# Report of the Committee Appointed to Investigate the Factors Contributing to Clinical Outcomes of COVID-19 Patients in Trinidad and Tobago

**14th February 2022**

## SIGNATURE PAGE

**REPORT of The Committee Appointed to Investigate the Factors Contributing to Clinical Outcomes of COVID-19 Patients in Trinidad and Tobago**

A Committee appointed by the Government of The Republic of Trinidad and Tobago

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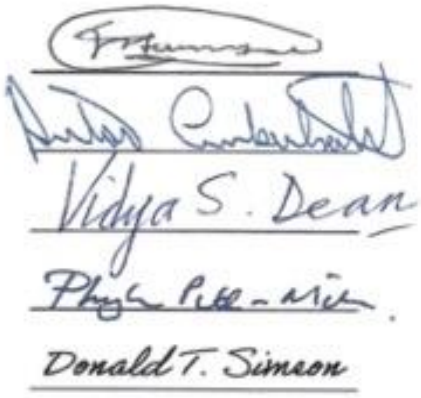

14th February 2022

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

## LIST OF ACRONYMS

| | |
|---|---|
| A&E | Accident & Emergency |
| ADLs | Activities of Daily Living |
| ADT | Admission, Discharge, Transfer |
| ARI | Acute Respiratory Infection |
| BMI | Body Mass Index |
| CEO | Chief Executive Officer |
| CFR | Case Fatality Ratio |
| CKD | Chronic Kidney Disease |
| CMO | Chief Medical Officer |
| CMOH | County Medical Officer/Office of Health |
| CMSE | Centre for Medical Sciences Education |
| COPD | Chronic Obstructive Pulmonary Disorder |
| CT | Cycle Threshold |
| CTSS | CT Severity Score |
| CVA | Cerebrovascular Accident |
| CXR | Chest X-Ray |
| DKA | Diabetic Ketoacidosis |
| DOH | Director(s) of Health |
| ECG | Electrocardiogram |
| ERHA | Eastern Regional Health Authority |
| GMRTT | Global Medical Response of Trinidad and Tobago |
| HDU | High Dependency Unit |
| HIPPAA | Health Insurance Portability and Accountability Act |
| ICU | Intensive Care Unit |
| IFR | Infection Fatality Ratio |
| MAP | Mean Arterial Pressure |
| MCOS | Medical Chief(s) of Staff |
| MOH | Ministry of Health |
| NCDs | Non Communicable Diseases |
| NCRHA | North Central Regional Health Authority |
| NWRHA | North West Regional Health Authority |
| PPE | Personal Protective Equipment |

| | |
|---|---|
| PPI | Poor Prognostic Indicators |
| REDCap | Research Electronic Data Capture |
| RHA | Regional Health Authority |
| RT-PCR | Real-Time Polymerase Chain Reaction |
| SARS-COV-2 | Severe Acute Respiratory Distress Syndrome due to Coronavirus-2 |
| SBP | Systolic Blood Pressure |
| SD | Standard Deviation |
| SPSS | Statistical Package of the Social Sciences |
| SWRHA | South West Regional Health Authority |
| T&TMA | Trinidad and Tobago Medical Association |
| TEMS | Tobago Emergency Medical Services |
| THA | Tobago House of Assembly |
| TOR | Terms of Reference |
| TRHA | Tobago Regional Health Authority |
| UWI | University of the West Indies |
| WHO | World Health Organization |

## SUMMARY

The Committee was convened on 17th January 2022 by the Minister of Health and deliberated until 14th February 2022. Data collection continued until the end of the third week which gave only a brief period of analyses and the crafting of the report. We would like to thank all Ministry of Health and Regional Health Authorities' staff for their cooperation in this exercise in addition to their pandemic-related duties. The Committee would like to note here, that the time was far too brief to allow a thorough assessment of COVID-19 clinical outcomes in Trinidad and Tobago and so the most that could have been done was a rapid assessment which is presented.

We conducted this rapid assessment through the following mechanisms: (1) meetings with technical officials of the Ministry of Health to determine what policies and data were available; (2) visits to COVID-19 care institutions in Trinidad and Tobago; (3) informal interviews of staff during our visits; (4) confidential interviews of staff from all RHAs involved in COVID-19 care; (5) interviews of senior management of the RHAs; (6) audits of medical notes; (7) statistical analyses of secondary datasets of persons who died from COVID-19, who were hospitalized, and who were managed at home; and, (8) an online survey of persons who were treated for COVID-19 at public health facilities.

We noted that within a pandemic, there are ebbs and flows and that the number of patients in hospital occurred against a background of surges. With this Pandemic, surges occurred with different variants of the COVID-19 virus and these variants also had a different innate lethality e.g., the Delta variant was known to have a much higher fatality rate than the Alpha variant. We noted that the average case fatality rate for Trinidad and Tobago varied during the Pandemic and is now lower than on the date of the first meeting of this Committee. Therefore, when data are considered and interpreted, one has to take the context and timing into account.

We found that the admissions, discharge and transfer policies for COVID-19 patients are within the ambit of international best practice especially as recommended by the World Health Organization (WHO). We found that the implementation of the policies during the Pandemic were hampered by unpredictable staff shortages and staff burn-out. We recommend that close attention needs to be paid to staff morale as well as purchases of some consumables. We wish to commend one institution where there was a staff mental health and wellness service serviced by two psychologists as an example of best practice. Another area of best practice was that at

many of the institutions that were visited, staff told us that they routinely communicated with the families of COVID-19 patients on a daily basis.

On the basis of our investigations, we have made 16 recommendations. We hope these would be considered by the Government of the Republic of Trinidad and Tobago.

# 1.0 BACKGROUND TO THE WORK OF THE COMMITTEE

## 1.1 Onset and Infectiousness of SARS-COV-2

The Severe Acute Respiratory Distress Syndrome due to Coronavirus-2 (SARS-CoV-2) was first detected in Wuhan, China in November / December 2019 where it caused a severe crisis with an initial death rate of 4.5%. The disease caused by SARS-CoV-2 is called COVID-19. The World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern on 30$^{th}$ January 2020 and a pandemic on 11$^{th}$ March 2020.

The basic reproduction number, $R_0$ (pronounced R Naught), helps us to predict the tendency of an individual to infect the population assuming all are susceptible. $R_0$ for measles is the highest known for mankind somewhere in the region of 12 to 18; that for seasonal influenza is estimated around 2.0. For COVID-19, the $R_0$ values are different in different studies but is likely to be around 3.0. The disease is therefore considered to be highly contagious, but the degree of infectiousness has also been seen to vary between different strains of the virus.

## 1.2 Spread of COVID-19 to Trinidad and Tobago

In March 2020 the first case was detected in Trinidad and Tobago. There have been three waves or surges in COVID-19 since then. The first wave of COVID-19 peaked in September 2020, the second in May 2021 and the third is ongoing but appears to have peaked sometime around the third week of January 2022. Initially the public health interventions were the non-pharmaceutical preventive measures including face masks, frequent washing of hands and social distancing as well as national lockdowns. By April 2021 the first vaccines became publicly available in Trinidad and Tobago. In June 2021, a biologic, tocilizumab (Actemera®), was approved by the Food and Drug Administration (FDA) for emergency use to treat COVID-19 in children and adults. The drug was made available for use to treat COVID-19 in Trinidad and Tobago later that year. The Ministry of Health (MOH) has advocated guidance from the World Health Organisation (WHO) for the treatment of COVID-19.

## 1.3 SARS-COV-2 Variants

The virus itself has changed in the past 2 years. The original strain was succeeded by the Alpha, Beta and Gamma variants in that order with the Gamma variant being considered the major cause of the surge that occurred in April-May 2021. The Delta variant, which was far more contagious and lethal, is thought to have been the cause of the December 2021-January 2021

surge. Death rates in Trinidad and Tobago have also varied over time, being highest during the first wave at 6.2% then decreasing to a low of 1.0% in August 2021. However, since August 2021, case fatality rates have risen to a maximum of 3.2% which was at the time of the first meeting of the Committee. At that time also, worldwide death rates ranged from 0.1% (Iceland) to 19.4% (Yemen).

## 1.4 National Response

The foci of the responses of the Government of the Republic of Trinidad and Tobago have been firstly to control spread and to decrease severity. This has been done through the promulgation of a series of public health regulations which regulate social distancing and the use of other protective measures in public spaces. Further, the Government has made vaccines freely available to the population with guidance on who should take them. For its various treatment regimes, the Ministry of Health has followed the WHO. Thus, there was an initial emphasis on use of steroids to which a biologic was added later on.

In Trinidad, the care of COVID-19 patients has been confined to certain hospitals in each Regional Health Authority (RHA) and this has come to be called the parallel health care system. Because initially the numbers were low, all cases were cared for within one regional health authority (RHA). The first RHA tasked with COVID-19 care was the North Central Regional Health Authority (NCRHA). At the NCRHA, COVID-19 care was isolated to Caura Hospital for moderate cases and the Couva Medical & Multi-Training Facility (CMMF) for severe cases, requiring ICU care. The care at CMMF was to later be expanded to include ward-based medical care and in 2021 the Arima General Hospital was added to manage both moderate and severe COVID-19 cases. There were various so-called 'step down facilities' between ward-based care and home care that were opened in all of the RHAs. Sometime after this, care for moderately and severely ill patients was provided in the South West Regional Health Authority (SWRHA) and Northwest Regional Health Authority (NWRHA). In Tobago, the system has not been so sharply defined and there was no parallel health care system.

On 15th January 2022, in the midst of the rapid surge in cases and deaths during the third wave, the Prime Minister announced a five-member Committee of independent experts to investigate the factors contributing to clinical outcomes of COVID-19 patients in Trinidad and Tobago.

## 2.0 MEMBERSHIP AND WORK OF THE COMMITTEE

### 2.1 Composition of the Committee

| | |
|---|---|
| Professor Terence Seemungal, FRCP, PhD, CCST, FACP | Professor of Medicine and Chest Specialist, Dean, Faculty of Medical Sciences, University of the West Indies-St Augustine Campus (UWI-STA) |
| Professor Emerita Phyllis Pitt-Miller, CMT, MB ChB, DA, FRCA | Professor of Clinical Anaesthetics and Intensive Care, UWI-STA, & Consultant Anaesthetist, Eric Williams Medical Sciences Complex |
| Dr. Anton Cumberbatch, MBBS, MPH | Specialist in Public Health and former Chief Medical Officer |
| Dr. Vidya Dean, DM (Anaes), UWI, DA (UK), FFARCSI, FRCA. | Consultant in Anaesthetics and Intensive Care |
| Professor Donald Simeon, PhD, MSc, BSc, CStat. | Professor of Biostatistics and Research, Director of the Caribbean Centre for Health Systems Research and Development, UWI-STA |

### 2.2 Terms of Reference

The terms of reference of the committee are as follows:

1. To identify the profile of the patients who died from COVID-19 by:
    a. Number and types of comorbidities including obesity
    b. Ethnicity
    c. Age
    d. Gender

2. To review the definition of '*COVID-19 Death*' used by the Ministry of Health for consistency with WHO guidelines and standard practice; and comment on the different methodologies for calculating case fatality rate (CFR) and make recommendations for the appropriate methodology for Trinidad and Tobago.

3. To examine the Admission, Discharge and Transfer (ADT) policy and procedure to determine the impact, if any, on clinical outcome.

4. To determine if the treatment and management protocols adopted by the Hospitals are consistent within WHO guidelines and international best practice, with access to adequate:
    a. Levels of staffing appropriate in a mass response to a global pandemic;
    b. Essential Medicines;
    c. Laboratory and Diagnostic Imaging Services;
    d. PPE; Oxygen; other.

5. To review the standards of care of COVID-19 patients, based on acuity, for uniformity and consistency within and across hospitals in the Regional Health Authorities (RHAs).

6. To identify any other factors that may affect clinical outcomes including, but not limited to:
    a. suboptimal home treatment, for e.g., utilizing non-WHO approved therapeutics;
    b. delayed presentation to health facilities;
    c. efficiency of the transfer system in transporting patients from home to hospital and inter-hospitals in the RHA health network.

## 2.3 Work Plan of the Committee

The Committee met daily for 4 weeks. Initial secretarial and logistical support was provided by the Ministry of Health. Dr Stewart Smith was Secretary to the Committee. The Minister of Health addressed the Committee at its first meeting and did not further participate in any other deliberations of the Committee. Initially the Committee met with the senior technical staff of the Ministry of Health to determine what data were available and how they could be accessed. This occurred during the first week. All meetings of the committee to consider analyses, results

of analyses and report writing occurred only between members of the Committee except form one meeting where two senior nurses were invited to advise the Committee on the interpretation of data with regard to nursing matters. The two senior nurses were Retired Nurse Franka Andrews and Nurse Phyllis Woolford. The Committee typed the contents of the final report on its own but final secretarial support for formatting was provided by the Ministry of Health. The Faculty of Medical Sciences provided the printing facility for printing of the final report.

# 3.0 METHODOLOGY

## 3.1 Review of Terms of Reference (TORs) and Timeline

The Committee had its first meeting on 17th January 2022. Its first order of business was to review the TORs to ensure that all members had the same interpretation of what was needed and the scope of work. The Committee then agreed that there would be overall responsibility for the work to be conducted and for the final report. Each member then volunteered to lead on one or more of the TORs.

The one-week timeline to complete the assignment was discussed and the Committee agreed that one week was too short to prepare a quality report. It was decided that a proposal would be made to the Government for a 4-week timeline including one week each to develop the methodology, collect the data, analyse the data and prepare the report. This proposal for a new timeline was sent to the Government for consideration on 18th January 2022 and the timeline was subsequently extended to four weeks. Even so, the Committee noted the scope of the work to be conducted and decided that a rapid assessment was the most appropriate methodological approach.

## 3.2 Design of the Rapid Assessment

A rapid assessment can be defined as a quick but robust investigation using appropriate data collection and analysis methods to produce valid and useable findings. It can include desk reviews as well as the analysis of primary and secondary data, depending on the availability of resources including time. Therefore, it is not usually possible to do all that might be desirable when conducting a rapid assessment.

The use of technology was maximized due to the time constraints as well as the need to comply with the COVID-19 public health regulations regarding face to face interactions. Consequently, all meetings of the Committee as well as interviews were conducted using videoconferencing software i.e., Google Meet, Teams and Zoom. Notably, technology was used to good effect for the Tobago site visits, which were conducted virtually using WhatsApp. In addition, the medical records of COVID patients that were reviewed were scanned and made available to the Committee electronically. The Committee also created a WhatsApp group to facilitate communication among members.

The Committee held several meetings between 17th January and 14th February.

All the data collected and documents collected and used by the Committee were stored in a Google Drive. Only the Committee members and the MOH Primary Contact to the Committee had access to the Drive. The latter was responsible for the uploading of all the MOH/RHA datasets and documents.

Usually, an assessment of the performance of an institution by an external entity begins with a self-assessment. This guides the external assessor on what documentations are available. Linked to TORs, such documentation would guide the preparation for the assessment. In this case, and because it was a rapid assessment, these documents were not immediately available. Therefore initial formal meetings of the Committee were held with officials from the MOH to get clarification of which documents were available and how they could be accessed. The Committee was told that Dr Stewart Smith was assigned as the Ministry's Primary Contact with the Committee and would also be the Committee Secretary.

## 3.3 Data Sources

The Rapid Assessment comprised the collection and analysis of data using multiple, concurrent methodologies. These included the collection of primary data, the conduct of audits of medical records, the analysis of secondary datasets provided by the MOH, and desk reviews:

- TOR # 1: Secondary data.
- TOR # 2: Desk reviews.
- TOR # 3: Desk review and primary data.
- TOR # 4: Desk review, chart audit, primary data.
- TOR # 5: Desk review, chart audit, primary data.

