

**IN THE SUPREME COURT OF BERMUDA
CIVIL JURISDICTION
2021 : No. 162**

IN THE MATTER OF THE BERMUDA CONSTITUTION ORDER 1968

**AND IN THE MATTER OF THE PROPOSED AMENDMENTS TO THE QUARANTINE
(COVID-19) AMENDMENT ORDER 2021**

**AND IN THE MATTER OF THE PROPOSED AMENDMENTS TO THE PUBLIC HEALTH
(COVID-19 EMERGENCY POWERS) (PHASED RE-OPENING) REGULATIONS 2021**

BETWEEN:

ALBERT BREWSTER

First Applicant

-and-

VINCENT LIGHTBOURNE

Second Applicant

-and-

WENDY WARREN

Third Applicant

-and-

THE PREMIER OF BERMUDA

First Respondent

-and-

THE MINISTER OF HEALTH

Second Respondent

FIRST AFFIDAVIT OF DR. CARIKA WELDON, MRSB, FIBMS

I, Dr. Carika Weldon, of 72 Middle Road, Warwick, WK 03, **HEREBY MAKE OATH AND SAY**
as follows:

1. I achieved my Bachelor of Science (BSc (Hons)) in Medical Biochemistry and a PhD in Biochemistry from the University of Leicester. I was invited to become a Member of

the Royal Society of Biology in April 2019 (MRSB) and awarded a Fellow of the Institute of Biomedical Science in April 2020 (FIBMS).

2. Before returning to Bermuda in April 2020 for the Bermuda COVID-19 Response, I was employed as a Research Scientist in the Oxford Genomics Centre at the Wellcome Trust Centre for Human Genetics, a department of the University of Oxford. I was also a Project manager for all Oxford Nanopore sequencing projects. My publications focus on mRNA processing & using nanopore sequencing as a tool.
3. I returned to Bermuda to establish and lead the Government of Bermuda's on-island Covid-19 testing facility, the Molecular Diagnostics Laboratory (the "MDL"). I am also the appointed Science Advisor to the Government of Bermuda for COVID-19, building on my 10 years in the field of RNA research. In October 2020 I was awarded the Queen's Certificate and Badge of Honour for services to the Covid-19 pandemic response.
4. The statements that I make in this Affidavit on matters about which I have direct knowledge are true, and where such statements are based upon information provided to me by others, I believe the same to be true.
5. There is now produced to me and exhibited hereto a paginated bundle of documents marked "**Exhibits to the First Affidavit of Dr. Carika Weldon MRSB, FIBMS**", which contains true copies of the documents to which I refer in this Affidavit.

Role Assisting the Government with pandemic

6. On March 26, 2020 I received a call from Bermuda to ask about how does COVID-19 PCR testing work. In this call I explain that the test was a genetic test that is more closely aligned with the work of research laboratories and so a GP office would not have the experience or equipment to conduct them. On this same day I was asked to come back by the Premier of Bermuda to assist in expanding testing capacity.
7. Between March 27 and April 6, 2020 I worked alongside others to help secure PCR machines, PCR kits and reagents to be able to expand capacity. Upon my arrival in Bermuda on April 6, I was then tasked with finding personnel to assist in the laboratory as well as helping to procure items for swabbing. I worked with the Ministry of Public

Works to redesign the space given to make it fit within guidelines. On April 19 MDL was opened and tested the first group of persons out of quarantine, of which I was included in this batch of testing. Once out of quarantine I worked with the Ministry of Public Works to set up a drive-thru testing facility at Old White's in Southside, opening on April 24, 2020. This initially allowed essential frontline workers to get tested via self-referral and then became open to the public.

8. MDL provided a more cost-effective testing solution which made long-term community testing feasible and over time all Department of Health testing came through MDL. Since this time, my role has been to oversee daily PCR testing at MDL and to stay at the forefront of testing. As new variants started to appear in late 2020, my role was to find a suitable way to identify variants quickly.
9. In my other role as Science Advisor, my role has been to keep up-to-date with the latest research related to this pandemic. As an RNA scientist, this role has also encompassed public engagement via press conferences and media appearances on how the testing works, how the vaccine works and the latest on variants.

