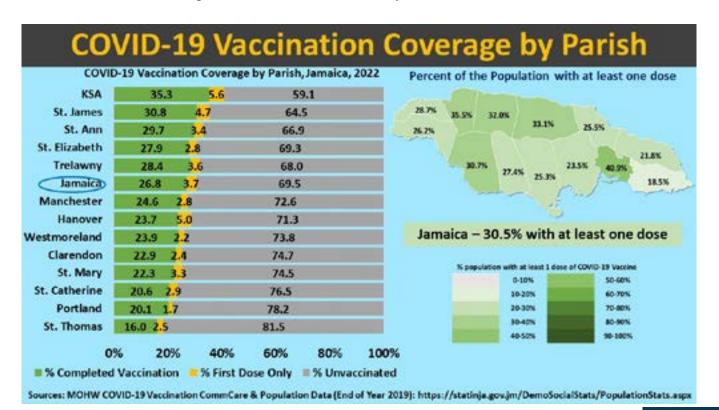
Sources: MOHW COVID-19 Vaccination CommCare & Population Data [End of Year 2019]: https://statinja.gov.jm/DemoSocialStats/PopulationStats.aspx

Vaccination

The COVID-19 vaccination coverage was greater in females than males. However, males 80 years and older had a greater coverage than females in this age group.

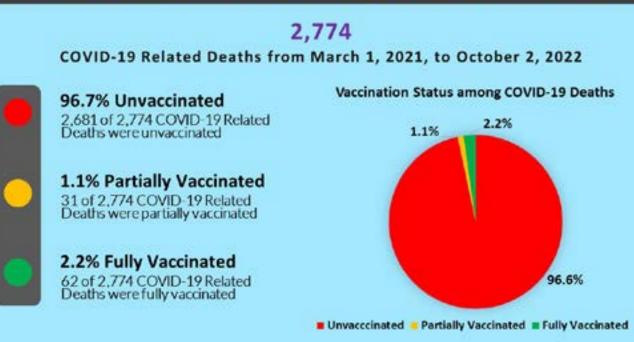


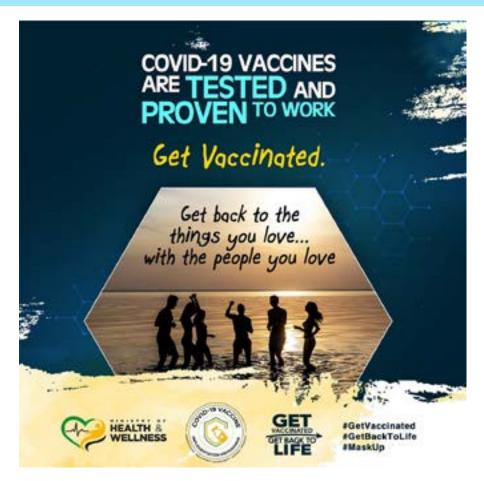
The parishes with the highest coverage were Kingston and St. Andrew followed by St. James and St. Ann. The parishes with the lowest coverage were St. Thomas followed by Portland and St. Catherine.



Among the 2,774 COVID-19-related deaths occurring since March 1, 2021 (the start of the COVID-19 vaccination programme): 96.7% were unvaccinated, 1.1% were partially vaccinated and 2.2% were fully vaccinated.

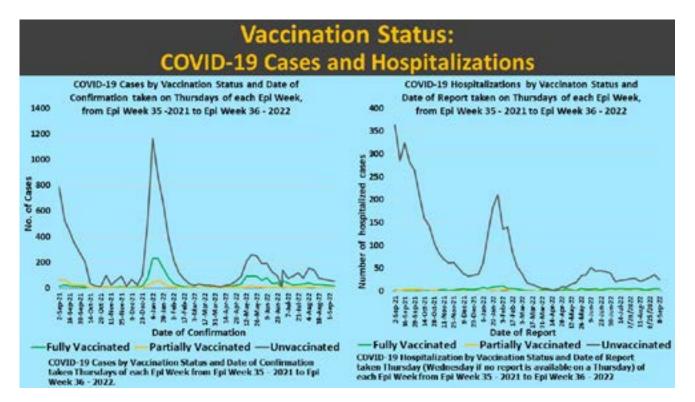
### SARS CoV2 Vaccination Status Among COVID-19 Related Deaths



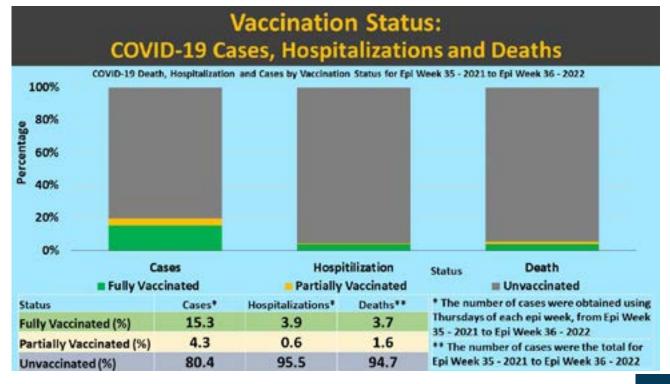


Vaccination

Review of the vaccination status for the period starting from epidemiology week 35, 2021 to epidemiology week 36, 2022 revealed that as confirmed cases increased the number of hospitalizations increased and the absolute numbers among all persons irrespective of vaccination status increased.



However, the proportion of fully vaccinated cases was greatest among the confirmed cases (15.3%). The proportion of fully vaccinated persons among the hospitalized and the COVID-19 related deaths was 3.9% and 3.7%, respectively. This showed that the vaccinated persons were less likely to be hospitalized and to die.



The first case of COVID-19 in Jamaica was confirmed on March 10, 2020. During the same month, the Essential National Health Research Committee (ENHRC) of the Ministry of Health and Wellness (MOHW) began to formulate a national coronavirus disease research agenda to provide data to guide the COVID-19 outbreak response. The Agenda was outlined in a 'Research Roadmap'.

The purpose of the COVID-19 Research Roadmap was to provide an integrated framework to guide the coordination, implementation and utilization of research pertaining to COVID-19 to inform the national response in the mitigation and/or management of the current outbreak and future activities.



The objectives of the National COVID-19 Research Agenda were to:

- 1. Support the generation of evidence needed to strengthen clinical management, public health guidance and actions essential for mitigating the impact of COVID-19 disease on the population of Jamaica
- 2. Determine the impact of COVID-19 on various sectors in Jamaica to provide information for action
- 3. Coordinate efforts across government, academia, the private sector, development partners and other stakeholders to optimize research efforts and outcomes in a 'whole-of-society' response to producing data.
- 4. Support the development of the research for health enterprise to be better prepared for the next emerging and re-emerging disease outbreak.