- TOR # 6: Desk review, primary data, secondary data.

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### *3.3.1 Primary Data*

Primary data collection included 1) Interviews of Key Health Sector Stakeholders, 2) Site Visits to COVID Treatment Facilities, and 3) Patients' Online Survey. The primary data were collected using the REDCap software. REDCap Data Forms were created and the secure links to each form were shared with the Committee members for the interviews and site visits. A secure link was also made available to the public for the online patients' survey. In each case, the data were entered directly into a REDCap database.

REDCap is widely used by researchers to manage data collection and online surveys, due to its flexibility and user-friendliness while being HIPAA-compliant. HIPAA (Health Insurance Portability and Accountability Act of 1996) is a US federal law that protects sensitive patient health information from being disclosed without the patient's consent or knowledge.

***Interviews of Key Health Sector Stakeholders***

The (virtual) interviews were conducted with small groups as well as with individuals. Everyone who participated was assured that their responses to the questions were confidential and no names would be included in the Committee's report.

*Group interviews* were conducted to better understand COVID-19 treatment-related operations, challenges, limitations, opportunities, lessons learnt and successes. All RHAs participated and separate 45-minute open discussions were held with:

- Chief Executive Officers (CEOs)
- Medical Chiefs of Staff (MCOS) and Directors of Health (DOH)
- General Managers, Nursing (GM (Nursing))
- CEOs and other members of the Executive Teams from each RHA.

*Individual interviews* were held with staff working at ICU/HDUs at COVID treatment sites. A total of 28 persons were interviewed from across the five RHAs. They comprised doctors, nurses and support staff.

Due to time constraints and logistics, the intended stratified random sample of staff members for interview was not feasible. Instead, through the MOH, the RHAs were asked to identify volunteers for interview.

Using a structured questionnaire, the staff members were asked about the challenges they faced, the stressors they experienced and to suggest solutions. The interviews were scheduled to last for 15 minutes, but most went well beyond this time.

***Site Visits to COVID-19 Treatment Facilities***

Two teams, each comprising two Committee members, conducted a total of seven in-person site visits to COVID Treatment sites in the NCRHA (3), North-West Regional Health Authority (NWRHA) (3) and South-West Regional Health Authority (SWRHA) (2). The planned visit to the ERHA was cancelled because it was too late for the staff involved. There was also a virtual tour of the three COVID treatment sites at the Tobago Regional Health Authority (TRHA).

During the site visits, data were collected using a pro forma for observations on the operations, facilities and supplies at the Isolation/Biocontainment Units, Emergency Department, Wards, and ICU/HDU. The team did not enter the hot zones during the tours. The teams also conducted informal interviews with staff members at the facilities visited.

***Patients Online Survey***

An online survey was conducted to engage and enable the sharing of experiences by COVID-19 patients who were treated and cared for in public hospitals/facilities. The survey instrument was designed to rate their experiences with the Medical treatment, Nursing Care, Accommodation, Meals, Communication by staff (doctors and nurses), and Bathroom facilities. They were also asked what they felt could be done to improve patient care.

There was a statement explaining the purpose of the survey and patients were informed that the data collected would be confidential. They were only able to complete the

questionnaire if they indicated that they understood what the survey was about and gave their consent.

The link to the REDCap data collection form was placed on the website and Facebook page of the Trinidad and Tobago Medical Association (T&TMA). It was available for the period 2nd February to 5th February 2022.

The conduct of the survey was advertised by the T&TMA through its social media platforms as well as by a Press Release by the Committee.

***Audit of Medical Records of COVID-19 Patients***

Patient notes were reviewed as it was one of the ways to investigate the quality of care that the patients received at COVID-19 Treatment Hospitals. It was decided to only investigate the medical notes of patients who were treated in ICU or HDU - the sites with the highest COVID-19 mortality.

The RHAs, through the MOH, were requested to provide patient notes from three specific days: the date when the country's Case Fatality Rate was highest (3.2%, 15th January 2022), median (2.0%, 26th May 2021), and lowest (1.0%, 27th August 2020).

Given the time constraints, the Committee initially decided to request a sample of 90 randomly chosen patient notes. All notes were to have the names of staff and patient identifiers redacted then scanned and uploaded. However, the Committee was informed that the RHAs were unable to respond to such a request rapidly. In addition, it was not logistically feasible to select the intended stratified random sample of patients as there was no national list of patients, noting that the transfer of patients between RHAs could lead to 'double counting' of patients. Therefore in an attempt to ensure that some data were received, this approach was reviewed and the Committee accepted a convenience sample of 25 patient notes chosen by the ERHA, NCRHA and NWRHA.

The patient notes were reviewed by Dr. Vidya Dean, Professor Pitt Miller and Professor Terence Seemungal and the data collected using a form developed using REDCap.

### *3.3.2 Secondary Data*

Excel spreadsheets were requested and received from the Epidemiology Division, Ministry of Health for analysis by the Committee to determine and compare the demographic and co-morbidity profile of three sets of COVID-19 patients: those who died, those who were hospitalized, and those who were managed at home. An Excel file was also provided with the daily number of persons vaccinated in the country.

***COVID- 19 Deaths***

This Excel spreadsheet comprised the 3278 COVID deaths up to January 21 2022.
The variables requested and received in the Excel file included Date of Death, Place of Death, Age, Sex, Comorbidities and Vaccination status. Ethnicity and Obesity were not included and the MOH informed the Committee that these variables were originally included in their data collection template but due to their inability to verify the entries, they were removed.

***COVID- 19 Patients in Hospital***

This Excel spreadsheet comprised the 12 977 patients who were hospitalized for COVID during the period July 22, 2021 to January 6, 2022.

The variables requested and received included institution, date of admission, age, sex, level of care, vaccination status and comorbidities. However, the latter was entered using an open text format with inconsistent spacing delimiters and spelling that could not be easily coded for analysis, especially given the Committee's tight deadline. The comorbidity data were therefore excluded from analysis. In addition, the spreadsheet only included hospital admission data so, the outcome of the patients (alive or dead) and the duration of stay were not available.

***COVID- 19 Patients Managed at Home***

The Excel spreadsheet with COVID-19 patients managed at home comprised 39 661 patients. The data were submitted by the County Medical Officers of Health (CMOHs) in Trinidad. The variables included county, date of admission, date of discharge, status of the patient, age, sex, comorbidities and vaccination status.

The dataset did not include patients who were still being managed at the cut-off date of February 1 2022. The MOH indicated that all counties did not start submitting these data at the same time and that there was no data from Tobago. In an interview with Tobago officials, the Committee was informed that the CMOH in Tobago was not responsible for this data. The official who managed this data was the General Manager (Primary Care Services) at the TRHA. A request was made for this data but they were not received by February 4.

### *3.3.4 Policies, Protocols and Guidelines for Clinical Management of COVID-19*

Requests were made for all relevant policies and protocols that guide the treatment and care of COVID patients in Trinidad and in Tobago. Several documents were received from MOH, RHAs and the TRHA.

## 3.4 Data Analysis

The analysis included all data received by the following deadlines: 2nd February for Trinidad and 4th February for Tobago. Given the short time frame allowed for the work of the Committee, there was an emphasis on quantitative analyses however where possible qualitative analyses were performed by inspection of the data.

### *3.4.1 Assistance*

The Committee sought advice of two senior nurses for technical input into analysis of some of the data collected that related to patient care.

### *3.4.2 Quantitative Analyses*

Quantitative data analyses were conducted for the primary data collected, the secondary data received from the Ministry of Health and the chart audits.

Descriptive statistics were generated to prepare the tables and figures that are presented in the Results section. The categorical variables were described as counts (percentages). The percentages used were for valid observations (excluding missing values). The interval scaled variables were summarized as means and standard deviation (SD) as well as the median and range. Age was also recoded into (age) groups for analysis.

Chi square tests were used to examine differences in categorical variables such as by sex and age group. For these analyses, differences were determined to be statically significant at $P<0.05$. These data were analysed using SPSS Version 28.

### *3.4.3 Qualitative Assessments*

The questionnaires used in the collection of the primary data included a few open-ended questions such as where respondents were asked for suggestions to improve services. Because of the time constraints, these variables could only receive a preliminary review to identify recurrent themes/issues.

The assessment of quality of care was conducted by triangulation of data from the following sources: audit of medical records, site visits, and staff interviews. A comparison was made between WHO guidelines and the national and regional protocols where they were submitted by the MOH and RHAs. Protocols and assessed treatments given to patients were compared through interviews of staff, site visits and the audit of the medical notes.

# 4.0 ANALYSES AND FINDINGS

The findings of the Rapid Assessment are presented for each of the Terms of Reference (TOR).

## 4.1 Analyses based on TOR #1

To address TOR #1, secondary data provided by the Ministry of Health were analysed. These included the following datasets: COVID-19 Deaths, COVID-19 Hospital Admissions, COVID-19 Patients Managed at Home.

### *4.1.1 COVID-19 Deaths*

The COVID-19 deaths dataset that was analysed comprised 3278 decedents from 25th March 2020 (the country's first COVID-19 death) to 21st January 2022. Their demographic characteristics, place of death, presence of comorbidities and vaccination status are presented in Table 1.

***Demographics***

There were more males (57.7%) than females (42.3%). The number of deaths increased with age and peaked in the 61-70-year age group (24.7%). Overall, 81.2% of deaths were in persons over the age of 60 years.

The age distribution by sex is displayed in Figure 1. While the sex distribution was similar across most of the age groups, the percentage of females in the 80+ age group (17.7%) was higher that of the males (13.7%) (P=0.04).

***Place of Death***

The Couva Medical and Multi-training Facility (CMMF – 14.5%), the Port-of-Spain General Hospital (POSGH – 10.5%) and the Augustus Long Hospital (ALH – 9.2%) were the facilities that reported the most deaths. Notably, the CMMF was initially designated as the hospital where severe COVID patients were treated. It was managed by the NCRHA while the POSGH was managed by the NWRHA and ALH by the SWRHA.

The 211 home deaths accounted for 6.4% of the total. It is important to highlight the large number of deaths that were included in the category described as 'Other' i.e. 633 cases - 19.3% of all deaths. This made it difficult to interpret results related to Place of Death.

***Comorbidities***

The number of comorbidities ranged from 0 to 5 with 68.2% of the decedents having at least one of those listed in Table 1. More females (70.7%) than males (66.4%) had comorbidities (P=0.009). There was also an increase in the presence of comorbidities with increasing age up to the 61-70 age group (P<0.001).

The most prevalent comorbidities were hypertension (49.9%) and diabetes (44.2%). See Table 1. The prevalence of hypertension (P<0.001), diabetes (P<0.001), IHD (P<0.001), malignancy (P=0.01) and COPD (P=0.027) increased with age. However, asthma decreased with age (P<0.001). The following comorbidities were more prevalent in females than males: asthma (P<0.001), diabetes (P=0.007) and hypertension (P<0.001). More males had COPD than females (P<0.001).

Data collected from staff interviews and the audit of medical records indicated that obesity was probably a significant comorbidity. If these data were available, the prevalence of comorbidities among COVID-19 deaths would likely be even higher.

***Vaccination Status***

Seven percent of the deceased were fully vaccinated. There was no difference in vaccination status by age group, sex or the presence of comorbidity.

It was decided to investigate whether there was a difference in the profile of the deaths before and after a significant segment of the population was fully vaccinated. The dataset of vaccine uptake by the national population indicated that 500 000 persons were fully vaccinated on October 1 2021. The profiles of the decedents before and after October 1 2021 are shown in Table 2. They were largely similar. However, in addition to a higher vaccination rate (1.9% v 11.4%), there were lower percentages of deaths with COPD (P=0.026), Immunodeficiency (P=0.026) and malignancy (P=0.021) after October 1 2022. Also, there was a lower percentage of deaths at the CMMF while it

was higher at St James Medical Complex, Scarborough General Hospital, the Chaguanas District Health Facility and at home after October 1, 2021. See Table 2. Changes in policies related to which institutions managed severe COVID-19 cases may be partly responsible for the latter observation.

It was noted that the Delta variant became the dominant COVID-19 strain at the start of October, based on the results of the samples sequenced (Professor Christine Carrington, Personal Communication). This is relevant as international reports indicated an increased risk of mortality associated with the Delta variant.

**Table 1: Demographic Characteristics, Place of Death, Presence of Comorbidities and Vaccination Status of Persons who Died from COVID-19**

| **Variable** | **Total Sample (n=3278)** | |
|---|---|---|
| | **No.** | **(%)** |
| **Sex** | | |
| Male | 1890 | 57.7 |
| Female | 1388 | 42.3 |
| **Age Group** | | |
| <18 | 11 | 0.3 |
| 18-40 | 236 | 7.2 |
| 41-50 | 348 | 10.6 |
| 51-60 | 627 | 19.1 |
| 61-70 | 809 | 24.7 |
| 71-80 | 742 | 22.6 |
| 80+ | 505 | 15.4 |
| **Place of Death** | | |

| Variable | Total Sample (n=3278) | |
|---|---|---|
| | **No.** | **(%)** |
| Arima General Hospital | 257 | 7.8 |
| Augustus Long Hospital | 303 | 9.2 |
| Caura Hospital | 165 | 5.0 |
| Chaguanas Health Facility | 188 | 5.7 |
| Couva Medical and Multi-training Facility | 476 | 14.5 |
| Eric Williams Medical Sciences Complex | 157 | 4.8 |
| Point Fortin Hospital | 126 | 3.8 |
| Port of Spain General Hospital | 343 | 10.5 |
| Sangre Grande Hospital | 157 | 4.8 |
| Scarborough General Hospital | 67 | 2.0 |
| St James Medical Complex | 195 | 5.9 |
| **Home** | **211** | **6.4** |
| **Other** | **633** | **19.3** |
| | | |
| **Comorbidities** | | |
| No. of Comorbidities | | |
| 0 | 1042 | 31.8 |
| 1 | 999 | 30.5 |
| 2 | 974 | 29.7 |

| Variable | Total Sample (n=3278) | |
|---|---|---|
| | **No.** | **(%)** |
| 3+ | 263 | 8.0 |
| | | |
| Asthma | 141 | 4.3 |
| COPD | 71 | 2.2 |
| Diabetes | 1148 | 44.2 |
| Hypertension | 1637 | 49.9 |
| Ischemic heart disease | 296 | 9.0 |
| Immunodeficiency | 18 | 0.5 |
| Malignancy | 144 | 4.4 |
| | | |
| **Vaccination Status** | | |
| Fully | 230 | 7.0 |
| Not | 3048 | 93.0 |