14-Days is necessary for the mandatory quarantine

10. The quarantine period was decided based on the known incubation period of SARS-CoV-2. From initial studies at the onset of the pandemic¹, the median incubation time was determined as approximately 5 days, however the range of incubation observed was between 2 to 15 days. 95% of cases experienced an incubation period of 13 days or less, and so a 14-day quarantine period became standard.
11. Current CDC guidance is to complete a 14-day quarantine. As stated by the CDC, *"The recommendation for a 14-day quarantine was based on estimates of the upper bounds of the COVID-19 incubation period. Quarantine's importance grew after it was evident that persons are able to transmit SARS-CoV-2 before symptoms develop, and that a substantial portion of infected persons (likely somewhere between 20% to 40%) never develop symptomatic illness but can still transmit the virus. In this context, quarantine is a critical measure to control transmission."* Although alternatives are given by the CDC for shorter periods (i.e. 7 or 10 days), they state clearly that, *"any option to shorten quarantine risks being less effective than the currently recommended 14-day quarantine."*

12. Local data is in line with publications on varied incubation periods. MDL's first testing batch on April 19, 2020 was 203 samples from asymptomatic residents who had been in supervised hotel quarantine. Testing was on Day 11, 12 and 13 based on the arrival of three different repatriation flights. Of those tested, 6% (n=12) were detected as having SARS-CoV-2. This was not expected however at this time there was no pre-testing before travel or testing on arrival and so was unclear if any converted after arriving or were positive already in transit.
13. Since the airport opened on 1 July 2020, MDL has tested all incoming travellers on arrival and most of their follow-up post-arrival testing. As of June 21, 2021, MDL has identified 260 traveller cases. Of this total, 125 cases tested negative on arrival then converted to positive during the 14-day quarantine period. Those that tested positive on Day 6, 7 & 8 had negative Day 4 tests. Those that tested positive on Day 9, 10, 12 & 14 also had negative tests on Day 8. The complete breakdown is as follows:

Table 1: Post-arrival new SARS-CoV-2 cases

Day post-arrival	Immunization status		Total
	No	Yes	
0	130	5	135
1	1		1
3	1		1
4	56	2*	58
6	1		1
7	1		1
8	31	2*	33
9	1		1
10	3		3
12	2		2
14	22	2*	24
Grand Total	249	11	260

14. The figures demonstrate that 9% (24) of cases were recorded on Day 14, suggesting a need to keep the 14-day period. It is also worth noting that the source of those immunized is not confirmed as cases were during the March-May 2021 outbreak, and likely to be local transmission.
15. Usually new pathogens have around 14 days to infect cells in the body and multiply before the immune system is able to mount a substantial defence. Vaccine immunity

prepares the body's immune system to attack a pathogen of interest for when a natural infection may occur. In the case of SARS-CoV-2, this shortens the time needed for the body to fight off the virus. This usually results in a shorter infection period and lower viral load (amount of virus in the body).

16. Studies have shown that COVID-19 vaccination reduces the risk of asymptomatic infection² and lowers the viral load³, of which a high viral load is a driving factor for transmission of the virus⁴. It has also been shown that only one dose of a 2-dose vaccine can lower household transmission by 40-50%⁵.

Infections rates

17. Studies have emerged from the United States, Israel, Scotland, Denmark, Sweden & United Kingdom showing significant reduction in the rate of infection of those vaccinated compared to those unvaccinated. A listing of the key findings of studies against SARS-CoV-2 infection more than 14 days after final dose is below:
 - (a) **86% reduction** using either Pfizer-BioNTech or Moderna vaccines in the general population in California;⁶
 - (b) **97% reduction** using Pfizer BioNTech vaccine in healthcare workers in the United States;⁷
 - (c) **99% reduction** using Moderna vaccine in healthcare workers in the United States;⁷
 - (d) **90% reduction** using either Pfizer-BioNTech or Moderna vaccines in healthcare, frontline and essential workers across the United States;⁸
 - (e) **77% reduction** using Johnson & Johnson vaccine in healthcare system members in the United States;⁹
 - (f) **90% reduction** using Pfizer-BioNTech or AstraZeneca vaccines in healthcare workers in the United Kingdom;¹⁰
 - (g) **92% reduction** using Pfizer-BioNTech or AstraZeneca vaccines in healthcare workers in the Scotland;¹¹
 - (h) **92% reduction** using Pfizer-BioNTech vaccine in health system members in Israel above 60 years of age¹² and
 - (i) **93% reduction** using Pfizer-BioNTech vaccine in health system members in Israel under 60 years of age.¹²
18. A further listing of the key findings of studies against SARS-CoV-2 infection more than 7 days after final dose is below:

- (a) **89% reduction** using either Pfizer-BioNTech or Moderna vaccines in the general population in United States;¹³
 - (b) **96% reduction** using Pfizer-BioNTech vaccine in healthcare workers in the United States;¹⁴
 - (c) **86% reduction** using Pfizer-BioNTech vaccine in healthcare workers in the United Kingdom;¹⁵
 - (d) **89% reduction** using Pfizer-BioNTech vaccine in healthcare system users aged 16 years and older in Israel;¹⁶
 - (e) **92% reduction** using Pfizer-BioNTech vaccine in the general population in Israel;¹⁷
 - (f) **64% reduction** using Pfizer-BioNTech vaccine in long term care facility residents in Denmark;¹⁸
 - (g) **90% reduction** using Pfizer-BioNTech vaccine in long term care facility staff in Denmark;¹⁸ and
 - (h) **86% reduction** using Pfizer-BioNTech vaccine in the general population in Sweden.¹⁹
19. A listing of key findings from studies showing vaccine effectiveness on asymptomatic SARS-CoV-2 infections more than 7 days past final dose is below:
- (a) **90% reduction** using Pfizer-BioNTech vaccine in healthcare workers in the United States;¹⁴
 - (b) **92% reduction** using Pfizer-BioNTech vaccine in the general population in Israel;¹⁶ and
 - (c) **86% reduction** using Pfizer-BioNTech or AstraZeneca vaccines in healthcare workers in Israel.²⁰

Rate of Transmission

20. Studies have shown that COVID-19 vaccination lowers the viral load detected of which a high viral load (i.e. low Cp values) is a driving factor for transmission of the virus^{3,4}. This falls in line with local Bermuda data (Figure 1) which shows that during the 2021 outbreak (March-May) those unvaccinated or only having one dose had majority low Cp values (Cp <30), whilst those with a second dose or fully immunized had majority high Cp values (Cp >30).

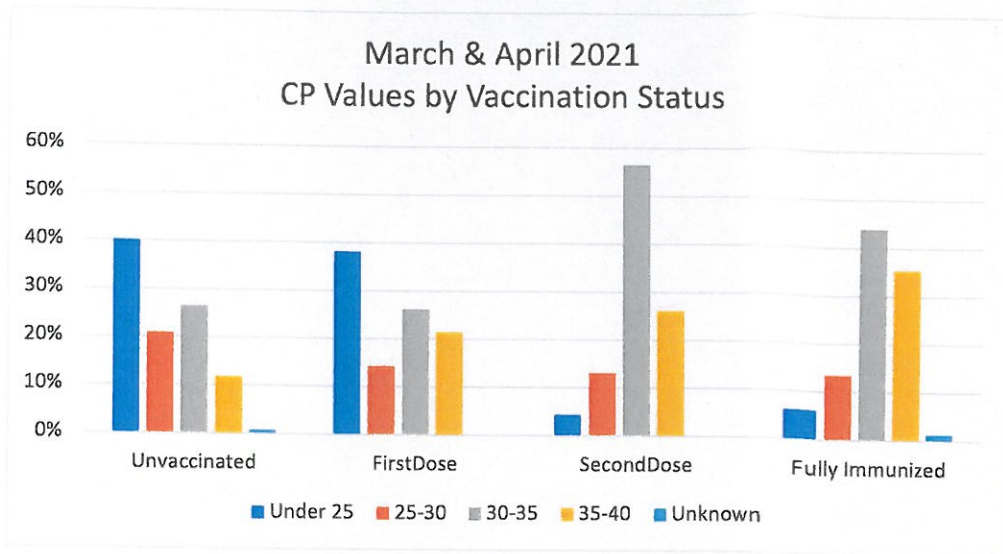


Figure 1: Cp values breakdown by vaccination status in 2021 outbreak of B.1.1.7 strain

21. Although WHO has not yet made any recommendation referring to official rate of infection or rate of transmission, it has been documented by WHO Directors that “timeliness of the recommendations [is] an area for improvement”²¹. It is worth noting that any new WHO recommendations would be based on a literary search of published studies, as the ones referred to in this document.