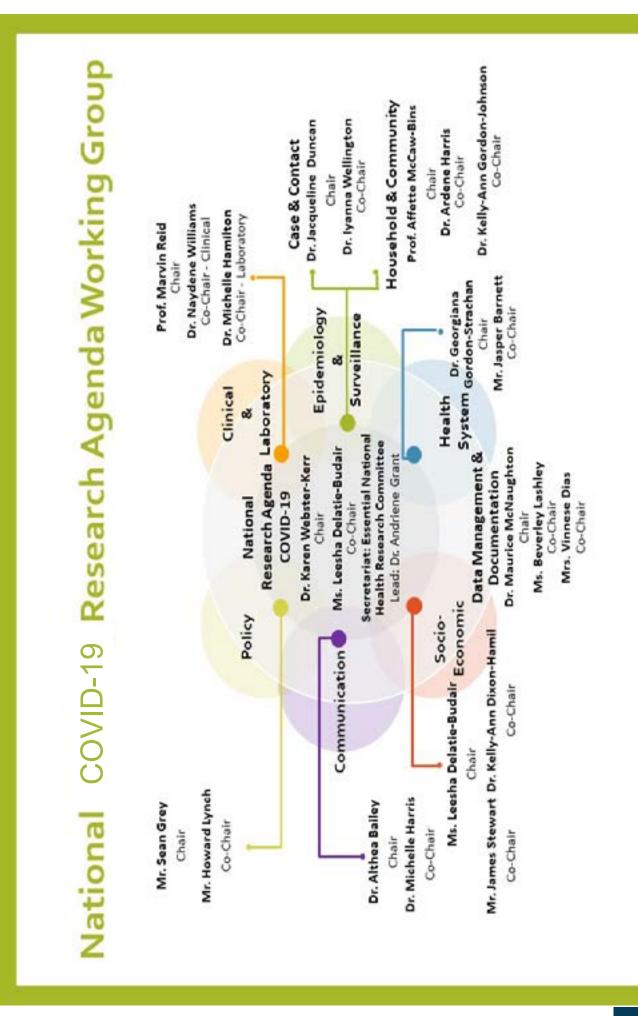
This National effort was chaired by Dr. Karen Webster-Kerr, Principal Medical Officer, National Epidemiologist and co-chaired by Ms. Leesha Delatie-Budair, Deputy Director-General, STATIN. Six Research Working Groups were responsible for identifying and prioritizing research under thematic areas, as well as providing guidance in the execution of research. The leadership of each Working Group is outlined in the table, below.

Research Working Group	Chairperson	Co-Chairperson(s)
Clinical and Laboratory	Prof. Marvin Reid	Dr. Naydene Williams Dr. Michelle Hamilton
Epidemiological/Surveillance	Case and Contact	
	Dr. Jacqueline Duncan	Dr. Iyanna Wellington
	Household and Community	
	Prof. Affette McCaw-Binns	Dr. Ardene Harris Dr. Kelly-Ann Gordon-Johnson
Health System	Dr. Georgiana Gordon-Strachan	Mr. Jasper Barnett
Socio-Economic	Ms. Leesha Delatie-Budair	Mr. James Stewart Dr. Kelly-Ann Dixon-Hamil
Communication	Dr. Althea Bailey	Dr. Michelle Harris
Policy	Mr. Howard Lynch	
	CROSS-CUTTING	
Data Management and	Dr. Maurice McNaughton	Dr. Beverly Lashley
Documentation		Mrs. Vinnese Dias

### List of COVID-19 Research Working Groups

Source: A Coordinated National Roadmap for COVID-19 Research, Essential National Health Research Committee, Ministry of Health and





Source: A Coordinated National Roadmap for COVID-19 Research, Essential National Health Research Committee, Ministry of Health and Wellness, Jamaica

The first research effort to be completed was a Knowledge, Attitudes and Practices Survey regarding COVID-19 conducted by the Statistical Institute of Jamaica (STATIN) in 2020. The Pan American Health Organization supported the Communication Research Working Group to conduct a qualitative study on health risk communication to vulnerable groups, the Planning Institute of Jamaica has initiated two studies to explore (i) Gender-Based Violence as well as (2) the multi-sectoral response to COVID-19 which are currently underway.

The following is a list of published research products to date which have arisen from the Research Agenda.

### List of COVID-19 Research Agenda Publications:

- Bailey A, Harris M, Bogle D, Jama A, Muir S, Miller S, Walters C, Govia I. Coping with COVID-19: Health Risk Communication and Vulnerable Groups. Disaster Med Public Health Prep. 2021 Jul 12;1-6. doi: 10.1017/dmp.2021.225
- Harris M, Bailey A, Cayetano C, Govia I, Jama A, Miller S, Walters C, Muir S. Coping with COVID

   Health Risk Communications and Vulnerable Persons. Final Report. Pan American Health Organization. 2021
- Govia, I., Palmer, T., Stubbs, M., Harris, M., Bogle, D., Miller, S., Walters, C., Muir, S. A., & Bailey, A. (2022, June 30). Vulnerable Group Members Coping With COVID-19 in Jamaica: A Qualitative Study. *Traumatology*. Advance online publication. <u>http://dx.doi.org/10.1037/trm0000391</u>
- 4. STATIN. Jamaican Labour Market. Impact of COVID-19. July 2020. Statistical Institute of Jamaica. 2021. ISSN: 0799-6527. Jamaican Labour Market Impact of COVID-19.pdf (statinja.gov.jm)
- Crawford T, Parchment K, Robinson S. Impact of COVID-19 Restrictions on Major Crimes and Sexual Offences in Jamaica: A comparative analysis of crimes reported by the Jamaica Constabulary Force (2014-2020). International Journal of Social Science and Humanities Research. Vol. 9, Issue 2, pp: (162-172), Month: April - June 2021. ISSN 2348-3156 (Print)
- STATIN. 2020 COVID-19 KAP Survey Report. Assessing the Knowledge, Attitudes and Practices (KAP) of Jamaicans Regarding the Novel Coronavirus and COVID-19. Statistical Institute of Jamaica. 2020. ISBN: 978-976-8252-54-8

Dr. Jacquiline Duncan, Chair of the Epidemiological/Surveillance: Case and Contact Research Working Group, has worked with National Epidemiology to devise an analysis plan for National Surveillance data. The original plan focused on characteristics of cases, clinical presentation, and outcomes. This has grown to further analysis covering a number of other areas. The team currently meets on a weekly basis.

The first manuscript on outcomes of COVID-19 has been prepared and the team is seeking a journal home. Another manuscript on COVID-19 transmission is close to completion.

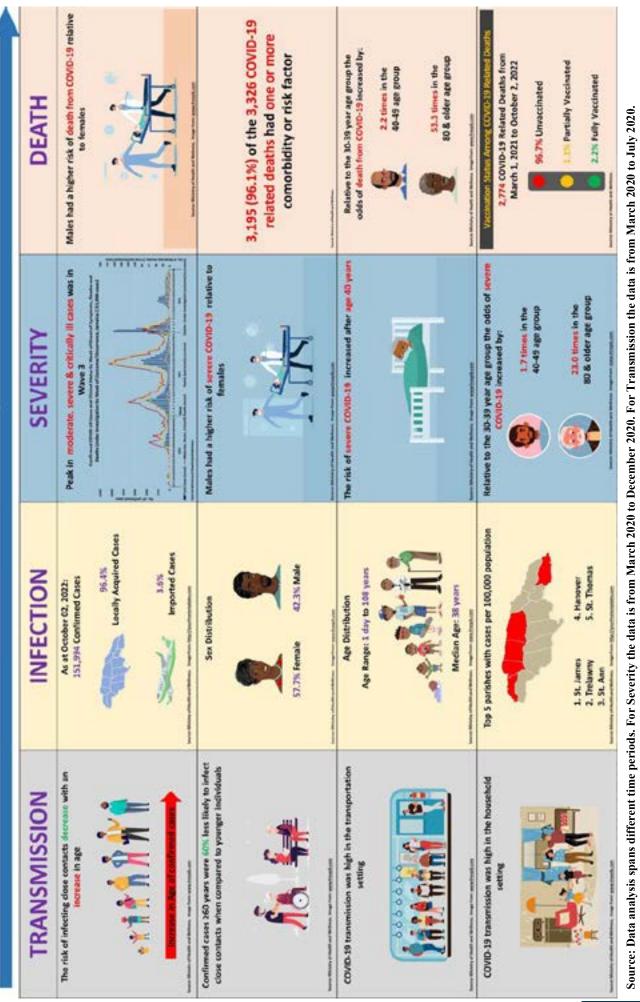
### Membership of the Case and Contact Data Analysis Team