**Figure 1: Distribution of COVID- 19 Deaths by Age, Group and Sex**

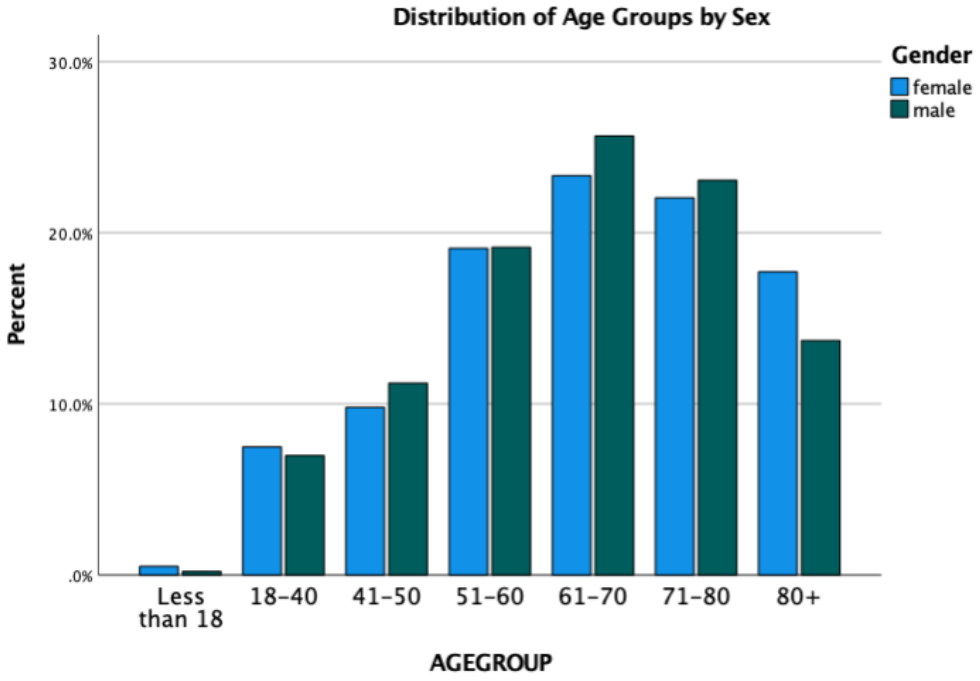



**Table 2: Profile of the Decedents before and after 500 000 persons were Fully Vaccinated in Trinidad and Tobago**

| Variable | Before 500K Vaccinated (n=1513) | | After 500K vaccinated (n=1765) | |
|---|---|---|---|---|
| | **No.** | **(%)** | **No.** | **(%)** |
| **Sex** | | | | |
| Male | 874 | 57.8 | 1016 | 57.6 |
| Female | 639 | 42.2 | 749 | 42.4 |
| | | | | |
| **Age Group** | | | | |
| <18 | 2 | 0.1 | 9 | 0.5 |

| Variable | Before 500K Vaccinated (n=1513) | | After 500K vaccinated (n=1765) | |
|---|---|---|---|---|
| | **No.** | **(%)** | **No.** | **(%)** |
| 18-40 | 114 | 7.5 | 122 | 6.9 |
| 41-50 | 142 | 9.4 | 206 | 11.7 |
| 51-60 | 301 | 19.9 | 326 | 18.5 |
| 61-70 | 383 | 25.3 | 426 | 24.1 |
| 71-80 | 323 | 21.3 | 419 | 23.7 |
| 80+ | 248 | 16.4 | 257 | 14.6 |
| | | | | |
| **Place of Death** | | | | |
| Arima | 107 | 7.1 | 150 | 8.5 |
| Augustus Long | 154 | 10.2 | 149 | 8.4 |
| Caura | 78 | 5.2 | 87 | 4.9 |
| Chaguanas DHF | 43 | 2.8 | 145 | 8.2 |
| Couva Medical and Multi-training Facility | 396 | 26.2 | 80 | 4.5 |
| Eric Williams Medical Sciences Complex | 70 | 4.6 | 87 | 4.9 |
| Point Fortin Hospital | 69 | 4.6 | 57 | 3.2 |

| Variable | Before 500K Vaccinated (n=1513) | | After 500K vaccinated (n=1765) | |
|---|---|---|---|---|
| | **No.** | **(%)** | **No.** | **(%)** |
| Port of Spain General Hospital | 179 | 11.8 | 164 | 9.3 |
| Sangre Grande | 41 | 2.7 | 116 | 6.6 |
| Scarborough General | 35 | 2.3 | 32 | 1.8 |
| St James | 16 | 1.1 | 179 | 10.1 |
| **Home** | **84** | **5.5** | **127** | **7.2** |
| Other | 241 | 15.9 | 392 | 22.2 |
| | | | | |
| **Vaccination Status** | | | | |
| Fully | 28 | 1.9 | 202 | 11.4 |
| Not | 1485 | 98.1 | 1563 | 88.6 |
| | | | | |
| **Co-morbidities** | | | | |
| No. of Comorbidities | | | | |
| 0 | 469 | 31.0 | 573 | 32.5 |
| 1 | 449 | 29.7 | 550 | 31.2 |
| 2 | 473 | 31.3 | 501 | 28.4 |
| 3+ | 122 | 8.1 | 141 | 8.0 |

| Variable | Before 500K Vaccinated (n=1513) | | After 500K vaccinated (n=1765) | |
|---|---|---|---|---|
| | **No.** | **(%)** | **No.** | **(%)** |
| | | | | |
| Asthma | 64 | 4.2 | 77 | 4.4 |
| COPD | 42 | 2.8 | 29 | 1.6 |
| Diabetes | 665 | 44.0 | 783 | 44.4 |
| Hypertension | 779 | 51.5 | 858 | 48.6 |
| Ischemic heart disease | 126 | 8.3 | 170 | 9.6 |
| Immunodeficiency | 13 | 0.9 | 5 | 0.3 |
| Malignancy | 80 | 5.3 | 64 | 3.6 |

### *4.1.2 COVID-19 Hospital Admissions*

The analysis comprised patients who were admitted to hospital for COVID-19 in public facilities during the period 22nd July 2021 to 6th January 2022. The dataset included 12 977 patients and their Demographic Characteristics, Level of Care and Facilities where they were treated are presented in Table 3.

***Demographics***

There were more males (51.7%) than females (48.3%) who were admitted to the facilities. While there was an excess of admissions among males, it was less than the percentage of males who died from COVID-19 (57.7%).

The age distribution presented in Table 3 indicates that there was an increase in admissions with age, peaking in patients aged 51-60 years. For comparison, the age group with the highest number of deaths was the 61-70 years. It should also be noted that the mean age of the persons who died was 64.5 (SD=15.5) compared with 56.7 (SD=18.2) for persons who were hospitalized. There was no difference in age between males and females.

***Level of Care***

When the level of care was examined, it was found that most patients were admitted to wards (92.4%). See Table 3. Unfortunately, there were no data to determine how many needed a higher level of care during their hospitalization or even their duration of stay.

There was no sex difference in level of care at admission. However, there was a difference by age group (P<0.001). The highest rate of admission to ICU was for patients less than 18 years (15.2%) while the lowest was among patients aged 80 and above (1.2%). The high rate of ICU admission for children may be related to the priority associated with treating this age group, including the availability of dedicated ICU facilities.

***Vaccination Status***

The data on vaccination status on admission revealed that 1907 (15.8%) patients were fully vaccinated. More males (17.5%) were fully vaccinated than females (13.9%) (P<0.001). Levels of vaccination increased with age and was highest in patients over the age of 80 (19.6%)

There was also a significant difference in level of care by vaccine status (P<0.001). Persons who were fully vaccinated were less likely to be admitted to HDU or ICU (5.4%) compared with those who were not (7.9%).

***Facility of Admission***

There was very limited data available for the analysis of the facilities where the patients were admitted. Data were missing or unusable for 68.7% of the patients. None of the patients with valid facility data were from the Eastern, North-West or Tobago Regional Health Authorities.

***Other Analyses***

The unavailability of discharge data limited the analyses that could be conducted. For example, it would have been beneficial to know who were discharged alive and who died so that factors associated with survival could be analysed. It would have also been useful to describe the patients' length of stay in the health facilities.

**Table 3: Demographic Characteristics, Level of Care, Vaccination Status and Facilities where Treated of COVID-19 Patients Admitted to Public Facilities for COVID-19 during the period July 22, 2021 to January 6, 2022**

| Variable | No. | (%) |
|---|---|---|
| **Sex (n=12 885)** | | |
| Male | 6660 | 51.7 |
| Female | 6225 | 48.3 |
| | | |
| **Age Group (n=12 785)** | | |
| Less than 18 | 175 | 1.4 |
| 18-40 | 2190 | 17.1 |
| 41-50 | 2119 | 16.6 |
| 51-60 | 2870 | 22.4 |
| 61-70 | 2547 | 19.9 |
| 71-80 | 1927 | 15.1 |
| 80+ | 957 | 7.5 |
| | | |

| Variable | No. | (%) |
|---|---|---|
| **Level of Care (n=12 601)** | | |
| Ward | 11640 | 92.4 |
| HDU | 450 | 3.6 |
| ICU | 511 | 4.1 |
| | | |
| **Vaccination Status (n=12 092)** | | |
| Fully | 1907 | 15.8 |
| Not Fully | 10185 | 84.2 |
| | | |
| **Facility (4 068)** | | |
| Arima GH | 66 | 1.6 |
| Augustus Long | 643 | 15.8 |
| Caura | 72 | 1.8 |
| CDHF | 103 | 2.5 |
| Debe Stepdown | 1134 | 27.9 |
| CMMF | 358 | 8.8 |
| EWMSC | 59 | 1.5 |
| Point Fortin (New) | 1309 | 32.2 |
| Point Fortin Area Hospital | 324 | 8.0 |

### *4.1.3 Patients Managed at Home*

Data were analysed for 39 656 COVID-19 patients managed at home for whom data were available up to 1st February 2022. The demographic characteristics, outcomes, vaccination status and the reporting county are presented in Table 4.

***Demographics***

There were more female (52.7) patients than male (47.3%) managed at home. This was unlike the situation with COVID-19 deaths and hospital admissions where there was an excess of males. It is possible that females had less severe disease than males. This requires further investigation.

The age group with the largest percentage of patients was 18-40 years. This also contrasted with the age groups in which the largest numbers of persons who died (61-70 years) and the hospitalized patients (51-60 years). The mean age was 41.2 years (SD=17.6) in the patients managed at home. This was lower than the mean age of persons who died was 64.5 (SD=15.5) and those who were hospitalized (56.7 (SD=18.2)).

***Outcome***

Most patients who were managed at home for COVID were discharged alive i.e., successfully completed their treatment (97.1%). However, there were patients who died (1.9%) or were transferred to a health facility for continued management (1%). See Table 4.

There was a significant association between outcome and age group (P<0.001). Whereas less than 1% of patients aged 50 years or less died, the mortality rate increased with each subsequent decade and was 17.7% in patients aged 80 years and over who were managed at home.

***Vaccination Status***

Due to inconsistent data entries for vaccination status, 62.5% of the entries could not be used to determine if the patients were fully vaccinated or not. Of the data for which it was possible to assign the vaccinated status, 28% were fully vaccinated and 72% were not. There was no difference in vaccination status by sex, however rates increased with age (P=0.007) and 34.2% of patients over the age of 80 years were fully vaccinated.

Vaccination status was also associated with outcome (P<0.001). Among patients who were discharged alive, vaccination rates were highest (28.1%) compared with those who were transferred (17.1%) and those who died (9.8%).

***Reporting County***

The counties reporting the largest numbers of patients, in the dataset that was received from the MOH, were St George East and St George Central (Table 4). The outcome of patients varied by county (P<0.001). The highest percentage of deaths in these patients was in St George Central (3.5%) and the lowest was in Victoria (0%). Vaccination rates also varied by county (P<0.001) from 8.5% in St Patrick to 34.6% in St George East.

**Table 4: Demographic Characteristics, Outcomes, Vaccination Status and County for the COVID-19 Patients who were Managed at Home**

| **Variable** | **No.** | **(%)** |
|---|---|---|
| **Sex (n=36 215)** | | |
| Female | 19003 | 52.7 |
| Male | 17122 | 47.3 |
| | | |
| **Age Group (n=38 151)** | | |
| Less than 18 | 3097 | 8.1 |

| Variable | No. | (%) |
|---|---|---|
| 18-40 | 16788 | 44.0 |
| 41-50 | 7066 | 18.5 |
| 51-60 | 5708 | 15.0 |
| 61-70 | 3277 | 8.6 |
| 71-80 | 1564 | 4.1 |
| 80+ | 651 | 1.7 |
| | | |
| **Outcome (n=39 638)** | | |
| Discharged | 38 509 | 97.1 |
| Transferred | 383 | 1.0 |
| Died | 746 | 1.9 |
| | | |
| **Vaccination Status (n=14 877)** | | |
| Fully vaccinated | 4163 | 28.0 |
| Not fully | 10 714 | 72.0 |
| | | |
| **Reporting County (39 656)** | | |
| Caroni North | 5184 | 13.1 |
| Caroni South | 2531 | 6.4 |

| Variable | No. | (%) |
|---|---|---|
| Nariva/Mayaro | 2700 | 6.8 |
| St George Central | 8376 | 21.1 |
| St George East | 8830 | 22.3 |
| St George West | 3171 | 8.0 |
| St Patrick | 1828 | 4.6 |
| St Andrew /St David | 923 | 2.3 |
| Victoria | 6113 | 15.4 |

### *4.1.4 Summary*

In summary, males were more likely to die from and be hospitalized for, and less likely to be managed at home for COVID-19 than females. Older patients were also more likely to die and be hospitalized, and less likely to be managed at home for COVID-19 than younger ones. No data were available to analyse the ethnicity of patients.

There were high rates of comorbidity among patients who died, especially hypertension and diabetes. There were no data on obesity. It is not clear if these comorbidity rates are different from uninfected persons or infected persons who survived, after taking age into consideration. There were no available or analysable comorbidity data for patients who were hospitalized and survived, or who were managed at home.

## 4.2 Analyses based on TOR#2, #6: The Public Health Context of Deaths and Other Clinical Outcomes of COVID-19 in Trinidad and Tobago

The terms of reference given to the Committee by the Ministry of Health can be interpreted as requesting a rapid assessment of the performance of hospital services of the parallel health care system (specifically designed to respond to COVID-19) from its inception, to January 2022. The linking of hospital performance to the case fatality rate (the only indicator mentioned in the TOR) whether intentional or not, is a cause for concern especially in a pandemic where one outstanding feature is the possible overwhelming of health services when there are periods of extreme numbers of ill patients seeking care.

The World Health Organisation, of which Trinidad and Tobago has been a member since 1962, through its executive organ the World Health Assembly, announced on 31st December 2019 that "A Public health emergency of international concern was declared" in response to increasing cases of an infectious disease occurring in China. This was subsequently called COVID-19 and was declared a pandemic. The reason why an event is called a public health emergency is linked to its mode of origin and method of spread, but most importantly the expected response.

A public health response is based on three key stakeholders:

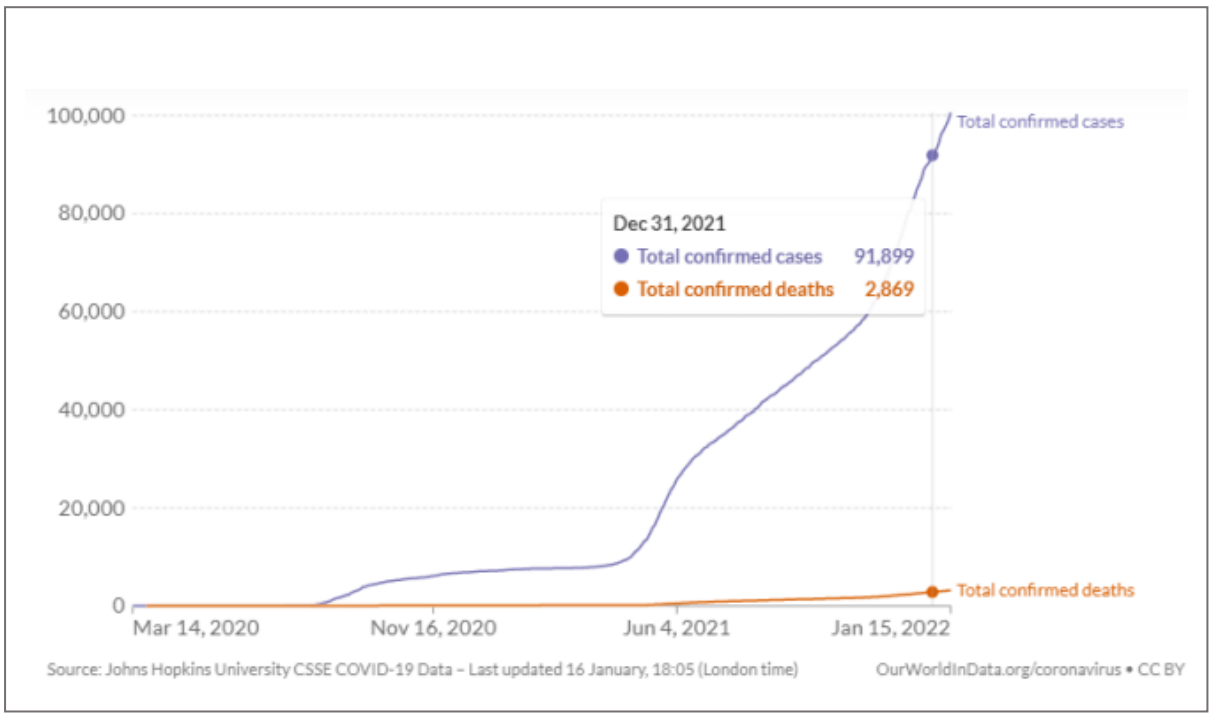
1. *Decision makers* (all areas – policy level, public sector, private sector)
2. *Health professionals and institutions* and
3. *The National Community*.