Variants

22. Testing conducted on 3 June 2021 revealed 3 arrival positive cases from US flights. I reported these cases as per the usual protocol at 9:01 am on 4 June 2021. At this time we had not tested the British Airways flight, nor had tested for the variant of the US arrival cases. On 4 June 2021 the screening test for variants was done on the 3 arrivals cases, revealing they were not a normal strain or the Alpha (B.1.1.7) strain, but either Brazil (Gamma), South Africa (Beta) or Indian (Delta) strain. This was communicated to the government via email at 11:45 am. It was then confirmed at 3:30 pm that cases were the Beta strain.
23. Testing since 3 June 2021 have shown that majority of cases are either Beta or Delta strains. This is a shift from earlier months were majority of cases were Alpha. Of the 19 cases in the last 3 weeks, the breakdown is as follows:
- (a) 37% (7) are Beta;
 - (b) 37% (7) are Delta;

- (c) 5% (1) are normal strain; and
- (d) 21% (4) are undetermined

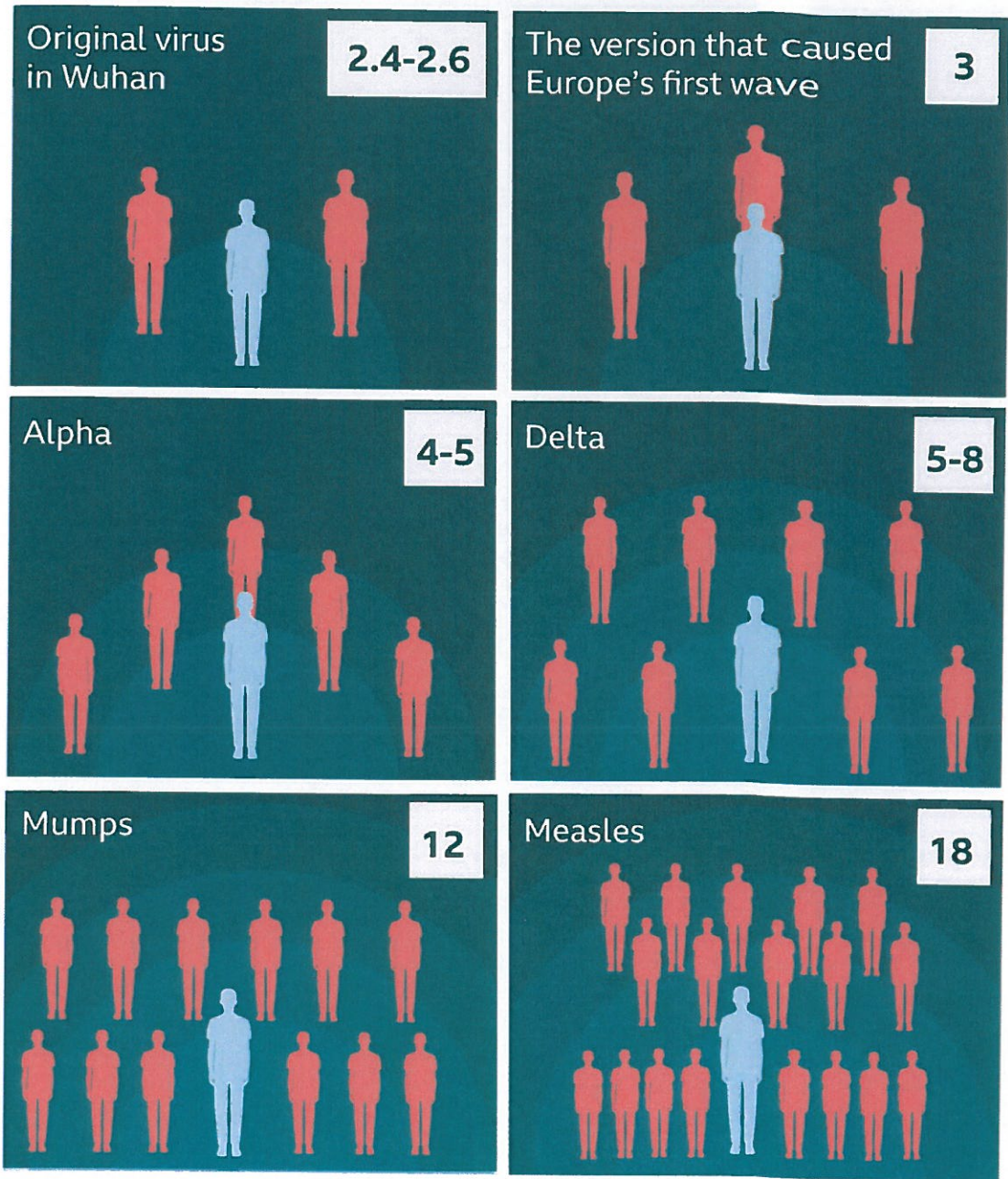
24. Looking at local data for 2021, arrival cases can be broken down by variant type and immunisation status as follows in Table 2:

	Immunization status		Grand Total
	No	Yes	
Positive Cases	130	5	135
Common (eg Cluster V)	1		1
Delta (India)	1	2	3
Undetermined	68	1	69
Beta (South Africa)	3	2	5
Alpha (UK)	26		26
Normal	31		31
Grand Total	130	5	135

25. The R0 number is the average amount of people one infected person can transmit the virus to if no preventative measures or immunity is in place. The below illustration shows the difference in R0 for each strain, demonstrating that Alpha and Delta are more contagious than the original strain²².

How the R0 numbers of Covid-19 variants and other diseases compare

The more contagious, the higher the R0 number



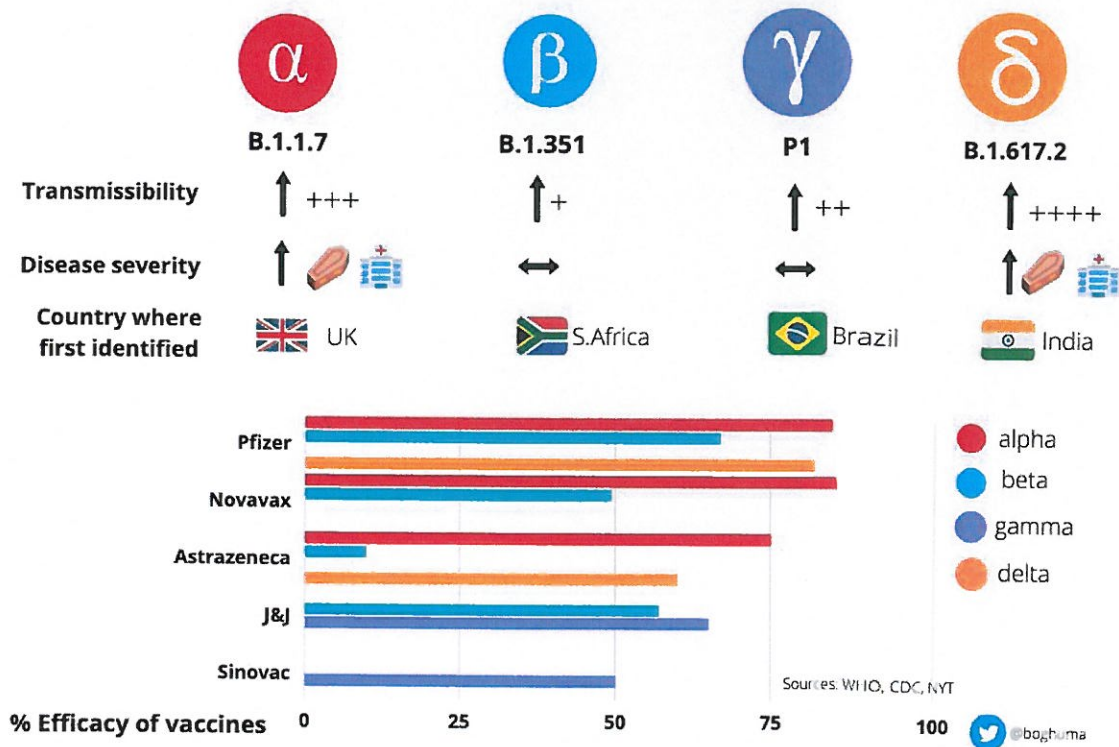
Source: Imperial College, Lancet, Australian government