Dr. Karen Webster-Kerr Dr. Jacquiline Duncan Dr. Andriene Grant Dr. Ardene Harris Dr. Kelly-Ann Gordon-Johnson Dr. Iyanna Wellington Mr. Jovan Wiggan Ms. Romae Thorpe Dr. Daidre Rowe Mr. Eon Campbell Ms. Marsha Brown Ms. Deborah Henningham Mrs. Tanielle Mullings Mrs. Jemma Azille Lewis Dr. Tyrone Roberts Mrs. Nicole Martin-Chen Dr. Carol Lord Dr. Tonia Dawkins-Beharie

Source: A Coordinated National Roadmap for COVID-19 Research, Essential National Health Research Committee, Ministry of Health and Wellness, Jamaica



# What We Learned About COVID-19: Analysis of Surveillance Data



[mages from: <u>www.freepik.com</u>,

### What We Learned About COVID-19: 2020 COVID-19 KAP Survey Report

ECONOM	IC ACTIVITY	
Between March and April 2020	As at the first week in April 2020.	
PERSONAL ACTIO	ONS TO LIMIT RISK	
Staying home unless absolutely necessary to go out:	Wear a mask when going outside:	
Physical distancing:	Wash hands more frequently:	
36	of hand sanitizer/rubbing alcohol to sanitize hands: 🐖	
COPING WI	ITH COVID-19	
1. Twelve of the 141 COVID-19 risk communication messages directly targeted the vulnerable	2. Respondents across all vulnerabilities reported that though messages were generally relevant, most messages did not contain information applicable to their specific vulnerability.	
3. The MOHW was the most prolific producer of public service announcements (PSAs)	4. Two-thirds of messages that targeted the study population were directed to the elderly	
	their information by means of traditional electronic sources, e of information, followed by television.	

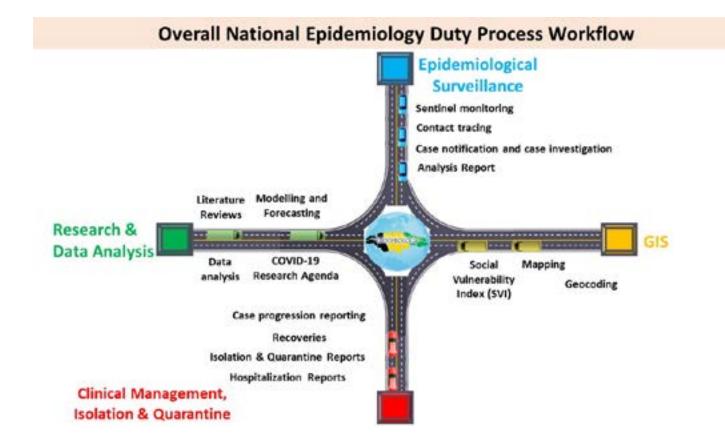
Source: Data from 2020 COVID-19 KAP Survey Report. Images from: <u>www.freepik.com</u>,

### **National Epidemiology Team: Work Flow and Products**

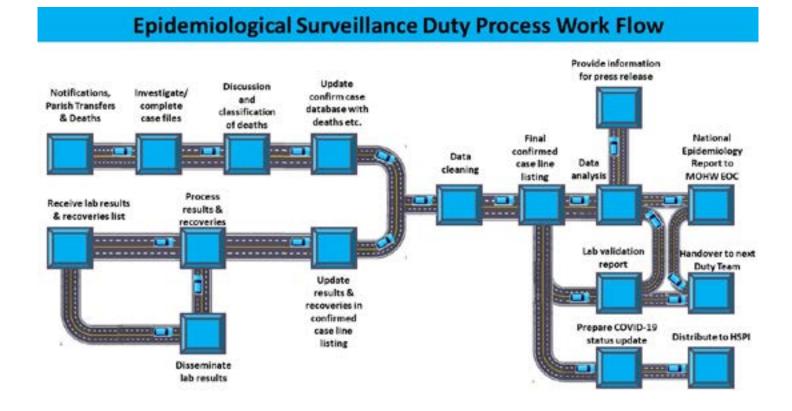
Since the start of the pandemic the National Epidemiology has adopted an "all of Epidemiology" Team approach in the timely processing and reporting of information to aid in the country's response. Officers have been operating on a rostered basis seven (7) days per week to ensure the daily reporting. On any given day the following persons are rostered for duty:

Area	Officer/Staff	Description of Duty of Officer/Staff
Epidemiological Management	National Epidemiologist	Daily Executive Management Reporting, Vaccination Programme Coverage Analysis, Classification of deaths, Chair the Essential National Health Research Committee (COVID-19 Research Agenda) general support and oversight of the various areas.
Epidemiological Surveillance	EOC Manager	Manages the daily epidemiological surveillance processes, attends EOC meetings and presents epidemiological data, liaises with the laboratory and parishes concerning new results. Dispatches results, investigates and classifies new and existing deaths, update and dispatch confirmed case database, analyzes data and prepares reports including a handover for the next Officer on Duty.
	Surveillance Officer	Sorts and cleans laboratory results, verifies and enters missing demographic and geographic information, identifies and removes duplicates, identifies reinfections and clusters, updates case listing, validates and recovers existing cases.
	Data Entry Clerk	Ensures that disease notification and investigation data are processed and updated in the requisite databases in a timely manner. This is to ensure timely analysis and reporting.
GIS	GIS Officer	Cleans and prepares data for further analysis, geocoding, analyzes data and prepare maps for reports, and vulnerability mapping.
Research and Data Analysis	Epidemiology Officer/ Biostatistician	Data cleaning, data analysis, prepares graphs and charts, COVID-19 research agenda

### National Epidemiology Workflow



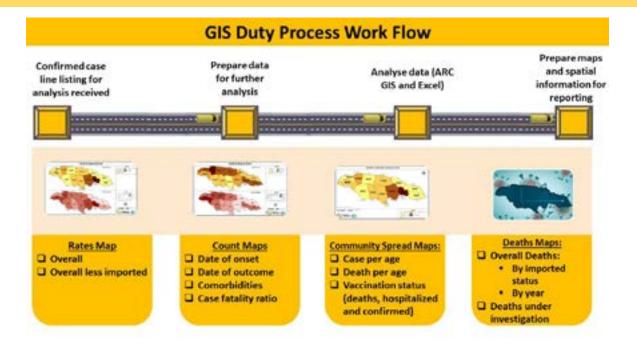
### **National Epidemiology Team: Work Flow and Products**



### List of National Epidemiology Routine Reports and Outputs (Epidemiological Surveillance)

Reports / Outputs	Frequency	Responsible
Laboratory Validation Summary Report (to Lab)	Daily	Surveillance Officer/EOC Manager
Vaccination status of confirmed cases and deaths checked on CommCare	Daily	Data entry clerk/Database Officer
Contact Tracing Report	Daily	Director, Health Status Monitoring
Mortality Surveillance Report	Weekly	Surveillance Coordinator
PAHO/WHO COVID-19 Line Listing	Daily	Surveillance Officer
Health Care Worker Report	Weekly	Surveillance Officer
National Epidemiology Daily COVID 19 Report	Daily	EOC Manager
Press Release	Daily	EOC Manager
COVID-19 Status Update (to HSPI)	Daily	EOC Manager
Cabinet Presentation/Report	Weekly	National Epidemiologist
Deaths Classification	Daily	National Epidemiologist /EOC Manager
COVID-19 Conversation Presentation	Weekly	National Epidemiologist
Residential Facilities Report	Weekly	Director, Health Status Monitoring
COVID-19 Parliamentary Sub-Committee	Quarterly	National Epidemiologist
Vaccination Programme Coverage Analysis – age sex and parish	Bi-weekly	National Epidemiologist/Database Officer
Gene sequencing test list	Weekly	Medical Epidemiologist
Gene sequencing reports		Medical Epidemiologist/Surveillance Officer
Laboratory Positivity Rates Analysis: Weekly & Daily	Bi-weekly	National Epidemiologist