These three stakeholders must work harmoniously with shared goals, common objectives and decisive actions, following public health principles, to achieve the desired outcomes. No one stakeholder is more important than the other.

As mentioned earlier, one of the greatest risks to the national community in a pandemic or epidemic is the overwhelming or collapse of the national health services due to the vast numbers of people seeking care for illness caused by the pandemic, simultaneously with emergencies and routine services linked to other diseases which occur every day in any health system. This risk is greatest, as we all now know, when there is overwhelming demand for patient care caused by surges linked to different variants spreading throughout the national community. This occurs in every country affected by the pandemic and is one common factor

which drives extremely high rates of morbidity and mortality. The situation as recorded by the John Hopkins' University from March 2020 to January 2022 is illustrated in Figure 2 below:

**Figure 2: Global Case Numbers and Deaths from March 14, 2020 to January 15, 2022**




The steep nature of the slope highlighted in the above graph from approximately October 2021 to 15th January 2022, demonstrates the challenges of high case numbers and deaths over that period. This can be interpreted as when our parallel care system was overwhelmed.

Another factor which has contributed to COVID-19 clinical outcomes globally, regionally and locally, is the health status of any population prior to the pandemic. The links between age and chronic diseases which lower the immunological response and therefore protection of individuals from severe disease and death cannot be disputed. The more populations are unhealthy, the more severe are the outcomes due to COVID-19. When this situation occurs health services become overwhelmed and the mortality impact will be at its greatest.

### *4.2.1 Relevant Information from the National Strategic Plan for the Prevention and Control of NCD's in Trinidad and Tobago*

**Figure 3: Population Pyramid for Trinidad and Tobago 2000 – 2011**

## DEMOGRAPHY

The country's population is approximately 1.35 million, with an estimated 8.6% of the population living in urban areas. Males account for 50.2% of the population, while

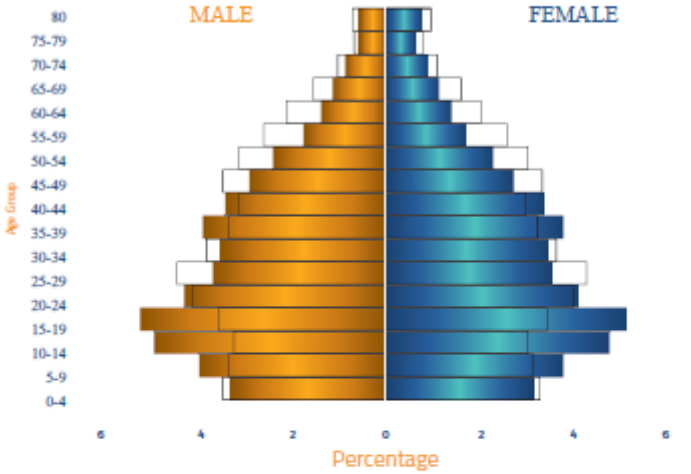



Figure 3: Population pyramids for Trinidad and Tobago for 2000 and 2011[6]
*2000 – orange and blue; 2011 – grey outline

females account for 49.8%[3]. The population pyramids in Figure 3 reveal the continuing demographic transition of the ageing population. Between 2000 and 2011, while there was growth in the youngest age group (0-4 years), there was significantly more growth in the age group 45-80+ years.

The crude birth and death rates are 12.83 births and 8.23 per 1 000 population respectively. The fertility rate is 1.71 children per woman and the infant mortality rate is 12.0 per 1 000 live births[3]. Life expectancy at birth is 73.9 years for females and 66.5 years for males[7].

***Weight and Obesity***

As in the rest of the Caribbean, the prevalence rate of obesity in Trinidad and Tobago has been increasing rapidly. Just over fifty-five per cent (55.7%) of the population ages 15-64 years were overweight or obese. Among females, 34% were overweight and 32% obese. Among men, 40% were overweight and 19% are clinically obese. There was a marked increase in obesity over the age of 24 years.

***Mortality and Morbidity due to NCDs***

NCDs are significant causes of morbidity and mortality globally. The WHO has projected that they account for over 70% of all deaths, with 80% occurring in developing countries. Notably, Trinidad and Tobago has one of the highest rates globally for NCDs. They account for over 60% of deaths annually. Of the NCDs, heart disease is the number one cause of death, accounting for a quarter (25%) of all deaths annually, followed by diabetes (now the second leading cause of death) accounting for 14%, cancer (13 %) and cerebrovascular disease (10 %). Regarding sex and NCDs, annual mortality figures stand at 52% of deaths in males and 41% of deaths in females. Of these deaths, 70% were adjudged to be premature (occurring before age 70), and 4 out of 10 can be prevented as they all share the same modifiable behavioural risk factors including tobacco use, harmful use of alcohol, unhealthy diets and physical inactivity.

***Diabetes***

Trinidad and Tobago ranks among the countries with the most prevalent and fastest-growing cases of diabetes. In adults ages 20 to 79 years, there are approximately 140 300 cases of diabetes. The prevalence of diabetes is 14.5%, with about 88 – 90% of patients having Type 2 diabetes. There are approximately 39,400 undiagnosed cases of diabetes. Approximately 1 594 deaths are attributable to diabetes, and 50% of deaths occur before age 65.

The following Figure presents a stark picture of the out-of-control situation of diabetes prevalence in Trinidad and Tobago when compared to the rest of the world.

**Figure 4: Prevalence of Diabetes in Trinidad and Tobago Compared to Regional and Global Prevalence**

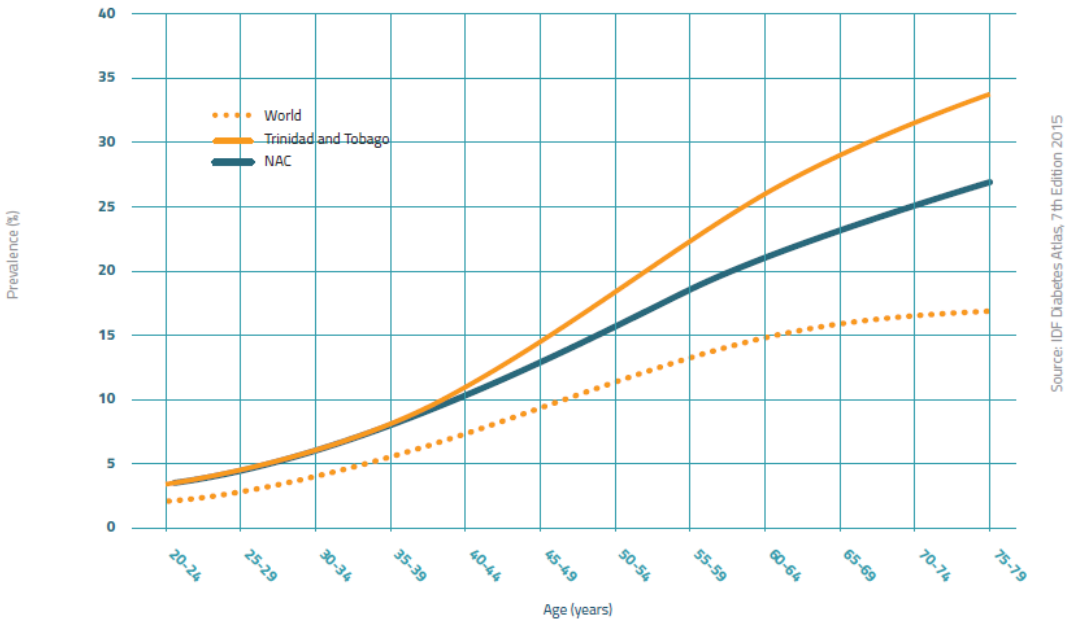



Figure 10: Prevalence of Diabetes in T&T, compared to the prevalence regionally and globally[25].

### *4.2.2 COVID-19 and Chronic Disease: The Impact Now and in the Future*

***The Problem of COVID-19 and Chronic Disease***

Persons with chronic diseases, have been impacted profoundly. Heart disease, diabetes, cancer, chronic obstructive pulmonary disease, chronic kidney disease, and obesity are all conditions that increase the risk for severe illness from COVID-19.

***Fatality Rates***

A COVID-19 death is classified, by the Ministry of Health Trinidad and Tobago as follows:

1) Demise in an individual, confirmed to be infected with the SARS-CoV-2 virus, by Real-Time Polymerase Chain Reaction (RT-PCR) testing, who presents to the health care system for management of their COVID-19 infection and subsequently dies (during the course of their treatment); or

2) Demise of an individual, confirmed to be infected with the SARS-CoV-2 virus, by Real-Time Polymerase Chain Reaction (RT-PCR) testing, who experiences sudden deterioration and death at home, or outside the healthcare system, by a pathophysiological mechanism which may plausibly have been caused or exacerbated by their COVID-19 infection, as determined by a medical professional.

COVID-19 deaths are therefore those occurring where confirmed SARS-CoV-2 infection was determined to be either the direct cause or a contributory cause of an individual's demise. This definition is entirely consistent with the epidemiological definition used by the World Health Organization.

WHO recommends using the surveillance case definitions fatality rates to help us to understand the severity of a disease, identify at risk populations and evaluate quality of health care. There are two measures to assess the proportion of infected individuals with fatal outcomes. One is infection fatality ratio (IFR) which estimates the proportion of deaths among all infected individuals and case fatality ratio (CFR) which estimates this proportion of deaths among identified confirmed cases.

To measure IFR accurately a complete number of infections and complete number of deaths caused by the disease must be known. The acronym CFR as applied to the measure of the number of deaths among all persons with a disease is most commonly referred to as the "case fatality rate". Strictly speaking the term is incorrect because the term rate is used to denote a time component which is absent in the "CFR". Countries have varying approaches to COVID-19 case definitions and as a result, the numerator and denominator of any formula used to calculate fatality rate will vary according to how they are defined.

**Figure 5: Equation for Measuring the Case Fatality Ratio**

$$Case\ Fatality\ ratio\ (CFR, in\%) = \frac{Number\ of\ deaths\ from\ disease}{Number\ of\ confirmed\ cases\ of\ disease} \times 100$$

https://www.who.int/news-room/commentaries/detail/estimating-mortality-from-covid-19

**Table 5: Countries with the Highest COVID 1919 CFR as of January 14, 2022**

| | COUNTRY | CONFIRMED | DEATHS | CASE-FATALITY |
|---|---|---|---|---|
| 1 | Yemen | 10,233 | 1,987 | 19.40% |
| 2 | Peru | 2,412,577 | 203,157 | 8.40% |
| 3 | Mexico | 4,257,776 | 300,912 | 7.10% |
| 4 | Sudan | 49,916 | 3,358 | 6.70% |
| 5 | Ecuador | 559,950 | 33,699 | 6.00% |
| 6 | Syria | 50,580 | 2,936 | 5.80% |
| 7 | Egypt | 396,699 | 22,063 | 5.60% |
| 8 | Somalia | 24,261 | 1,335 | 5.50% |
| 9 | Taiwan | 17,624 | 851 | 4.80% |
| 10 | Afghanistan | 158,602 | 7,376 | 4.70% |
| 11 | Bosnia and Herzegovina | 310,023 | 13,722 | 4.40% |
| 12 | China | 117,511 | 4,849 | 4.10% |
| 13 | Bulgaria | 806,977 | 31,922 | 4.00% |
| 14 | Liberia | 7,121 | 287 | 4.00% |
| 15 | Myanmar | 532,725 | 19,298 | 3.60% |
| 16 | Paraguay | 475,686 | 16,670 | 3.50% |
| 17 | North Macedonia | 239,920 | 8,070 | 3.40% |
| 18 | Tunisia | 762,717 | 25,744 | 3.40% |
| 19 | Indonesia | 4,268,890 | 144,155 | 3.40% |
| 20 | Niger | 8,306 | 286 | 3.40% |
| 21 | Romania | 1,875,887 | 59,150 | 3.20% |
| 22 | Trinidad and Tobago | 98,927 | 3,134 | 3.20% |

Reliable CFR% are generally obtained at the end of the outbreak after all cases have been resolved (affected individuals either died or recovered). However, this calculation may not hold in an ongoing epidemic because it makes two assumptions:

*Assumption 1:* The likelihood of detecting cases and deaths is consistent over the course of the pandemic

*Assumption 2:* All detected cases have resolved (that is reported cases have either died or recovered)

During an ongoing pandemic some of the active cases already detected may subsequently die leading to an underestimation of CFR before their death .If people sick with the disease typically die quicker than they recover CFR may be overestimated CFR calculated using the formula provides a conditional estimate of CFR and is influenced by lags in report dates for cases and deaths which leads to a wide variation in CFR estimates over the course of an epidemic (as evidenced by our reporting of three different CFR in our present pandemic randomly selected by MOH: 6.2% 3.1% 2.6% 1.8%). This tends toward a stable final estimate as all cases are resolved at end of pandemic.

The severity of COVID-19 has been widely reported to be influenced by age, sex and underlying comorbidities. There is evidence that other factors such as ethnicity are also independent risk factors. Any attempt to capture a single measure of fatality in a population will fail to account for the underlying heterogeneities within and between different risk groups and the important bias that occurs due to their different distributions within and between populations. Therefore, efforts should be made to calculate risk group specific estimates of fatality risk in order to better describe the true patterns of fatality occurring in a population.

In COVID-19 we have seen broad variations in naive estimations of CFR that may be misleading. Countries are difficult to compare for a number of reasons. They may be more or less likely to detect and report on all COVID-19 deaths. In addition, they may be using different case definitions and testing strategies or counting cases differently (e.g. mild cases not being tested or counted, also profile of patients, for example their age, sex, ethnicity and underlying comorbidities may vary between countries).

***Challenges in the comparisons of COVID-19 data including case fatality rates***

The definition of a COVID-19 case as recommended by WHO itself is subject to change as the pandemic progresses. This definition of a case which is fundamental to the denominator and the definition of a death which is fundamental to the numerator, can be evidenced by the following examples: Public Health England on 12th August 2021 changed its definition of a COVID-19 death to "Death in a person with a laboratory confirmed COVID-19 test who died within 28 days of a first positive test" with that change in death definition to a limit of 28 days. The death count on 12th August 2020 changed by 5377.

The definition of a confirmed case of COVID-19 is heavily influenced by how the confirmation is made and the testing strategy which the country employs during various stages of the pandemic. Many countries only test persons with moderate to severe symptoms and no longer test mild cases. In addition, the tests used for establishing a case have now also incorporated antigen testing with clinical criteria, timelines and self-reporting.

The usefulness of the case fatality rates in a country like Trinidad and Tobago essentially resides in tracking the national situation and can be useful if accurate data is collected and analysed in relation to facilities and a time period in which these cases and deaths occur. The accuracy of the data will be critical for proper analyses and comparisons.