26. The efficacy of vaccines against symptomatic disease is also shown for a list of vaccines, as well as transmissibility and disease severity. As illustrated, data suggests

that hospitalizations and deaths are higher for Alpha and Delta, but not Beta and Gamma.

KEY SARS-COV-2 VARIANTS OF CONCERN AND VACCINES



Specific issues for Bermuda

27. In my experience, a small island like Bermuda is vulnerable to undetected cases of the virus, especially those of more transmissible variants. Due to our size, effects are amplified compared to larger countries like the US or UK. The public health system in place to respond to COVID-19 in Bermuda is very good, but relies solely on frontline workers working daily due to daily incoming flights. When this is further stressed by an outbreak, it becomes impossible to sustain as there worker fatigue, the workforce diminished due to quarantine (as Bermuda is so small and a case is not too far removed) and ultimately can leads to errors. The December 2020 outbreak was all normal strains but saw active cases rise from 20 to just under 300 in a matter of weeks, with deaths lagging as expected. The introduction of a more transmissible virus (B.1.1.7) saw this trend triple up to over 900 active cases in March-May 2021. Both outbreaks occurred during the time of mobile quarantine, where recent travellers can

move around more freely after returning from abroad. It was clear that this policy, when not adhered to as written, could cause another future outbreak, especially with the new emerging variants that are more transmissible. To prevent another future outbreak, it is imperative to have stricter border measures.

Herd immunity

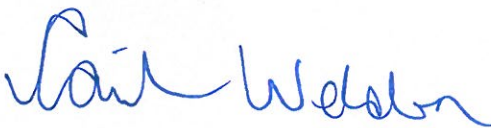
28. Herd immunity is the amount of people in a population that are needed to be fully vaccinated in order to provide overall protection from a certain disease²³. During herd immunity, it is less likely that someone can spread the disease to another, and extends beyond those who are immune, but also covers those who are not immune.
29. Herd immunity is expressed as a percentage and is calculated as 1 minus the inverse of R0 or ***Herd immunity = 1 - (1/R0)***. This means R0 is directly proportional to the amount of the community needed to reach herd immunity: the higher the R0, the higher the percentage needed. Herd immunity based on different strains can be seen below:
- (a) Based on the original virus in Wuhan (R0 = 2.5), herd immunity = 60%;
 - (b) Based on the virus that reached the Europe (R0 = 3), herd immunity = 67%;
 - (c) Based on Alpha virus (R0 = 5), herd immunity = 80%; and
 - (d) Based on Delta virus (R0 = 8), herd immunity = 87.5%.
30. As a result, and given the presence of variants on the Island or the potential for variants to spread, Bermuda has not had a sufficient percentage of the population vaccinated to establish herd immunity.

Declaration

31. I have produced this Affidavit based on my knowledge and professional expertise. In providing this Affidavit, I understand that I owe a duty to the Supreme Court of Bermuda and that I must provide my unbiased opinion as a witness in relation to the matters within my expertise.
32. I confirm that I have been appointed as Science Advisor to the Government of Bermuda for COVID-19 since April 2020.

33. I confirm that I have made clear which facts and matters referred to in this Affidavit are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer.

SWORN by the above-named
DR. CARIKA WELDON, MRSB, FIBMS
City of Hamilton, Bermuda
This 28th day of June 2021

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BEFORE ME:



COMMISSIONER FOR OATHS

Takiyah I. J. Burgess, L.L.B.
Barrister & Attorney
Notary Public
For and in the Islands of Bermuda
MY COMMISSION IS UNLIMITED AS TO TIME

SUPREME COURT BERMUDA
2021 JUN 29 AM 8:40

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