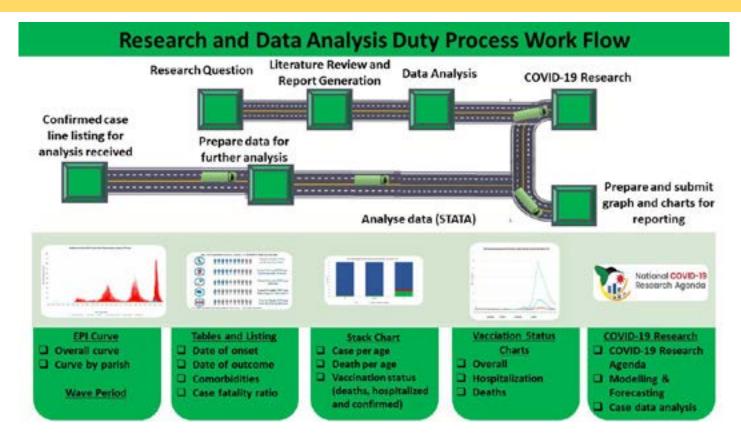
### **National Epidemiology Team: Work Flow and Products**



### List of National Epidemiology Routine Reports and Outputs (GIS)

<b>Reports / Outputs</b>	Frequency	Responsible
Parish rates maps (overall, overall less imported and active)	Daily	GIS Officer
Parish count maps (overall, overall less imported and active)	Daily	GIS Officer
<ul> <li>Death Maps</li> <li>Deaths and under-investigation rates less imported</li> <li>Deaths count and rates less imported</li> <li>Deaths count by year less imported</li> </ul>	Tri-weekly	GIS Officer
Community count maps of active cases nationally and by individual parishes	Daily	GIS Officer
Cases by community table/spreadsheet	Daily	GIS Officer
Parish reports for Ministry of Education, Private Sector Organization of Jamaica (PSOJ), National Spatial Data Management Division (NSDMD)	Daily	GIS Officer
Cases by development area	Weekly	GIS Officer
Targeted area maps (parish, community, development area, selected area)	Periodically	GIS Officer
Time series maps	Periodically	GIS Officer
Chains of transmission maps	Daily	GIS Officer
Workplace cluster maps	Daily	GIS Officer
Vaccination coverage maps at the parish level	Periodically	GIS Officer
COVID-19 geographical spread map	Tri-weekly	GIS Officer
Social Vulnerability Index (SVI) maps at the community and parish level	Once	GIS Officer
Jamaica Defense Force (JDF) Georeferenced spreadsheets	Periodically	GIS Officer

### **National Epidemiology Team: Work Flow and Products**



### List of National Epidemiology Routine Reports and Outputs (Research & Data Analysis)

Frequency	Responsible
Daily	Epidemiological Officer / Biostatistician
Daily	Epidemiological Officer / Biostatistician
Cases: Daily & Admissions Weekly	Assistant Biostatistician / Biostatistician / Research Officer / Data Entry Clerk / Epidemiological Officer
Bi-weekly	Epidemiological Officer / Biostatistician
Bi-weekly	Epidemiological Officer / Biostatistician
Tri-weekly	Epidemiological Officer / Biostatistician
Weekly	Epidemiological Officer / Biostatistician
Tri-weekly	Epidemiological Officer / Biostatistician
Weekly	Epidemiological Officer / Biostatistician
Daily	Epidemiological Officer
On Request	Biostatistician
On Request	Research Officer
Weekly	Biostatistician
	DailyDailyDailyCases: Daily & Admissions WeeklyBi-weeklyBi-weeklyTri-weeklyWeeklyTri-weekly WeeklyDailyDailyOn RequestOn Request



Dr. Karen Webster-Kerr

#### Principal Medical Officer, National Epidemiologist

Long before the first COVID-19 case was confirmed in Jamaica, Dr. Karen Webster-Kerr, National Epidemiologist was already directing an all-hands-on-deck response team. Dr. Webster-Kerr joined the National Epidemiology team in 2013 as Principal Medical Officer, National Epidemiologist and since then has led the team's response through several outbreaks, including dengue, influenza, ZIKA, Chikungunya among other health events. During the COVID-19 pandemic Dr. Webster-Kerr led from the front, always ensuring that her team had the requisite support to carry out their tasks. As Head of the National Epidemiology COVID-19 response team Dr. Webster-Kerr was responsible for:

- ensuring the requisite protocols and guidelines were developed and disseminated.
- completing and presenting daily executive updates to various stakeholders.
- providing oversight of the national surveillance and research response.
- chairing the Essential National Health Research Committee.

In addition, Dr. Webster-Kerr has been integrally involved in the data analysis and played a major role in the identification of trends and modelling and forecasting of the disease to predict the severity of each wave and the potential impact on the resources. She employed a handson approach to preparing presentations targeting various audiences including the Cabinet. She was also the face of the National Epidemiology Team on "COVID Conversations" and on other media platforms. Her work in guiding the epidemiological monitoring and response to the COVID-19 pandemic in Jamaica has led to the implementation of numerous evidence-based interventions, improving outcomes in the population.



**Dr. Ardene Harris** 

#### Senior Medical Officer, Medical Epidemiologist

Dr. Ardene Harris has been an integral part of the National Epidemiology response to the COVID-19 pandemic from the onset. As a Medical Epidemiologist Dr. Harris' input was integral to the development of the 2019 Novel Coronavirus (COVID-19) Surveillance Protocol. She has worked tirelessly, many times 24 hours, to ensure that the COVID-19 information was available to influence the various interventions. For the past 2 1/2 years, Dr. Harris has been an EOC Manager for the Epidemiology / Surveillance response, providing epidemiological data, updates and feedback to the MOHW Emergency Operations Centre (EOC) to inform public health action. The role of an EOC Manager is a 24-hour undertaking and includes the receipt, distribution, processing and analysis of COVID-19 laboratory data, investigation and classification of COVID-19 deaths, the preparation and presentation of detailed reports to various stakeholders on the status and trends of the COVID-19 outbreak in Jamaica and participation in daily MOHW EOC meetings and the presentation of epidemiology data/reports.

In addition, Dr. Harris managed the COVID-19 mortality surveillance system, coordinating the investigation and classification of COVID-19-related deaths as well as maternal deaths related to the COVID-19 outbreak. She led the contact tracing, clinical progression, health care worker surveillance, residential facility surveillance and chains of transmission work streams which was responsible for collecting and analysing data relating COVID-19 contacts and transmission and preparing the necessary reports, graphs, charts on where and how COVID-19 was being transmitted locally. This information was used to inform quarantine and other non-pharmaceutical interventions.



Mr. Jovan Wiggan Epidemiology Officer

Mr. Jovan Wiggan has provided significant contribution to the National Epidemiology Response to the COVID-19 pandemic especially in relation to complex data analyses and data visualization. Mr. Wiggan was integral to designing charts to depict chains of transmissions of cases and contact tracing diagrams in the early phases of the pandemic.