***Transfer and Transporting Systems for COVID-19 Patients - the Public Health Aspect***

The documents received from MOH re: GMRTT (ambulance service) outline comprehensive policies, regulatory and operational details for responding to and transporting COVID-19 patients. The 1-month period allotted for the completion of the review is insufficient to complete the verification of actual operational details consistent with the standard operating procedures supplied.

The operations of RHAs' ambulance service transporting COVID-19 patients in between RHAs' COVID-19 hospital services also were not analysed in detail as the standard operating procedures were supplied by one RHA (see TOR#3 below). However, from interviews with ambulance staff and supervisors, in addition to other health care professionals, it was discerned that the service was professionally executed. Proper infection controls were done together with appropriate oxygen supplies when patients were being moved. Noteworthy was the use of social media "WhatsApp" in "group chats" amongst relevant staff to assist in the efficient transport of patients from institution to institution.

Regarding suboptimal home treatment using non-WHO approve therapeutics, this assessment could not be done using evidence based scientific data because the timeframe allotted to complete the exercise was insufficient. There were 97897 persons confirmed as testing positive for COVID-19 in Trinidad and Tobago. In order to get any evidence to establish facts or trends in use of home treatments a longer time period would be essential. A substantial survey of some rigor would have to be conducted on those patients who tested positive and some type of validation of their information would have to be done. This data would have to be analysed before any type of scientific assessment could be derived.

## 4.3 Analyses Based on TORs #3, #4 to #5

### *4.3.1 Staff Interviews*

The committee conducted 8 separate group discussions. These include the CEOs; Medical Chiefs of Staff and Directors of Health; General Managers (Nursing) of the RHAs as well as the members of the Executive Teams from each for the five RHAs. In addition, individual interviews were held with 28 members of staff involved in the care of COVID-19 patients. There were 6 employees each from the ERHA, NCRHA and SWRHA and 5 each from the NWRHA and the TRHA.

The persons interviewed included 11 doctors, 11 nurses and 6 support staff. The duty hours were 24-hour shifts (n=12), 12-hour shifts (n=8) and 8-hour shifts (n=8). They had worked in their present hospitals for a median of 7 years (ranging from 1 to 24 years). They were asked about the challenges they faced in the admission/transfer processes as well as in the management of COVID-19 patients. The latter included care of the patient on the wards, meals, availability of drugs and services, patient discharge and transfer home, how they dealt with death and communication with the family of decedents. They were additionally asked about stressors they experienced at work that might have affected their output, and what were the possible solutions as they saw it. Finally, they were asked to share their thoughts on how patient care could be improved, given the country's resources.

Some of the issues identified in the preliminary review of the data related to their challenges included:

- Human resources: There were increased numbers of patients to staff, especially during surges of COVID-19 cases. This had an impact on quality of care.
- Mental health: The large number of patient deaths had an impact on the staff members, especially the nurses and junior doctors.
- Continuity of care: Some felt that the level of care in step down facilities might have been inadequate and resulted in poor outcomes.
- Comorbidities: In particular, obese (challenges moving the patients) and diabetic patients were difficult to manage.
- Availability of supplies: Facilities ran out of basic supplies, especially during surges.

The principal stressors that they identified were (with the number of staff members mentioning them in brackets):

- Dealing with the large number of patient deaths. (6)
- Staff contracts were very short-term. (5)
- Equipment not working, including A/C units. (5)
- Staff shortages. (3)
- Fatigue/burnout. (3)

They offered the following solutions:

- Improve staffing - numbers, working conditions, psychological support, training. (20)
- Improve supply of consumables. (10)
- Use other treatment guidelines to manage COVID patients and not depend on WHO. (4)
- Service equipment regularly. (4)

### *4.3.2 Review of Medical Records*

The medical records of the 25 COVID-19 patients selected by the RHAs were reviewed using a pro forma. It was noted that 84% of the medical records referred to admissions during the recent December 2021 surge. The results of the audit are presented in Table 6.

The patients were mostly admitted to ICU (45.8%) or a general ward (45.8%). Ten (40%) of them died. The most prevalent comorbidities were obesity (48%), hypertension (44%) and diabetes (36%). The most common symptoms on admission were shortness of breath (88%) and cough (60%) with the median duration of symptoms being 7 days (range = 1 to 18 days). Four (15%) patients were fully vaccinated. The median oxygen saturation on admission was 84% (range = 59% to 97%) with 64% of patients being hypoxic. An additional 12% of patients became hypoxic during their hospital stay.

Regarding treatment, oxygen was requested for all the patients and was administered in 96% of cases. Antibiotics were requested for 96% of cases and administered for

everyone for whom they were requested. Dexamethasone was requested for 84% of patients and administered for 90.1% of the requests. Notably, Tocilizumab was requested for 25% of patients (5 patients) and administered in 40% of those for whom the request was made (2 patients). The level of care required for 76% of patients was ICU and 84.2% of them received it. See Table 6.

**Table 6: Results of the audit of a sample of 25 Medical Records that were provided by the RHA**

| | **No. (n=25)** | **%** |
|---|---|---|
| **Severity** | | |
| ICU | 11 | 45.8 |
| General Ward | 11 | 45.8 |
| Stepdown | 2 | 8.3 |
| | | |
| **Outcome** | | |
| Dead | 10 | 40 |
| Discharged Alive | 15 | 60 |
| | | |
| **Comorbidities** | | |
| Obesity | 12 | 48 |
| Hypertension | 11 | 44 |
| Diabetes | 9 | 36 |
| Cardiac disease | 4 | 16 |

| | **No. (n=25)** | **%** |
|---|---|---|
| | | |
| **Symptoms** | | |
| Shortness of breath | 22 | 88 |
| Cough | 15 | 60 |
| Sputum | 7 | 28 |
| Neurological | 7 | 28 |
| Gastrointestinal | 7 | 28 |
| Cardiovascular | 6 | 24 |
| CRD | 2 | 8 |
| | | |
| **Duration of Symptoms** | Mean = 6.5 days (SD=4.0)<br>Median= 7 days (Range 1 to 10 days) | |
| | | |
| **Oxygen Saturation of Admission** | Mean = 84.8% (SD=9.1)<br>Median = 84% (Range = 59% to 97%) | |
| | | |
| **Hypoxia** | | |
| On Admission | 16 | 64 |
| Became Hypoxic During Stay | 3 | 12 |

| | **No. (n=25)** | **%** |
|---|---|---|
| | | |
| **Vaccination Status** | | |
| Fully Vaccinated | 4 | 12 |
| | | |
| **Treatment** | | |
| Dexamethasone Requested | 21 | 84 |
| Dexamethasone Given (% of what was requested) | 19 | 90.5 |
| | | |
| Prednisolone Requested | 7 | 28 |
| Prednisolone Given (% of what was requested) | 6 | 85.7 |
| | | |
| Tocilizumab Requested | 5 | 20 |
| Tocilizumab Given (% of what was requested) | 2 | 40 |
| | | |
| Antibiotics Requested | 24 | 96 |
| Antibiotics Given (% of what was requested) | 24 | 100 |
| | | |

| | **No. (n=25)** | **%** |
|---|---|---|
| Oxygen Requested | 25 | 100 |
| Oxygen Given (% of what was requested) | 24 | 96 |
| | | |
| Other Drugs Requested | 21 | 84 |
| Other Drugs Given (% of what was requested) | 21 | 100 |
| | | |
| **Highest Level of Care Required** | | |
| ICU | 19 | 76 |
| HDU | 1 | 4 |
| General Ward | 3 | 12 |
| Stepdown | 2 | 8 |
| | | |
| **Highest Level of Care Received** | | |
| ICU (% of what was required) | 16 | 84.2 |
| HDU (% of what was required) | 1 | 100 |
| General Ward (% of what was required) | 5 | 166.7 |
| Stepdown (% of what was required) | 3 | 150 |

### *4.3.3 Site Visits to COVID-19 Treatment Facilities*

The Committee divided itself into two teams which (between them) conducted site visits to the following facilities:

| | |
|---|---|
| NCRHA: | Arima General Hospital |
| | CMMF |
| | EWMSC. |
| NWRHA: | Port of Spain Field Hospital |
| | Port of Spain General Hospital (Biocontainment Unit and A&E Department) |
| | St James Medical Complex. |
| SWRHA: | Augustus Long |
| | Debe Step Down Facility |
| *TRHA: | Scarborough General Hospital |
| | Scarborough Regional Hospital (Fort) |
| ERHA: | *No site visit.* A visit was scheduled for the Tacarigua Step Down Facility but the staff members left before the Committee members arrived. |

**conducted virtually for the entire Committee*

The observations were scored on a 10-point scale [0 (Very poor) to 10 (Excellent)] for infection control procedures, overcrowding, storage of PPE, use of PPE, relationship between the department and other units, oxygen sources and availability and availability of medications.

The following departments were reviewed:

- Isolation/Biocontainment Units (2 independent assessments)
- Emergency Department (3 independent assessments)
- General Wards (4 independent assessments)
- ICU Care (4 independent assessments)

The scores assigned by each team for each criterion and department are shown in Table 7. Overcrowding had the widest range of scores i.e., from 5 to 10. Infection control scores ranged from 8 to 9; storage of PPE from 6 to 9; use of PPE from 7 to 9; relationship with other units from 6 to 9; oxygen sources and availability from 6 to 10; and availability of medications from 6 to 8.

**Table 7: Scores assigned by the Committee Members when they assessed Health Facilities during Site Visits**

| Criteria | Isolation / Biocontainment Units (n=2) | Emergency Department (n=3) | Wards (n=4) | ICU Care (n=4) |
|---|---|---|---|---|
| Infection Control Procedures | 8, 8 | 8, 8, 8 | 8, 8, 8, 8 | 8, 8, 9, 9 |
| Overcrowding | 6, 8 | 7, 7, 8 | 5, 8, 8, 10 | 7, 7, 9, 9 |
| Storage of PPE | 7, 7 | 7, 7, 8 | 6, 7, 7, 9 | 5, 7, 8, 9 |
| Use of PPE | 8, 8 | 7, 8, 8 | 7, 7, 8, 9 | 8, 8, 8, 9 |
| Relationships with Other Units | 8, 9 | 7, 8, 8 | 6, 6, 8, 9 | 6, 7, 7, 8 |
| Oxygen Sources and Availability | 7, 7 | 7, 8, 8 | 6, 7, 7, 10 | 7, 8, 9, 10 |
| Availability of Medications | - | - | 6, 7, 8, 8 | 7, 7, 7, 8 |

**NB: The criteria were scored from 1 (Very Poor) to 10 (Excellent)**

### *4.3.4 Patients Online Survey*

A total of 138 persons who were previously treated for COVID-19 in public health facilities responded to the online survey. Given the public nature of the survey, a

verification exercise was conducted in which 25 cases were randomly selected and sent to the respective RHA for checking. The information sent to the RHAs were Hospital where treated, Date of Birth, Date of Admission and Date of Discharge.

Responses were received from the RHAs which indicated that they were able to successfully conduct checks for 23 of the cases, 17 (74%) of which were verified as patients. There was no record of the other 6 (26%) being treated in the hospitals that they indicated.

The demographic characteristics and satisfaction with services received in hospital for the 138 respondents are presented in Table 8. There were 73 (53.3%) female respondents and 62 (45.3%) males. Most of them (73.9%) were aged between 20 and 60 years. Their mean age was 51.8 years (SD=14.6), ranging from 20 to 85 years. Their profile was therefore different from that of patients who were hospitalized and who were on average older with a mean age of 56.7 (SD=18.2). This might be related to reduced accessibility of online surveys to older persons. There were also more males (51.7%) than females (48.3%) in the hospitalized dataset. See Table 3.

Most of the respondents were treated on the ward (62.3%) and A&E (40.6%). Note that patients could be treated in more than one department. Their mean length of stay was 10.7 days (SD=9.7), ranging from 1 to 52 days.

Regarding previous interaction with the public health service, 35% said that they were satisfied/very satisfied. Similarly, 35% said that they were dissatisfied/very dissatisfied. Of the 106 respondents who reported that they used the ambulance service, 46.5% said that they were satisfied or very satisfied with it.

Most of the respondents reported good or very good experiences being treated for COVID at the health facilities. These included 63.5% for medical treatment, 61.1% for nursing care, 60.4% for communication with doctors and 60.4% for communication with nurses. It should also be noted that 8.7% and 10.3% reported very poor experiences with communication with doctors and nurses respectively. The feedback was not very positive for meals and bathroom facilities with 48.4% and 30.2% respectively reporting that they were poor or very poor.

The following are the most common suggestions to improve the care of COVID-19 patients, with the number of respondents who made the suggestion in parentheses:

- Improve the quality and timing of the meals. (26 respondents)
- Improve facilities for communication with relatives and communication between staff and patients. (22)
- Improve the accommodation including under tents. (18)
- Staff should be more empathetic. (18)
- Improve bathroom facilities - cleaning, privacy, especially in the tents. (13)
- Increase staff numbers. (11)
- Better monitoring of patients. (7)

**Table 8: Demographic Characteristics, and Satisfaction of Hospitalized COVID Patients with Services Received**

| **Variable** | **No.** | **(%)** |
|---|---|---|
| **Sex** | | |
| Female | 73 | 53.3 |
| Male | 62 | 44.3 |
| Other | 2 | 1.5 |
| | | |
| **Age Group** | | |
| 20-40 | 32 | 23.2 |
| 41-50 | 32 | 23.2 |
| 51-60 | 38 | 27.5 |
| 61-70 | 22 | 15.9 |

| Variable | No. | (%) |
|---|---|---|
| 70+ | 14 | 10.1 |
| | | |
| **Where treated** | | |
| A&E | 56 | 40.6 |
| Ward | 86 | 62.3 |
| HDU | 19 | 13.8 |
| ICU | 20 | 14.5 |
| | | |
| **Duration of Stay** | Mean 10.7 (SD 9.7) days;<br>Median 7, range 1-52 days | |
| | | |
| **Previous interaction with health service** | | |
| Very satisfied | 23 | 16.8 |
| Satisfied | 25 | 18.2 |
| Neutral | 41 | 29.9 |
| Dissatisfied | 29 | 21.2 |
| Very dissatisfied | 19 | 13.9 |
| | | |
| **Used ambulance service** | | |
| Yes | 106 | 77.4 |

| Variable | No. | (%) |
|---|---|---|
| | | |
| **Satisfaction with ambulance service** | | |
| Very satisfied | 29 | 28.7 |
| Satisfied | 39 | 38.6 |
| Neutral | 12 | 11.9 |
| Dissatisfied | 13 | 12.9 |
| Very dissatisfied | 8 | 7.9 |
| | | |
| **Medical treatment** | | |
| Very Good | 49 | 38.9 |
| Good | 31 | 24.6 |
| Neutral | 21 | 16.7 |
| Poor | 16 | 12.7 |
| Very poor | 9 | 7.1 |
| | | |
| **Nursing care** | | |
| Very Good | 43 | 34.1 |
| Good | 34 | 27.0 |
| Neutral | 28 | 22.2 |

| Variable | No. | (%) |
|---|---|---|
| Poor | 10 | 7.9 |
| Very poor | 11 | 8.7 |
| | | |
| **Accommodation** | | |
| Very Good | 40 | 31.7 |
| Good | 29 | 23.0 |
| Neutral | 23 | 18.3 |
| Poor | 15 | 11.9 |
| Very poor | 19 | 15.1 |
| | | |
| **Communication - Doctors** | | |
| Very Good | 39 | 31.0 |
| Good | 37 | 29.4 |
| Neutral | 15 | 11.9 |
| Poor | 24 | 19.0 |
| Very poor | 11 | 8.7 |
| | | |
| **Communication - Nurses** | | |
| Very Good | 39 | 31.0 |

| Variable | No. | (%) |
|---|---|---|
| Good | 37 | 29.4 |
| Neutral | 21 | 16.7 |
| Poor | 16 | 12.7 |
| Very poor | 13 | 10.3 |
| | | |
| **Meals** | | |
| Very Good | 10 | 7.9 |
| Good | 29 | 23.0 |
| Neutral | 26 | 20.6 |
| Poor | 25 | 19.8 |
| Very poor | 36 | 28.6 |
| | | |
| **Bathroom Facilities** | | |
| Very Good | 31 | 24.6 |
| Good | 24 | 19.0 |
| Neutral | 33 | 26.2 |
| Poor | 13 | 10.3 |
| Very poor | 25 | 19.8 |

## 4.4 Major Findings based on TOR #3

### *4.4.1 Admissions Policy*

The Ministry of Health's Directorate of Health Services Quality Management produced an Admission & Discharge Planning Protocol Document in October 2008. On 12th March 2020 the Ministry of Health reported the country's first COVID-19 case. COVID-19 case management guidelines were produced by 21st March 2020 followed by a document entitled "Suspected COVID-19 Admission Criteria to Caura Hospital" which was produced and became the Admission Criteria adopted by most RHAs.