Over the past 21/2 years, Mr. Wiggan has worked consistently long hours, often times 7 days per week to ensure that the various analyses were conducted and the charts and infographics produced to support the various reports and presentations. These charts include: epidemiological curves for cases by date of onset of symptoms, date of outcome (for deaths and clinical severity of COVID-19 cases) and case classification (national and by parish level), combination of symptoms tables and charts, combination of comorbidities tables and charts, and tables and charts for comorbidities and risk factors of deceased COVID-19 cases. Additional outputs include: charts for cases, hospitalizations and deaths by vaccination status, charts for cases and deaths by wave period, calculation of case fatality rates by wave period and also proportional mortality charts.

With impeccable attention to detail, working as biostatistician and epidemiological officer, Mr. Wiggan was instrumental in drafting and publishing "COVID-19 at a Glance" and also in drafting the current COVID-19 edition of the Vitals publication. As a member of the COVID-19 research team, he cleans, analyses and reports on surveillance data and contributed to documents for publication related to COVID-19 transmission.



Dr. Andriene Grant

#### **Director, Epidemiology Research and Analysis**

Dr. Andriene Grant has been leading the Epidemiology COVID-19 Research Response for the past 2 <sup>1</sup>/<sub>2</sub> years. As lead for the Research and Analysis work stream, Dr. Grant was responsible for the development of an analysis plan to guide COVID-19 analysis activities, oversee analysis activities related to COVID-19 positive cases and special interest groups, establish research working groups to guide the COVID-19 research agenda and develop and execute research proposals/activities. Dr. Grant and her team contributed to the following: A Coordinated Research Roadmap for COVID-19 (including implementation and procurement plans); Executive Summary. Modeling the Transmission and Control of SARS-CoV-2 in Jamaica. Preliminary Findings; Vulnerability Mapping: COVID-19. An Explorative Analysis; The Benefits and Impact of the COVID-19 Vaccination Programme and the Return to Normal; SARS-CoV-2 Transmission in Public Gatherings Including Religious Events and Funerals. Literature Review; A Cross-Sectional Analysis of Risk Factors Associated with Severe COVID-19 Outcomes in Jamaica using National Surveillance Data.

In addition to research and analysis, Dr. Grant has also contributed hundreds of hours to the COVID-19 Surveillance process in her role as EOC Manager. Her responsibilities included provision of epidemiological data/updates and feedback to the MOHW Emergency Operations Centre (EOC) to inform public health actions, the processing and analysis of COVID-19 laboratory data, investigation and classification of COVID-19 deaths the preparation of detailed reports to various stakeholders on the status and trends of the COVID-19 outbreak in Jamaica and participation in daily MOHW EOC meetings and the presentation of epidemiology data/reports.



Mrs. Nicole Martin-Chen

### **Director, Health Status Monitoring**

Mrs. Nicole Martin-Chen has been an integral part of the National Epidemiology Response. Over the past 2 1/2 years she has provided technical support in crafting and managing the COVID-19 pandemic, through the management of the Emergency Operation Centre surveillance response, the tracking of contacts of confirmed COVID-19 cases, and the identification of community and residential clusters and their unique characteristics and trends. Mrs. Martin-Chen has spent hundreds of hours carrying out activities such as the revision of COVID-19 surveillance protocol, design and revision of reporting templates for COVID-19 cases, research and discussion of COVID-19 models and forecasting applications, collection, compilation, and reporting of contact tracing information for timely decision making. She was also responsible for the compilation and reporting of data for community and residential surveillance, maintaining contact with field, parish, and regional staff to verify and validate data submitted particularly for large clusters and communities under lockdown and performing EOC manager duties with the primary responsibility to manage the ongoing systematic collection, analysis, and reporting on the COVID-19 situation in country.



Mr. Hector Burrowes GIS Officer

Mr. Hector Burrowes single-handedly led the GIS Geo Spatial & Maps Work Stream for the majority of the past 2 1/2 years. Working 7 days per week, 365 days per year, Mr. Burrowes has been responsible for: collating daily updates on new cases, geocoding data, conducting analyses and defining linkages between cases and generating maps of cases. Over the period, Mr. Burrowes has produced over 20,000 maps depicting community spread, date of onset, date of outcome, comorbidities, overall and overall, less imported rates among other variables. Additionally, Mr. Burrowes generated a Social Vulnerability Index (SVI) at the parish and community level to aid decision makers in health identify the communities/parishes that were at greater risk. The SVI indicates the relative vulnerability of each community/parish. It ranks communities/parishes on socioeconomic factors, including crowding, school attendance, population below the poverty line, population density, elderly population, nursing homes etc. The SVI provides specific socially and spatially relevant information to help public health officials better assess community/parish needs.



**Dr. Nathlee McMorris** 

#### Medical Epidemiologist, Medical Microbiologist

Since 2019, Dr. McMorris has worked tirelessly to support the National Epidemiology Branch's COVID-19 response contributing to the following activities:

- Provision of epidemiological data/updates and feedback to the MOHW Emergency Operations Centre (EOC) to inform public health action. This included the processing and analysis of COVID-19 laboratory data and the preparation of detailed reports to various stakeholders on the status and trends of the COVID-19 outbreak in Jamaica. Participation in daily MOHW EOC meetings and the presentation of epidemiology data/reports.
- 2. Coordination of the COVID-19 Genomic Surveillance which includes the weekly provision of suggested list of confirmed COVID-19 cases for gene sequencing, review and interpretation of gene sequencing results and the compilation of reports regarding the number and types of variants present and emerging and provision of data and technical briefs.

Dr. McMorris was also a part of the team who developed the 2019 Novel Coronavirus (COVID-19) Surveillance Protocol. She has been leading the COVID-19 Surveillance integration into pre-existing Respiratory Surveillance Systems and the strengthening of all SARI sentinel sites to perform their mandated activities through the provision of material and knowledge input. This has enabled more rapid response to the COVID-19 pandemic in Jamaica.



Ms. Nellisa Thompson

#### **Programme Coordinator**

Since 2020, Ms. Thompson has spent hundreds of hours (day and night) performing Surveillance Officer duties in relation to COVID-19, including: sorting and cleaning laboratory results, verifying and entering missing demographic and geographic information, identifying new cases and removing duplicates, identifying reinfections and clusters, updating case listing, validating and recovering existing cases in addition to providing ongoing support to the National Surveillance Team's COVID-19 response.

Ms. Thompson was also instrumental in the drafting of the National Epidemiology Work Stream for the COVID-19 Response; organization and delivering training for regional and parish officers in the use of Go.Data Database Management Platform; assisting with monitoring of sentinel sites; coordinating the daily update and validation of COVID-19 data on the JAMCOVID Dashboard and coordinating the verification and updating of the vaccination status of confirmed cases.



Dr. Iyanna Wellington

#### Medical Epidemiologist – Communicable Disease

As head of Communicable Diseases Surveillance in the National Epidemiology Branch, it was Dr. Iyanna Wellington's responsibility to coordinate the surveillance response to the COVID-19 pandemic. Up to July 2021 when she demitted office, Dr. Wellington ably managed activities relating to case notification and case investigation which included the receipt and processing of COVID-19 notifications, analysis of data and the preparation of presentations and reports, following up with the laboratory services and the relevant institutions to verify information where necessary, make recommenddations for suspected cases for testing and communicate daily status of samples to the parishes. In addition to managing the overall process relating to notification and investigation of cases, Dr. Wellington also served as EOC Manager (Surveillance) where she was responsible for providing daily epidemiological updates and feedback to the MOHW EOC, processing and analysis of COVID-19 laboratory data, investigation and classification of COVID-19 deaths, the preparation of detailed reports to various stakeholders on the status and trends of the COVID-19 outbreak in Jamaica and participation in daily MOHW EOC Meeting and the presentation of epidemiological data and reports.

Dr. Wellington also played a major role in the development of the 2019 Novel Coronavirus (COVID-19) Protocols and guidelines.



### Dr. Kelly-Ann Gordon-Johnson

### **Epidemiologist, Grant Manager**

Dr. Kelly-Ann Gordon-Johnson was the Grant Manager for the Surveillance and Response to Avian and Pandemic Influenza Project when COVID-19 hit. Based on her vast knowledge of epidemiology she was quickly drafted into the National Epidemiology response to the COVID-19 pandemic. Up to August 2020 when she demitted office, Dr. Gordon-Johnson was an integral part of the team which participated in the development of the COVID-19 Surveillance protocols and also the drafting of the reporting format for the Surveillance Report. Dr. Gordon-Johnson also led the monitoring of sentinel sites work stream. During the COVID-19 pandemic, it was critical that there was a continuance of the regular sentinel operations in relation to the sampling, reporting and testing of severe acute respiratory infection (SARI) and influenza-like illnesses (ILI). By monitoring these activities, the Branch could easily identify discrepancies or trends and plan actions. Dr. Gordon-Johnson also served as EOC Manager (Surveillance) on a rotation basis carrying out the activities relating to processing laboratory results, conducting analyses and preparing daily reports and presentations for the MOHW EOC and press releases.



Dr. Cathi-Ann Williams

### Medical Officer (Health) – Communicable Disease Surveillance

Dr. Cathi-Ann Williams played an integral role in the National Epidemiology response to the COVID-19 pandemic especially in the case notification and case investigation processes. Up to April 2021 when she demitted office, one of her main responsibilities was the review and classification of COVD-19 notifications forms received by the National Surveillance Unit on a daily basis. In addition, she was a part of the team responsible for the development of the COVID-19 Surveillance Protocols and she also played a role as EOC Manager (Surveillance) where she was responsible for carrying out the activities relating to processing laboratory results, investigation and classifying deaths, conducting analyses and preparing daily reports and presentations for the MOHW EOC and press releases.



**Dr. Tyrone Roberts** 

#### **Medical Epidemiologist**

When Dr. Tyrone Roberts joined the National Epidemiology Branch in January 2022, the Team was in the middle of the worst COVID-19 wave yet; the fourth wave. The country was recording daily highs of over 1,000 new cases and the team being understaffed and at the point of burn out. Dr. Roberts had to quickly learn the role of EOC Manager which entailed the provision of epidemiological data/updates and feedback to the MOHW Emergency Operations Centre (EOC) to inform public health action. This included the processing and analysis of COVID-19 laboratory data, investigation and classification of COVID-19 deaths, the preparation of detailed reports to various stakeholders on the status and trends of the COVID-19 outbreak in Jamaica and participation in daily MOHW EOC meetings and the presentation of epidemiological data/reports.

Prior to joining the National Epidemiology Team, Dr. Roberts was a part of the Southern Regional Health Authority (SHRA) COVID-19 response team.



Dr. Kara Yap

#### Medical Officer (Health) – Communicable Disease Surveillance

Dr. Kara Yap joined the National Epidemiology Team in February 2022 and in a short span of time has contributed significantly to the Team's Response. In her role as an EOC Manager Dr. Yap has been responsible for managing the daily epidemiological surveillance processes, making presentations at MOHW EOC meetings and presenting epidemiological data, liaising with the laboratory and parishes concerning new results, dispatching results and investigating. She is also responsible for classifying new and existing deaths, updating and dispatching confirmed case database, analyzing data and preparing reports, including press release presentations.

Prior to joining the National Team Dr. Yap played an integral role in the St. Elizabeth Parish Health Team's COVID-19 response.



Ms. Romae Thorpe Biostatistician

When COVID-19 was declared a pandemic and the cases in Jamaica began to increase, the number and complexity of analysis required of Ms. Romae Thorpe also increased significantly. Over the past two plus years Ms. Thorpe has supported the team in presenting timely and effective epidemiological data to support action. This included generating and distributing the estimated reproduction number for Jamaica which is used to measure the spread of COVID-19, generating of epi curves for symptomatology, case classification, clinical status, geographic location, demography, onset, etc., generating different charts and graphs to depict different variables. Ms. Thorpe was also integral in the analysis of BPO Call Centre data in the early part of the outbreak - sometimes on a weekly basis. She also performed statistical analyses on data toward the submission of a paper to an esteemed journal, entitled "A Cross-Sectional Analysis of Risk Factors Associated with COVID-19 Outcomes in Jamaica using Surveillance Data" and provided technical and other editorial expertise for the COVID-19 Transmission Paper as part of the National Research Agenda.

In addition to performing complex analyses and research support, Ms. Thorpe has also supported the surveillance activities by performing EOC Surveillance-related duties including processing of laboratory results to identify new COVID-19 cases, maintaining and updating of the confirmed case line listing with new cases on assigned days and reconciling cases listed for recovery.



Dr. Eon Campbell

### Biostatistician

Dr. Eon Campbell has made a significant contribution to the National Epidemiology Team's response to the COVID-19 pandemic. For the past year, Dr. Campbell has been involved in conducting complex analyses and producing various outputs such as epidemiological curves for COVID-19 case transmission, curves for COVID-19 outcomes (death and severity of illness) classification and curves for cases, hospitalization and death by vaccination vaccinated, partially status (fully vaccinated. unvaccinated). He was also responsible for calculating COVID-19 cases and deaths by wave period, and COVID-19 case fatality ratio for wave period. In addition to conducting analyses he has also been involved in research activities and has participated in the publishing of 'The Benefits and Impact of the COVID-19 Vaccination Programme and the Return to Normal' and the 'COVID-19 at a Glance'.



Ms. Lesley-Ann James Surveillance Officer

Ms. Lesley-Ann James is a Surveillance Officer in the National Surveillance Unit who joined the team in 2018. Her main responsibility is for mortality surveillance; however, her work encompasses several other areas. As part of the National Surveillance Team Ms. James has spent hundreds of hours processing COVID-19 laboratory results, verifying and entering missing demographic and geographic information, identifying new COVID-19 cases and removing duplicates, identifying reinfections and disease clusters, updating the confirmed case listing as well as validating and recovering existing COVID-19 cases. In addition, Ms. James has been responsible for identifying and updating COVID-19 data and reports for vulnerable groups such as health care workers and COVID-19 deaths, including those associated with pregnant women. She also contributes to the analysis and reporting of maternal mortality among COVID-19 cases and genomic sequencing and reporting on new variants.



Ms. Amanda Rousseau Surveillance Officer

As part of the National Surveillance Team Ms. Amanda Rousseau has been critical to the COVID-19 response. She joined the team in 2019, before the COVID-19 pandemic and has spent hundreds of hours processing, verifying and contributing to COVID-19 reports and press releases. Ms. Rousseau also maintained the routine reporting for influenza, arboviruses, accidental poisoning, meningitis and the weekly bulletin throughout the COVID-19 outbreak, improving the breadth of data available for informing public health actions. Ms. Rousseau also represents the unit for IHR meetings and port audits.



Ms. Minette Robertson Surveillance Officer

Ms. Minette Robinson provided valuable support to the National Epidemiology COVID-19 response in the early stages of the pandemic. Her role was to coordinate the data entry and validation activities which included supervising the Data Entry Clerks, ensuring the proper sorting, classification and filing of the forms so that data would be readily available for use by the various teams. Sadly, Ms. Robertson passed away during this period.