The Admission Criteria utilizes the COVID-19 Pathway as a means of differentiating those patients who require hospital care as opposed to home care and Table 4 shows that 52.7% were male and 47.3% were male. Outcomes: 38509 (97.1%) were discharged, 383 (1.0%) were transferred to other facilities and 746 (1.9%) died. This differs markedly from the data of the hospitalized patients.

We considered all COVID-19 deaths from 25th March 2020 to 20th January 2022. There were 57.7% males and 42.3% females. The number of deaths increased with age and peaked in the 61-70 age group. Overall 81.3% of the deaths were in patients over 60 years of age. Seven percent (7%) of the deceased were fully vaccinated. The place of death was Couva Medical and Multi-Training Facility (14.5%), Port of Spain General Hospital (10.5%) and Augustus Long Hospital (9.2%). 211 home deaths accounted for 6.4% of the total and the main comorbidities were hypertension (49.9%) and diabetes (44.2%) while the prevalence of asthma decreased while the prevalence of COPD increased. Vaccination status shows clearly that COVID-19 infections occur in the unvaccinated.

<u>Admission Criteria for the Caura COVID-19 Unit is shown below.</u>

1. <u>Historical Risk Factors / Comorbidity</u>
    a. No risk factors that portend increased likelihood of progressing to HDU/ICU care requirement or a poor outcome
    b. Accepted - stable comorbidity e.g. uncomplicated DM/HTN, early stage CKD

c. Not accepted – severely immunocompromised, CKD stage IV/V, dialysis requirement

2. Vital Signs

   a. Accepted: SBP 90-180, MAP>65, P 60-120, R <24,

   b. Accepted: SpO2 ≥90% + O2 requirement

   c. A single reading outside of these ranges does not preclude admission, but vital signs are considered as a whole

3. Physical Examination

   a. Accepted: No significant gross abnormality to moderate findings e.g. bilateral creps to midzones without significant hypoxia or risk factor for disease progression

   b. Not accepted: Cardiopulmonary distress, bilateral creps throughout entire lung fields, significant bilateral or prolonged wheezing, signs of acute CVA obviating need for CT scan.

4. Imaging

   a. Accepted: minimal infiltrates on CXR or CT Severity Score ≤17

   b. Not accepted: significant bilateral infiltrates (dense infiltrates ≥50% of one or both lung fields), CTSS >17, other significant finding that may confer increased risk of poor outcome

5. Investigations

   a. Accepted: No poor prognostic indicators (PPIs)

   b. PPIs: NLR >3.13, Plt<50, Significantly elevated D-dimer, LDH, CK, transaminases, CRP

6. COVID-19 Severity

   a. Asymptomatic/Mild COVID-19 with concern for further evaluation e.g. r/o AMI

   b. Moderate COVID-19

   c. Not accepted-Severe/Life threatening COVID-19

7. Other Acute Diagnoses

    a. Uncomplicated acute diagnoses – acute PE in individual at low risk of deterioration

    b. Not accepted – DKA/HHS, HTN emergency, sepsis, severe exacerbation of asthma/COPD, ACS requiring emergent/urgent cardiology intervention e.g. STEMI/recurrent MI/young person with first AMI, dialysis requirement, major surgical concerns

    c. Not routinely accepted – urgent CT scan or ultrasound requirement, e.g. r/o CVA

8. Special Groups for Admission

    a. Select minors (< 18yrs) with asymptomatic/mild disease & no significant comorbidity

    b. Suspected/Active Tuberculosis without other severe acute diagnoses or HDU/ICU care requirement

    c. Prisoners without severe acute diagnoses or HDU/ICU care requirement

    d. Select patients with controlled psychiatric conditions

    e. Clearly established palliative care

    f. Stepdown from higher acuity care centre of recovering patients fitting CCU admission criteria, once stabilised and minimal/no risk of re-escalation requirement e.g. low or no O2 requirement >48hrs

It was noted that Admission is determined in the context of the whole patient and not just individual criterion. We assessed the effectiveness of the admission criteria by analysing a sample of patients notes, asking Medical and Nursing staff about the use of the Admission Criteria in their interview as well as direct questioning on the site visits. The results of the Medical Record review of 25 notes revealed the following. Note, many of these patients were admitted when the second phase of the infection occurs. This is the phase of the strong Cytokine storm.

**Table 9: Results of Medical Record Review of Admissions for 25 Patients**

| Variable | No. |
|---|---|
| **Outcomes** | |
| Discharged | 15 (60%) |
| Died | 10 (40%) |
| | |
| **Comorbidities** | |
| Diabetes Mellitus | 9 (36%) |
| Hypertension | 11 (44%) |
| Cardiac | 4 (16%) |
| Obesity | 12 (48%) |
| Asthma | 1 (4%) |
| Stroke | 1 (4%) |
| | |
| **Vaccination Status** | |
| Fully Vaccinated | 4 (16%) |
| Unvaccinated | 21 (84%) |
| | |
| **Duration of Symptoms** | Mean 6.5 days SD 4.0 Median 7 Range 1-18 |

| Variable | No. |
|---|---|
| | |
| **Hypoxic** | |
| On admission | 16 (64%) |
| Became so later on | 3 (12%) |
| | |
| **Symptoms** | |
| Shortness of breath | 22 (91.5%) |
| Cough | 15 (60%) |
| Sputum | 7 (28%) |
| Neurological | 7 (28%) |
| Cardiovascular | 16 (64%) |
| GI | 7 (28%) |
| Chronic Renal Disease | 2 (8%) |
| | |
| **Severity** | |
| General ward | 11(44%) |
| ICU | 11 (44%) |
| Step down | 2 (8%) |
| | |

| Variable | No. |
|---|---|
| **Treatment** | |
| Dexamethasone requested | 21 |
| Dexamethasone given | 19 |
| | |
| Prednisolone requested | 7 |
| Prednisolone given | 6 |
| | |
| Tocilizumab requested | 5 |
| Tocilizumab given | 2 |
| | |
| Antibiotics requested | 24 |
| Antibiotics given | 24 |
| | |
| Oxygen requested | 25 |
| Oxygen given | 24 |
| | |
| Other drugs requested | 21 |
| Other drugs given | 21 |
| | |

| Variable | No. |
|---|---|
| **Highest Level of Care Required** | |
| General Ward | 3 |
| HDU | 1 |
| ICU | 19 |
| Step down | 2 |
| | |
| **Highest Level of Care Administered** | |
| General Ward | 5 |
| HDU | 1 |
| ICU | 16 |
| Step down | 3 |

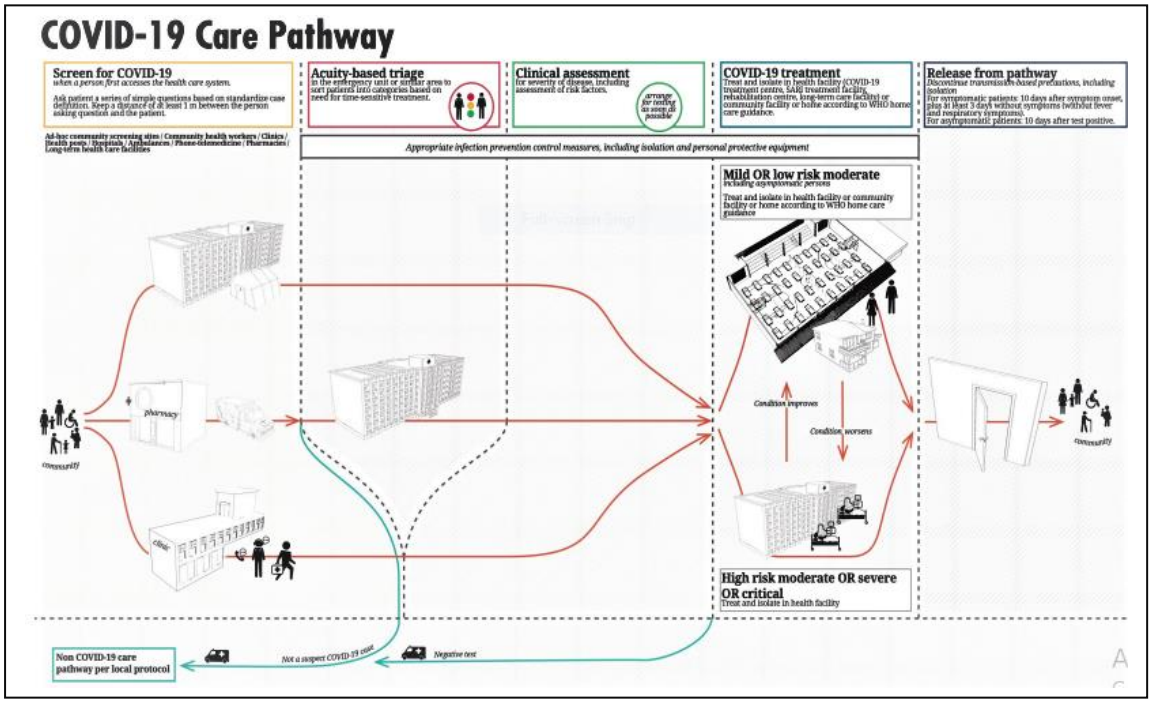
Key Findings

The admission criteria met international best practices. It would seem that the patients were admitted to the correct location to receive the appropriate type of care, however the staff told us that it was their impression that during the recent surge patients "presented late and as such they were more seriously ill".

We were not able to detect any delays in the provision of care which might have led to a negative result except that they presented in the second phase of the disease.

An overview of the COVID-19 Pathway is shown in Figure 6 and provides the pathway for patient care and as far as we could determine this was the process that was followed.

**Figure 6: COVID-19 Pathway for Patient Care**




**Source: WHO COVID-19 Clinical Management Living Guidance, January 2021**

### *4.4.2 Discharge Policy*

***Discharge Criteria for Hospitalized Patients with COVID-19.***

A patient with confirmed COVID-19 who is warded at hospital must meet the following criteria for discharge from hospital:

I. Recovered COVID-19 patient

a. Completed period of required isolation precautions using the Symptom-Based Strategy.

b. NB Recovered COVID-19 patients will be discharged home or transferred to an appropriate tertiary facility to continue in-hospital care if required for other clinical reasons.

II. Non-recovered COVID-19 Patient

*Clinically stable patient:*

a. Home if patient can isolate at home and manage activities of daily living (ADLs) and instrumental ADLs (IADLs).

b. Stepdown Facility if patient cannot isolate at home, but can manage own ADLs.

III. End Isolation Date Calculation

*Symptomatic Cases:*

a. A minimum of ten (10) days after the onset of symptoms PLUS three (3) days asymptomatic PLUS an additional seven (7) days.

(i) Symptom< 10days

End Isolation –20 days from symptom onset.

(ii) Symptoms > 10 days

End Isolation=10 days after last day of symptoms.

*Asymptomatic Cases:*

a. Ten days from the date the positive swab was taken PLUS an additional seven (7) days

End Isolation=17 days from NPS date

Please note symptoms refer to fever and/or respiratory symptoms (e.g. cough, rhinorrhoea, SOB). If patients are still symptomatic as defined above, when discharged home, then NO ISOLATION END DATE can be given. CMOHs will follow up and determine. These guidelines may have been recently changed.

***Clinical Stability Criteria***

Clinical Stability Criteria is the criteria that should be met for discharge from Hospital

by patients with mild to moderate COVID-19. These are a list of criteria depending on age and the presence of significant comorbidities and are as follows:

I. <u>Age < 50 years & no significant comorbidity</u>

a) Asymptomatic or mild symptoms, but no shortness of breath >24-48 hrs
b) Normal vital signs > 24-48 hrs
c) Normal/baseline physical examination
d) Normal or non-significant findings on investigation (ECG, radiological, blood, etc.)

- *Includes stable blood investigations on two consecutive venepunctures in some moderate cases*

e) Completed work-up for significant acute diagnostic considerations
f) Acute diagnoses managed or able to be completed as an outpatient (e.g. antibiotics)
g) Deemed appropriate for discharge by all necessary specialties (medical social work mental health services, physiotherapy, etc.)
h) Able to self-isolate at home and manage ADLs and IADLs on own or with assistance

II. <u>Age > 50 years and/or significant comorbidity</u>

a) Asymptomatic or mild symptoms, but no shortness of breath > 72hrs
b) Normal vital signs > 72hrs
c) Normal/baseline physical examination
d) Normal or non-significant findings on investigation (ECG, radiological, blood, etc.)

- *Includes stable blood investigations on two consecutive venepunctures in some moderate cases*

e) Completed work-up for significant acute diagnostic considerations
f) Acute diagnoses managed or able to be completed as an outpatient (e.g. antibiotics)
g) Deemed appropriate for discharge by all necessary specialties (medical social work mental health services, physiotherapy, etc.)

h) Able to self-isolate at home and manage ADLs and IADLs on own or with assistance

There are also Clinical Stability Criteria for the Severe/Critical COVID-19 patient which is much stricter than what is shown in the previous lists:

I. Severe/Critical COVID-19

a) Asymptomatic or mild symptoms, but no shortness of breath > 72hrs
b) Normal vital signs (including no fever & off supplemental O2) > 72hrs
c) Normal/baseline physical examination
d) Normal or non-significant findings on investigation (ECG, radiological, blood, etc.)

- *Includes stable blood investigations on two consecutive venepunctures*

e) Completed work-up for significant acute diagnostic considerations
f) Acute diagnoses managed or able to be completed as an outpatient (e.g. antibiotics)
g) Deemed appropriate for discharge by all necessary specialties (physiotherapy, medical social work mental health services, etc.)
h) Able to self-isolate at home and manage ADLs and IADLs on own or with assistance

***COVID-19 Severity Criteria***

a) Mild Illness: Individuals who have any of the various signs and symptoms of COVID-19 (e.g. fever, cough, sore throat, malaise, headache, muscle pain) without shortness of breath, dyspnoea, or abnormal chest imaging.

b) Moderate Illness: Individuals who have evidence of lower respiratory disease by clinical assessment or imaging and a saturation of oxygen (Spo2) >94% on room air at sea level.

c) Severe Illness: Individuals who have respiratory rate >30 breaths per minute, at sea level (or for patients with chronic hypoxaemia, a decrease from baseline of >3%), ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (Pao2/Fio2) <300mmHg or lung infiltrates > 50%.

d) Critical Illness: Individuals who have respiratory failure, septic shock, and/or multiple organ dysfunction.