Nurse Tena-Kim Johnson-Hoilett Surveillance Officer

Nurse Tena-Kim Hoilett, Surveillance Officer, was integral to the National Epidemiology response to the COVID-19 pandemic. Up to July 2021, she contributed hundreds of hours to processing laboratory results, verifying and entering missing demographic and geographic information, identifying new COVID-19 cases and removing duplicates, identifying reinfections and disease clusters, updating the confirmed case listing, validating and recovering existing COVID-19 cases.



Mr. Hakeem Shields Surveillance Officer

Mr. Hakeem Shields has contributed significantly to the National Epidemiology "all in" response. As a Surveillance Officer, he spent hundreds of hours processing laboratory results, verifying and entering missing demographic and geographic information, identifying new COVID-19 cases and removing duplicates, identifying reinfections and disease clusters, updating the confirmed case listing, validating and recovering existing COVID-19 cases.



Ms. Venice Campbell Surveillance Officer

Ms. Venice Campbell joined the National Epidemiology Team in August 2022 and is already providing much needed support to the team's response. As a Surveillance Officer, her responsibilities include: processing laboratory results, verifying and entering missing demographic and geographic information, identifying new COVID-19 cases and removing duplicates, identifying reinfections and disease clusters, updating the confirmed case listing, validating and recovering existing COVID-19 cases.



Ms. Tana Bandoo Surveillance Officer

Ms. Tana Bandoo joined the National Epidemiology Team in August 2022 and is already providing much-needed support to the team's response. As a Surveillance Officer her responsibilities include: processing laboratory results, verifying and entering missing demographic and geographic information, identifying new COVID-19 cases and removing duplicates, identifying reinfections and disease clusters, updating the confirmed case listing, validating and recovering existing COVID-19 cases.



Dr. Daidre Rowe Medical Officer

Dr. Daidre Rowe is a Consultant Neurosurgeon who has been a part of the technical team involved in working toward the submission of a paper to an esteemed journal, entitled "A Cross-Sectional Analysis of Risk Factors Associated with COVID-19 Outcomes in Jamaica using Surveillance Data." She has also provided technical and editorial expertise for the COVID-19 Transmission Paper as part of the National Research Agenda.



Ms. Hillary Mitchell Epidemiology Clerk

Ms. Hillary Mitchell has provided invaluable support to the surveillance response to the COVID-19 pandemic. As Epidemiology Clerk, it was Ms. Mitchell's responsibility to ensure the case notification and investigation records that were delivered to the National Surveillance Unit were sorted and distributed to the appropriate officer(s). In addition to assisting with records, Ms. Mitchell also coordinated the shipment of samples to CARPHA in Trinidad and Tobago for urgent testing.

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Ms. Deborah Henningham Research Officer

Ms. Deborah Henningham has provided significant contribution to the COVID-19 Research effort since joining the team in April 2021. She has supported the National Epidemiology Research activities that informed MOHW and GOJ policy decisions through the preparation of literature reviews and technical papers, data analysis and visualization and the generation of daily COVID-19 outputs (geographical spread, reproductive rates, estimated reproductive number). Of note, she has prepared the following literature reviews:

- 1. The SARS-CoV-2 transmission in public gatherings including during religious events and funerals
- 2. The benefits COVID-19 vaccination
- 3. Mass gathering affidavit adapted from a previous affidavit (*religious gathering*).



**Tanielle Mullings** 

**Research Officer** 

Ms. Tanielle Mullings has provided tremendous support to the COVID-19 Research Response. Her contribution includes:

- 1. Supporting the National COVID-19 Research Agenda through the preparation of ethical submissions, literature reviews, preparation of manuscripts for submission to journals, preparation of policy documents and presentations.
- 2. Conducting literature review of COVID-19 literature for Cabinet presentations
- 3. Preparing graphs for review of COVID-19 data for select health areas
- 4. Preparing graphs and ratio tables for review of COVID-19 outpatient data.

In addition to research, Ms. Mullings has also supported surveillance activities in areas such as updating of confirmed cases information, verification and updating of data for confirmed cases and assisting with contact tracing for St. James.



Mr. Oral Forrester Database Officer

Mr. Oral Forrester has played a critical role in the Surveillance Response to the COVID-19 pandemic through his involvement with the creation and management of databases and the provision of technical support in the maintenance of the IT infrastructure in the Branch. The Team's ability to deliver timely and accurate data rests heavily on its ability to access the databases on-demand; down-time must be kept at a minimum. Mr. Forrester also provided much-needed support with the processing and storing of case notification files.



Mr. Lerone Vernon Database Officer

Mr. Lerone Vernon's main role in the COVID-19 response was to support GIS Spatial Mapping activities. In this regard Mr. Vernon had spent many hours assisting with geocoding of case location and generating development area maps. His contribution had been significant as he had provided much-needed support to the GIS Officer allowing for the timely production of maps and other outputs that have been critical in informing decision-making and interventions.



Mr. Brandon Christie Database Officer

Mr. Brandon Christie's main role in the COVID-19 response is to support GIS Spatial Mapping activities. In this regard Mr. Christie has spent many hours assisting with geocoding of case location. His contribution has been significant as he has provided much-needed support to the GIS Officer allowing for the timely production of maps and other outputs that have been critical in informing decision-making and interventions.



Mr. Anthony McLean

### **Database Officer**

Since joining the National Epidemiology team in February 2022, Mr. Anthony McLean has made significant contribution to the National Epidemiology's effort to monitor and report on vaccination status of confirmed COVID-19 cases. Mr. McLean currently has responsibilities for the daily updating of the vaccination status (among Confirmed Cases) database and is also responsible for producing the vaccination coverage slides for presentation to Cabinet and other relevant stakeholders on a weekly basis.



Ms. Kharell Thomas Data Entry Clerk

Ms. Kharell Thomas has supported the National Epidemiology COVID-19 response in many different areas. A Data Entry Clerk primarily assigned to research, Ms. Thomas has definitely been an all-rounder as she has provided support in processing and entering thousands of COVID-19 notification and investigation data in requisite databases, verifying vaccination status and updating vaccination status database daily, calculating reproductive rates and supporting GIS Spatial Mapping activities by geocoding case locations.



Mrs. Charlene Thompson-Scott Data Entry Clerk

Mrs. Charlene Thompson-Scott was a part of the data entry team that ensured timely processing and access to COVID-19 case investigation information. She was responsible for sorting, logging and entering COVID-19-related case information in the requisite databases thereby ensuring that the team could perform analysis and report in a timely manner.



Mr. Shawn Johnson Data Entry Clerk

Mr. Shawn Johnson has been a part of the National Epidemiology Team since 2019. As a data entry clerk, his main responsibility is to ensure that disease notification and investigation data are processed and updated in the requisite databases in a timely manner. This is to ensure timely analysis and reporting of health events. At the start of the COVID-19 pandemic Mr. Johnson processed and entered thousands of COVID-19 suspected and confirmed case information into the COVID-19 Database. Mr. Johnson was also responsible for the daily uploading of data to the JAMCOVID Dashboard which was a tool used to provide up-to-date data on Jamaica's COVID-19 situation to travellers and other members of the local and international community.



Mr. Fabion Shaw Data Entry Clerk

Mr Shaw is a part of the data entry team that ensured the timely processing and access to COVID-19 case investigation information. Mr. Shaw is responsible for sorting, logging and entering thousands of COVID-19 related case information in the requisite databases thereby ensuring that the team could perform analysis and report in a timely manner.



Ms. Shavaniel Wilson Data Entry Clerk

Ms Shavaniel Wilson was a part of the data entry team that ensured the timely processing and access to COVID-19 case investigation information. During her time with the team, Ms Wilson processed and entered thousands of COVID-19-related case information in the requisite databases thereby ensuring that the team could perform analysis and report in a timely manner.



Mrs. Venessa Brown-Bailey Data Entry Clerk

Mrs. Venessa Brown-Bailey was a part of the data entry team that ensured the timely processing and access to COVID-19 case investigation information. She was responsible for sorting, logging and entering thousands of COVID-19-related case information in the requisite databases thereby ensuring that the team could perform analysis and report in a timely manner.



Ms. Cornelia Palmer Data Entry Clerk

Ms. Cornelia Palmer is a new member of the National Epidemiology staff as a part of the data entry team. Since joining the team, she has been responsible for sorting, logging and entering of COVID-19-related case information in the requisite databases thereby ensuring that the team could perform analysis and report in a timely manner.



Ms. Jameillia Hudson Assistant Statistician

Ms Jameillia Hudson's main role in the COVID-19 response was to support the Research Team in conducting analysis and performing administrative duties for the Essential National Health Research Committee. Ms. Hudson was responsible for calculating the daily reproductive rates and geographic spread of the COVID-19 cases in Jamaica.

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Ms. Samantha Anderson

#### **Monitoring and Evaluation Officer**

As a new member of the Health Status Monitoring Team, Ms. Anderson has provided technical support by crosschecking the contact tracing reports and coordinating and scheduling her Unit's core activities to ensure that team members who had EOC responsibilities were able to carry out their duties with a clear overview of their schedule and core responsibilities for the month.

Additionally, she reviewed COVID-19 data and drafted reporting narratives with the view to producing topical Health Status Monitoring Reports since joining the team in July 2022.



Ms. Marsha Brown

#### **Surveillance Coordinator**

Ms. Brown joined the team as a surveillance coordinator in October 2021 with the main tasks of completing records for deaths among COVID-19 cases, preparation of weekly COVID-19 mortality tables and graphs for Cabinet and MOHW EOC Reports. In addition, she provided support to the team in relation to the processing of laboratory results, updating of the confirmed case listing and the validating and recovering of existing COVID-19 cases. She also provided support to the Case and Contact Research Group in data analysis and literature review, vaccine effectiveness data analysis plan compilation and the COVID transmission paper editorial committee.



Ms. Anna Kay Howell GIS Analyst

Ms. Fiona Henry Administrator

Ms. Anna Kay Howell has been with the National Epidemiology Team for a month (October 2022), however, she is already providing much-needed support to the GIS Spatial Mapping activities. Her main responsibility is for generating COVID-19 maps by epidemiology week. Her support is significant considering the sole GIS Officer was carrying this activity singlehandedly for almost two years

As Administrator for the National Epidemiology Team, Ms. Fiona Henry's role is to ensure that the team has the requisite tools and support to effectively carry out their roles and responsibilities. In addition to supporting the team's administrative needs, Ms. Henry also assisted with the Surveillance case investigation and notification process by processing thousands of notifications, processing of laboratory results and updating of the confirmed case database.





Ms. Samantha Pryce Secretary

Ms. Samantha Pryce has provided continuous clerical and administrative support to the team throughout the COVID-19 pandemic ensuring the team's ability to complete tasks in a timely and efficient manner.



Ms. Ingrid Williams Secretary

Ms. Ingrid Williams has provided continuous clerical and administrative support to the team throughout the COVID-19 pandemic ensuring the team's ability to complete tasks in a timely and efficient manner.



Ms. Trishawna Forrest

Secretary

Ms. Trishawna Forrest has provided continuous clerical and administrative support to the team throughout the COVID-19 pandemic ensuring the team's ability to complete tasks in a timely and efficient manner. In addition, Ms. Forrest has supported the Data Entry Team with the processing of the thousands of case notification forms received on a daily basis.

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### **Editorial Staff**

### **Editorial Staff:**

Dr. Karen Webster-Kerr - Principal Medical Officer, National Epidemiologist Dr. Ardene Harris - Senior Medical Officer, Medical Epidemiologist, National Surveillance Unit Dr. Andriene Grant - Director, Epidemiological Research and Data Analysis Unit Mr. Jovan Wiggan - Epidemiological Officer, National Epidemiology Branch Miss Nellisa Thompson - Programme Coordinator, National Epidemiology Branch Mr. Hector Burrowes - Monitoring and Evaluation/GIS Officer, Epidemiological Research and Data Analysis Unit Dr. Nathlee McMorris - Medical Epidemiologist, National Surveillance Unit Dr. Tyrone Roberts - Medical Epidemiologist - Communicable Disease, National Surveillance Unit Dr. Kara Yap - Medical Officer (Health) - Communicable Disease Surveillance, National Surveillance Unit Mrs. Nicole Martin-Chen - Director, Health Status Monitoring Unit Mr. Anthony Mclean - Database Officer, National Epidemiology Branch Mr. Eon Campbell - Biostatistician, Health Status Monitoring Unit Miss Lesley-Ann James - Surveillance Officer, National Surveillance Unit Miss Amanda Rousseau - Surveillance Officer, National Surveillance Unit Miss Romae Thorpe - Biostatistician, Epidemiological Research and Data Analysis Unit Miss Deborah Henningham - Research Officer, Epidemiological Research and Data Analysis Unit Miss Tanielle Mullings - Research Officer, Epidemiological Research and Data Analysis Unit Miss Kharell Thomas - Data Entry Clerk, Epidemiological Research and Data Analysis Unit Mr. Stephen Davidson - Director, Public Relations and Communications



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## MASK ETIQUETTE

If there becomes a need to wear a mask, appropriate use and disposal are essential to ensure they are effective and to avoid increased risk of transmission.

### Steps for using masks:

- Wash hands with soap and water or use an alcohol-based hand sanitizer;
- Place mask carefully to cover mouth and nose and tie securely to avoid gaps between the face and the mask;
- Avoid touching the mask, while being worn;
- When removing the mask do not touch the front, but remove the straps from behind;
- After removal or whenever you touch a used mask, clean hands by using an alcohol-based hand sanitizer or soap and water;
- Replace masks with a new clean, dry mask as soon as they become damp/humid;
- Do not re-use single-use masks;
- Discard masks after each use and dispose of them immediately upon removal in a closed bin.

### #ProtectYourselFromCoronavirus #StayCoronavirusFree #KeepHealthy

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### PREGNANT & BREASTFEEDING MOTHERS SHOULD GET VACCINATED AGAINST COVID-19.

Pregnant women with COVID-19 are at higher risk of developing severe illness compared to non-pregnant women of reproductive age.

Severe illness includes illness that requires hospitalisation, intensive care, a ventilator or special equipment to breathe, or illness that results in death.

> COVID-19 in pregnancy has been associated with increased risk of preterm birth and of newborns requiring neonatal intensive care.

Make your vaccination appointment today.

Call the Vaccination Call Centre at 888-ONE-LOVE (888-663-5683).

Visit https://www.moh.gov.jm



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MINISTRY OF

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# NATIONAL EPIDEMIOLOGY

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52-60 GRENADA CRESCENT, KINGSTON 5: OFFICE OF THE MINISTER OF STATE HEALTH PROMOTION & PROTECTION BRANCH [WITH THE EXCEPTION OF VETERINARY PUBLIC HEALTH AND ENVIRONMENTAL HEALTH UNITS] STANDARDS AND REGULATION DIVISION INTERNAL AUDIT UNIT