Patients with the following conditions will be re-swabbed to obtain a single negative report before being discharged.

a) Re-admissions with persistent symptoms.

b) Baseline comorbidities with shared COVID-19 symptoms (e.g. COPD, lung malignancy)

    - *End isolation date unable to be determined due to persistent symptoms that may be due to the baseline disease.*

c) End Stage Renal Disease

    - *These patients require a negative PCR report before being granted access to haemodialysis at private institutions*.

d) Urgent Surgical Intervention

    - *These patients require a negative PCR report before being granted access to urgent surgical intervention.*

e) Patients to enter Long-Stay Homes with Shared Facilities.

    - *These patients require a negative PCR report before being accepted (back) to these facilities.*

***Discharge Documents***

The following documents will be issued to all patients on discharge and the appropriate CMOH informed:

a) Discharge Summary: highlighting:

- Diagnoses
- Treatment received
- Take home medications
- Outpatient clinic follow-up
- Contact info. For the relevant CMOH's office
- Tentative end isolation date (if able to be determined at the time of discharge)

b) Patient Discharge Leaflet:

- Summarises key information that is of interest to the patient.

c) Virtual Discharge Summary for CMOH:

- Send by WhatsApp and email to the relevant CMOH for each patient discharged.
- Allows for seamless continuation of care from the hospital to the community.

Key Findings

The Discharge Policy was well planned and appeared to work well from our assessment of the medical records, staff comments on our facilities' tours, from the patient survey, and staff interviews.

Perhaps an area that needs further investigation is the views of relatives of the COVID-19 patients who we were unable to survey due to time constraints but would be an important group to research since relatives were unable to visit their loved ones during their hospital stay.

### *4.4.3 Transfer Policy*

Patients use the transportation system under certain specific circumstances.

a) To seek emergency medical care.

b) Inter facility transfer.

c) Emergency Care unaware that they are COVID-19 positive.

This service is provided Nationally by Global Medical Response of Trinidad and Tobago (GMRTT), Fire Services Emergency Ambulances, and RHA Ambulances. GMRTT provided a policy document "COVID-19 Influenced Medical Treatment Protocol Revisions" which lists the steps followed when they are called to transfer a COVID-19 patient by the Office of the CMOH.

Advice is also given as to precautions to be taken when a positive COVID-19 patient is transferred e.g. PPE, O2 via nasal cannula while ensuring the patient wears a facemask over the Nasal Cannula to decrease spread of the virus. Staff wear N95 masks and persons in the compartment of the ambulance are limited to essential staff only.

Guidelines are up to current WHO standards and EMT Technicians are advised to perform the following with caution:

a) Bag Valve Mask(BVM) Ventilation.

b) Oropharyngeal suctioning.

c) Endotracheal Intubation.

d) Nebulizer Treatment.

e) Resuscitation involving Emergency Intubation.

f) Cardiopulmonary resuscitation (C.P.R.)

As a consequence, their management protocols remind them that presenting with "acute respiratory symptoms especially respiratory failure should be considered to be infected with SARS-CoV-2 (COVID-19) This includes patients with known asthma, COPD, and CHF.

I. EMT Standing Orders:

a) O2 as appropriate to maintain SpO2 > 93% not for COPD patients.

i. Nasal Cannula(NC)with surgical mask placed over the Cannula and can use up to 7L/min flow rates if necessary.

b) If persistently hypoxic despite nasal cannula, apply Nonrebreather (NRB) mask at 12-15 L/min.

c) Assist patient with THEIR OWN Salbutamol or Salbutamol/ipratropium(MDI) (with spacer, if available) Administer 4-6 puffs per dose of MDI. Administration may be required every 5 minutes as needed.

d) If needed, assist ventilations with bag-valve-mask device (BVM) at 100% O2.

- BVM SHOULD BE EQUIPPED WITH A HEPA FILTER.

e) Request ALS

II. Paramedic Standing Orders:

a) Do not administer corticosteroids in patients suspected to have COVID-19 unless they are critically ill. Consider Magnesium Sulphate after use of MDIs and IM Epinephrine.

b) Consider administering MDI: 4-6 puffs via spacer if available which may be repeated every 5 minutes.

c) For severe distress after administration of IM Epinephrine: Administer MDI4-6 puffs

d) If MDI proves ineffective add one (1) unit dose of Ipratropium 0.5 mg to the nebulizer with Salbutamol treatment (HIGH-RISK Aerosol Generation Properties*)

e) Consider Magnesium sulfate,2 grams in 100ml of NS given IV/IO (interosseous) over 10 minutes.

f) If a second dose of Salbutamol is needed add one dose of Ipratropium 0.5mg to the nebulizer with the Salbutamol treatment.

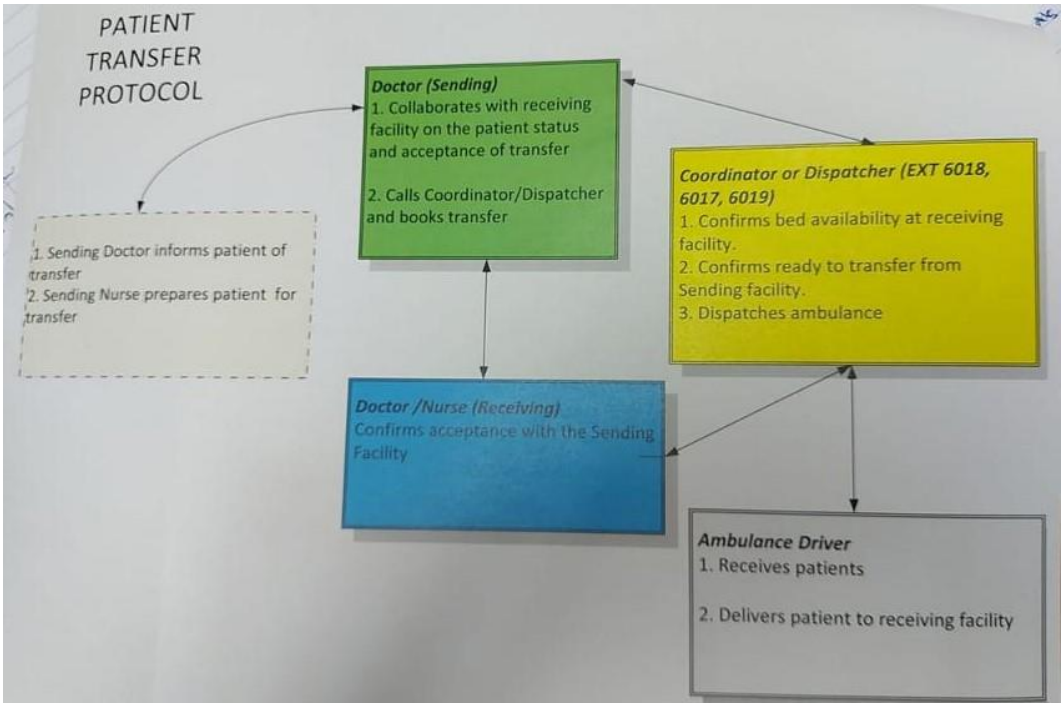
GMRTT effectively revised their policies to suit the increasing risk to their staff and should be congratulated for continuing to provide a good service.

***RHA Ambulance Services***

RHAs all have fleets of Ambulances which are used to transport patients between their facilities as well as across RHA facilities. Each RHA has a specific number of Ambulances in their fleet set aside to transport COVID-19 patients.

They function according to the Referral & Transfer Protocol of the Ministry of Health produced by the Directorate of Health Services Quality Management July 2009 but each region updated their protocols to suite the Pandemic. We received updated protocols from SWRHA and a letter about emergency calls from the TRHA-Tobago Emergency Medical Services (TEMS).

**Figure 7: NWRHA Patient Transfer Protocol**



A checklist for the transport of critically ill persons was recommended by WHO (WHO; April 2020) which many RHAs used to ensure that patients are transferred in a safe manner. The areas covered by this checklist are presented in Figure 8 below:

**Figure 8: WHO Checklist for the Transfer of Critically Ill Patients**

**Checklist for Transfer**

Consider using this checklist to ensure the safe transport of the patient to the designated unit. This is adapted from the IMAI district clinician manual: hospital care for adults and adolescents (WHO, 2011).

- Patient stabilized
- Appropriate infection prevention and control measures in place:
  e.g. medical mask for patients with ARI
- Everything secured: airway, NG tube, IV, monitors, endotracheal tubes, ventilator.
- Enough drugs: vasopressors, sedatives
- Enough oxygen: adequate oxygen saturation (SpO2)
- Enough IV fluids: blood pressure adequate.
- Health care workers (e.g. transporters, receiving staff) and receiving unit/ward prepared.

Source: WHO Clinical Care of Severe Acute Respiratory Infections Tool Kit, April 2020

The number of ambulances belonging to GMRTT is 47; SWRHA has 25 ambulances but 5 are out of service; NWRHA has 10 ambulances of which 3 are reserved for COVID-19 patients and 7 for interfacility transport. (Non COVID-19 patients); NCRHA has 8 and TRHA has 2. The ERHA has a total of 4 ambulances; 2 which are used for the hospital and the other 2 for the community. Further, as it pertains to the TRHA, the RHA receives 50 emergency calls per month plus 20 per month for COVID-19 related matters.

Key Findings

The transfer policies were implemented and the organogram of some regional arrangements meant that some distant locations mentioned that they had long waits to transfer patients as compared with the previous system where an ambulance was located

at that site on a permanent basis. Examples mentioned were Debe Stepdown Facility from San Fernando Operations Centre or in Tobago from the Fort to Signal Hill where these transfer systems also cover Laboratory and Pharmacy services. Whereas at another facility where the ambulance was specifically assigned to the facility, we saw two ambulances parked and awaiting instructions for patient transfer.

Overall the Transfer Policies were appropriate and in our patient survey 67.3% expressed satisfaction however the staff expressed some dissatisfaction due to delays. We noted that 8% of patients surveyed were very dissatisfied – this number should not be ignored. We believe that the major challenge with the ambulance service occurred during the last surge.

## 4.5 Major Findings TOR # 4

The treatment of COVID-19 in Trinidad and Tobago followed the WHO guidelines. This was borne out by comparisons of The WHO publications on COVID-19 and the National Guidelines on COVID-19 as well as the protocols of the Regional Health Authorities.

It is important to mention that Trinidad and Tobago is a Member Country of WHO. The WHO is a specialized agency of the United Nations for International Public Health. The WHO has 194 Member States, as of January 2021.

### *4.5.1 Levels of Staffing Appropriate in a Mass Response to a Global Pandemic*

Staff shortages were common. There were complaints at every level about the shortage of staff. These levels ranged from Executive Management to doctors and nurses to Orderlies and Patient Escorts.

***Doctors***

We recognise that shortages of staff are an international problem in this pandemic as duty rosters could not take into consideration unpredicted absence due to COVID-19 or

staff quarantine. However, that is small comfort to overworked staff at ground level. While we did not measure the workload of every single doctor, it is clear that the patient load had increased as evidenced by hospital occupancy rates. Almost every single doctor we met complained of overwork almost to the point of exhaustion. Some of these doctors also had to do non-medical jobs e.g. lift and move patients, pull up patients in bed, process nasal swabs.

Any mention of short staffing must also mention treatment of staff. At some sites, young doctors had to sleep on mattresses on the floor. Often, this involved three or four doctors sleeping in the same room. Male doctors and female doctors had to share the same sleeping accommodation. This raises serious concerns about privacy. There were also security concerns. Some doctors complained that the door of their room could not be locked. This is worrisome given the current state of crime in the country.

***Locum Contracts***

There were frequent complaints about very short locum contracts of one (1) month to three (3) months duration. These short contracts create great uncertainty and depress the morale of young doctors who are exposing themselves to great risk.

***Meals***

Some staff complained about problems getting meals especially after long hours in the Hot Zone.

***Nurses***

There was a universal complaint of severe understaffing among nurses. Nurses complained of having to work long hours in Personal Protective Equipment (PPE), often without a break to drink water or go to the washroom. They reported that they had to lift and turn patients because of a shortage of attendants/orderlies. Obese patients were very difficult to prone.

Some nurses spoke of the psychological pressure they felt when confronted with many deaths in a day. They also spoke of the extreme mental stress they faced whenever one of their colleagues died from Covid. One nurse, who is the mother of two young children, made a plea for Day Care Centres near to the hospital. She pointed out that she often finished her shift late because of the very ill patients. Having her children nearby would ease her anxiety.

Two very experienced, very senior nurses were consulted by the Committee. They mentioned that under normal circumstances, the nurse to patient ratio would be one nurse to two patients in ICU. Our National Policy on Intensive Care Services (Section 8.27 p11 MoH 2006) recommends one nurse to one patient in ICU. These very senior nurses also said that on the Ward, the ratio should be one Registered Nurse to four (4) to six (6) patients. Figure 9 below illustrates the Registered Nurse-to-Patient-Safe Staffing Ratios as recommended by National Nurses United.

**Figure 9: Internationally Recommended Nurse-to-Patient Safe Staffing Ratios for ICU and Ward Settings**


Source: National Nurses United, USA

There are no guidelines about nursing ratios in a pandemic. However, in Trinidad and Tobago, we were often told of one ICU Nurse nursing six (6) ICU Ventilated Patients. We also received reports about one Registered Nurse on the Ward nursing twenty (20) to thirty (30) patients. This severe workload must take a toll mentally, physically and psychologically.

***Orderlies/Attendants/Patient Escorts***

Attendants themselves gave reports of a shortage of attendants. This fits with reports from doctors and nurses about having to lift and turn patients without the help of orderlies.

### *4.5.2 Essential Medicines*

We interviewed pharmacists, doctors, nurses and the Executive Managers about essential medicines and the supply of drugs. The medications prescribed followed the WHO Guidelines. There seemed to be good foresight and plans regarding ordering and stocking of most drugs.

***Tocilizumab***

Tocilizumab was conspicuous by its shortage. Experienced ICU Consultants said that they only had about 20% of the required amount of Tocilizumab. Pharmacists also agreed that the drug was in short supply. Executive Management tried to solve this problem by sharing their supplies among the Regional Health Authorities. There were also reports about shortages of midazolam, methylprednisolone and propofol. Where methylprednisolone was indicated we noted that sometimes dexamethasone had to be used instead.

***Oxygen***

Oxygen was generally well supplied by Oxygen Concentrators, Liquid Oxygen Supplies and back up oxygen cylinder manifolds. There were a few reports of low oxygen pressure. This emphasises the vast amount of oxygen required by moderate and severely ill COVID-19 patients. In particular, High Flow Nasal Cannulae require up to 60 litres per minute for

a single patient. We wish to commend the Executive Management for their foresight in the use of liquid oxygen and oxygen concentrators.

### *4.5.3 Personal Protective Equipment (PPE)*

There seemed to be adequate supplies of PPE when we visited and interviewed the RHAs and their staff.

## 4.6 Major Findings TOR # 5: Review the standards of care of COVID-19 patients based on acuity, for uniformity and consistency within and across hospitals in the RHAs

Acuity Level in a medical sense means the amount of medically related support which a patient needs as measured by an assessment. As Acuity rises more resources are needed to provide safe care. The workload also increases.

Research in this area has spoken about the need to develop a model to show the relationships of the various elements of workload. One measure of Acuity is the amount of nursing time spent on a patient.

One method of classifying patient illness is into mild, moderate and severe categories. Patients in the Mild category could be considered as those patients with mild COVID-19 who were treated at home. These patients were treated with oral medications but they DID NOT require Supplemental Oxygen. They probably interacted with the Health Services when a diagnosis was made. They may have been followed up by telephone in very many cases but there were sporadic reports of patients receiving no phone calls from the County Medical Officer of Health's Office for follow up. Nonetheless, this category of patients did very well. 97.1% were discharged alive, the mortality was 1.9% and 1% transferred to a health facility.

The Moderate category of patients was defined to be the COVID-19 patients treated on the Ward. These patients required low flows of Supplemental Oxygen of the order of 3 litres per minute. It is recognised that there were shortages of nurses on the Wards. Some reports speak of one nurse to twenty (20) to thirty (30) patients. This sort of staffing ratio would point to

decreased levels of care. In addition, were reports of shortages of Tocilizumab and meals arriving late. The mortality in this category could not be inferred from data shown to us.

The Severe Category comprised those patients in the ICU or the HDU. Very often the HDU and ICU were housed in the same physical place. The main thing about these patients is that they required a high degree of Physiological Support or Organ System Support. This always meant a very high level of Respiratory Support in the form of very high oxygen flows and possibly Mechanical Ventilation.

The modalities of treatment in ICU comprised High Flow Nasal Cannulae requiring up to sixty (60) litres of oxygen per minute; Non-Invasive Mechanical Ventilation and Invasive Mechanical Ventilation with intubation of the trachea. Other treatments included drugs to support the blood pressure, intravenous medication, feeding via nasogastric tube and dialysis in some cases.

In the area of Mechanical Ventilation with intubation of the trachea, tracheostomy is a well-recognised method of reducing sedation in ICU patients. Tracheostomy also makes it easier for the patient to breathe for himself and also to cough to clear secretions. There were reports of difficulties in getting tracheostomies done.

Intensive Care of this kind requires a Nurse to Patient ratio of one (1) nurse to one (1) patient. This ratio is clearly stated in the National Policy on Intensive Care Services, 2006. This is a document of the Ministry of Health. Of course, as stated elsewhere in this document, one Nurse in a COVID-19 ICU regularly nursed six (6) patients during surges. This points to a serious decrease in the level of care during surges. We understood from staff that it was difficult to have a full rota even when this was prepared as staff would become unpredictably ill from COVID-19 or be in quarantine. In addition, there were shortages of Tocilizumab, Midazolam, Propofol and Methylprednisolone. Many of the patients were reported to be obese and heavy. There was often difficulty with turning the patient prone (to lie on their abdomen) because of shortages of attendants/ orderlies. These patients were heavily sedated and could not help

themselves. The prone position is of importance in treating the lung disease associated with COVID-19 because it allows increased expansion at the bases of the lungs and improved oxygen levels.

Taken together, these comments speak to a very serious decrease in the acuity of treatment in Intensive Care for COVID-19. The data sent to us did not allow calculation of an ICU mortality rate.

## 5.0 The COVID-19 RESPONSE IN TOBAGO

### 5.1 Advice from the Secretary for Health, Wellness and Social Protection

The Secretary for Health, Wellness and Social Protection thanked the Chairman and Committee Members for reaching out to the Tobago House of Assembly (THA). The Secretary stated she was pleased to learn of the initiative as announced by the Prime Minister and wondered whether the Committee would be visiting Tobago. She noted that the Tobago health system was in a state of flux as they had what she described as a "semi" parallel health system to treat and manage COVID-19 patients and that they were working toward a full parallel health system to deal with COVID-19 cases.

Currently COVID-19 patients are managed in the Outpatient Clinic at the Scarborough General Hospital (SGH), but the situation was improving as the Old Fort, Fort King George site was being refurbished and prepared to accommodate 98% of all COVID-19 inpatients. The other 2% represented patients who required surgery and would still have to be housed at the Scarborough General Hospital where there was a dedicated operating theatre (OT) and ward space to manage such patients. She indicated that the new COVID-19 facility will have six (6) ICU beds with a dedicated oxygen supply by oxygen concentrator, but that more refurbishment was required at the Old Hospital.

The Secretary was of the view that there were several challenges to adequately clinically manage COVID-19 patients and that the THA was exploring the possibility of accessing external international assistance and clinical support to assist with clinical training and development of treatment protocols. She believed that there was a "decent" volume of testing being conducted on the island as they had received a PCR testing machine donated by PAHO as there was no large-scale testing prior to their receipt of a four-channel rapid PCR machine from MOH. Prior to that, samples were sent to Trinidad for processing. She noted that Tobago is moving towards more antigen testing and that they have rationalized the use of PCR and antigen testing so as to best optimize and balance resources with clinical needs.

The Medical Chief of Staff provided a brief overview of the current COVID-19 arrangements at the Scarborough General Hospital (SGH). He pointed out that there was a dedicated operating theatre (OT) at the SGH for C-sections and an area at the Maternity Ward that was

cordoned off for COVID-19 mothers; and that they accommodated COVID-19 dialysis patients at the Geriatric Unit, which also had a dedicated Reverse Osmosis (RO) system.

He noted the OT at the Fort (the old hospital) was not in use as major repairs were required, but noted that other spaces were refurbished, including the Geriatric Ward and the Maternity Ward (Green Room). There was a combination of tank and cylinder oxygen to support COVID-19 patients and once the Oxygen Concentrator, which was due to arrive shortly on the island was installed, patients will be transferred from the Scarborough General Hospital to the Fort COVID-19 Parallel Unit.

He advised that with the commissioning of the six (6) ICU beds at the Fort COVID-19 Unit there will be a total of eleven (11) ICU beds on the island. These beds will be managed by a mixture of specifically ICU-trained nurses and non-ICU-trained. During peak periods and surges, acute care surgical nurses from the OT will be assigned to manage ICU patients. He pointed out that the new ICU had its own generator and was purpose built.

In that regard, he shared that in March 2020 there was no infrastructure or capacity at the SGH to deal with or manage acutely ill COVID-19 patients. He recalled that the first COVID-19 patient that they attempted to transfer to Trinidad for care was refused by the helicopter crew and the patient was therefore ventilated at the SGH. He noted that that was the only COVID-19 death in 2020.

He agreed to provide a summary with timelines for the review of the Committee.

## 5.2 The COVID-19 Response in Tobago

At the beginning of the pandemic, a COVID-19 Committee was assembled to manage the island's response, which consisted of representatives from the TRHA and the THA: the Secretary for Health (THA/political level), the Administrator for Health (Accountant), the Chair of the TRHA Board, the Medical Chief of Staff, General Manager Primary Care, and the CMOH. There was coordination between the CMOH and the CMO.

The Technical Advisor, Health Facilities, MOH assisted with the setting up of ICUs in Tobago at an operational level.

The decision making process is joint between the policy makers (THA) and the operational side (TRHA). Regular meetings are held (weekly, biweekly). The general policy approach from the MOH was followed in Tobago, through the THA and at the operational level, the general policy guidelines were adapted.

At the start, there was no standalone institution in Tobago for managing COVID-19 patients. Based on the policy agreement of March 2020, if there were any COVID-19 cases in Tobago, those patients would be transported to Trinidad for care at Caura. The modes of transportation for these patients were by boat (through the Coast Guard) or helicopter.

The first few cases were patients with mild symptoms. Three (3) patients were transferred by boat. The journey was approximately six (6) hours and very unpleasant. Transport to Trinidad ceased in May 2020, when the helicopter refused to transport a seriously ill patient who required ventilation and ICU care to Trinidad. A decision was made for Tobago to provide its own treatment facilities for the people of the island. The hospital was mandated to identify isolation rooms on each ward. The medical ward was chosen as the area for the COVID-19 patients as it was easier to convert an already functioning ward into a facility. The medical patients were cared for in the surgical ward. The facility was refurbished, based on advice from the Technical Advisor, Health Facilities, MOH to provide care for COVID-19 positive patients who were not so ill but still needed care and seriously ill patients would be in the ICU.

The Scarborough Hospital went into emergency mode, cancelling elective surgeries to reduce the number of persons coming to hospital who did not need to be there, but outpatient clinics continued. The old hospital was looked at as an alternative (July 2020) but because of time and the cost to upgrade, it was not utilised.

In 2020, the state quarantine policy was in force so it was decided in August 2020 to use the Green Room to house well COVID-19 patients. There was a recently refurbished space at the Fort, originally intended to house substance abuse users, that was converted into the ICU to house COVID-19 positive patients who required oxygen. The geriatric facility was emptied, with patients transferred to nursing homes and upgraded to be able to provide oxygen and used to house COVID-19 positive patients who were moderately ill. From August 2020, the use of the Medical Ward was discontinued.

In 2020, the numbers were very low – including periods where there were no (0) cases or only one (1) case - so the facility was adequate, however it was still vulnerable to the threat of overflow. In 2021, the Government allowed home quarantine because of the surge in cases, however Tobago was still able to continue state quarantine until Mar/April 2021.

By that time, the numbers had increased and they were not able to house mild COVID-19 and asymptomatic patients. The mild COVID-19 and asymptomatic patients were allowed to quarantine at home, the Green Room was used for mildly ill patients, the Fort for moderately ill, and Signal Hill used for patients needing ICU care. The number of patients requiring ICU care was zero at some points, so this arrangement was sufficient until about July 2021 when the Delta surge occurred, resulting in the ICU becoming full.

In July 2021, ICU capacity was increased. In the earlier stages, if a patient in the Green Room or the Geriatric Facility decompensated, he/she would have to be transported by ambulance, which was not always immediately available as there was only one (1) ambulance. As such it was decided that the ICU needed to be close to the COVID-19 facilities at the Fort. Also, there are now two (2) ambulances.

Around August/September 2021, there were significant developments with respect to creating the ICU at the Fort. Arrangements were made for separate staff. Positions were advertised for SMOs, Registrars, House Officers, and nurses but responses were only received for anaesthetics.

With respect to determining the number of staff, the TRHA put forward how much staff they require to the THA for approval. Two (2) SMOs were recruited and dedicated to COVID-19. Prior to January 2022, one (1) SMO covered both COVID-19 and non-COVID-19 patients. There is still no separate Consultant for the COVID-19 facility. The Consultant on call covers COVID-19, but there is a separate Registrar based only at the COVID-19 facility. There is a SMO and a House Officer for anaesthetics for COVID-19, but not enough Registrars for the COVID-19 ICU. Tobago has always been short in terms of specialist care. The ICU for care of COVID-19 only patients is not yet completed.

## 5.3 COVID-19 Response in Tobago – Primary Care

Since 2020, there were efforts to have a primary care facility that would operate 24 hours since most primary care services close at 4 p.m. – 3 health centres have walk in hours until 8 p.m. – after which, the only public health facility for persons to seek care is the A&E in Scarborough General Hospital.

Infrastructure (mainly tents), staffing, furniture, PPE etc. to plan for surges were procured under a $4.5 million budget. However, nine (9) doctors and eighteen (18) nurses had to be redirected to the Office of the CMOH and secondary care for contact tracing and treatment of patients.

At the primary care level, all staff received thermometers to self-monitor and a daily symptom tracker. A telehealth platform has been utilised, with telephone/ video consultations with patients. A target of 85% clinic attendance was set and maintained. There was a falloff for child health clinics because parents did not bring their children.

Staff monitor COVID-19 positive patients to ensure that they can intervene clinically before deterioration so that the number of persons brought in unresponsive can be minimised. Patients in home isolation have been managed since June 2021 and this continues. With respect to vaccination, an appointment system was implemented but is not currently in use. Mass vaccination sites, drive throughs, and community caravans are used to deliver vaccines.

## 5.4 Equipment and Infrastructure

From a Corporate Services standpoint, the TRHA was able to quickly mobilise and respond to the needs of patients as it pertains to PPE and coordination of supplies. There have been logistical challenges, e.g. at the start of 2021, additional storage space was needed for PPE. By the time the arrangements were made, the supplier had already sold the stock.

Additionally, there have been price surges during the pandemic, so the TRHA has tried to buy larger quantities to get lower prices. This however means that there is need for extra storage space.

The focus has been on COVID-19, and other goals and objectives have become secondary. The demand for certain critical equipment e.g. oxygen has increased by exceptional numbers. The TRHA has managed to meet its needs. Oxygen is constantly being sourced from Trinidad using cargo vessels and the Coast guard for transport.

Capacity for oxygen concentrators and other equipment has also increased. The mortuary space was overwhelmed and a container has been procured to deal with overflow. General infrastructural and equipment requirements have been sorted quickly.

Funding for healthcare in Tobago is not from Trinidad, but through the Division of Health of the THA. The TRHA has received direct assistance from the MOH in the form of equipment, supplies, and technical expertise. Medical supplies come from C40.

## 5.5 Monitoring and Evaluation of the Quality of Healthcare Services

Monitoring and evaluation is not a strong point at the primary care level. Within the primary care setting, persons on the ground do not understand the importance of data collection and why it must be collected systematically. Work is being done to tighten up how data is collected and used, but there continues to be challenges, with employees perceiving data requests as a criticism of their performance. The data that is available is used.

After the meetings with TRHA General Managers and Medical Chief of Staff, we were taken on a Virtual Tour of the Fort, Emergency Department at the Scarborough General Hospital and The ICU at Scarborough General Hospital.

An acting registrar in intensive care showed us the facilities at the Fort which consists presently of 2 main areas which provide care to the mild /moderate patients. The main concerns were the uncovered connection of the 2 buildings and the possibility of exposure to the elements if one needed to visit the other area in an emergency. Its location up the hill from Scarborough made it difficult to always get laboratory results quickly or other specialist care such as surgical care where the patients have to be transferred to Scarborough General.

We were shown the area where the 6 bedded ICU is to be located with a satisfactory Oxygen supply due to the purchase of an oxygen concentrator. This facility also provides Haemodialysis for both COVID-19 patients and non COVID-19 patients but the COVID-19 patients are rostered in the afternoon.

An acting consultant showed us the A&E Department where there is a special area which can house the overflow ICU patients when more than 5 patients are exceeded. The facility has a triage area outside the building and then depending on the patient assessment they are referred to ICU or if mild or moderate, will be transferred to the Fort. If they require surgery or other specialised care, they stay at the Scarborough General Hospital. This appears to be appropriately designed and functions well.

An Acting Consultant took us around the ICU which has a current Nursing staff of 16 (3RN's per shift). The National Policy requires 25 Nurses; a deficit of 9 RNs. The Unit compares favourably with those in Trinidad and the problem with the supply of oxygen has been addressed with the purchase of an oxygen concentrator. The main concern was the shortage of sedatives for ventilated patients which was a concern expressed at all ICUs visited.

As with all our RHA visits we also interviewed staff members of the ICU/HDU. Most mentioned staffing levels and the provision of meal, laboratory and pharmacy services having to come from Scarborough. There was no physiotherapy service at the Fort and there was a lack of patient escort and orderlies assigned to the ICU/HDU to assist in proning the patients.

Overall the staffing levels as provided by the GM Nursing highlighted the main weakness in patient care, however the plans to bring the ICU and other wards care in the same location should help and perhaps an ICU Nurses training programme would help to increase staffing.

**Table 10: Staffing Levels at the TRHA**

| Facility | Current staffing | Required staff | Deficit. |
|---|---|---|---|
| Covid ICU SGH<br>5 beds | 16<br>3 RNs per shift,<br>working 12 hour shifts. | National policy requirement of 1:1 ratio<br>25 RNs required | 9 RNs |
| Green Room Facility<br>36 beds | Currently has 17 RNs<br>2-3 RNs per shift.<br>Patient acuity Covid+ve and moderately ill. | Ideal staffing -33RNs<br>To allow for 4- 5 RNs per shift. | Deficit 18 RNs<br><br>Considering that Some RNs can be substituted with ENAs if available<br>Staffing of 28 RNs and 8 ENAs is acceptable |
| Geriatric facility 19 beds | Currently has 20 RNs<br>1 Head Nurse<br>This allows for 3 RNs per shift<br>Patient acuity Covid positive and severely ill, (not on ventilator) | Ideal staffing<br>24 RNS<br>5 ENAs<br>Ideal staffing will allow 5 staff per shift. | Deficit – 4 RNs<br>ENAs – 5 |
| Lowlands facility 26 Beds | Patient Acuity-<br>Covid +ve and mildly ill/ recovering.<br>staffing<br>9 RNS 1 ENA | Ideal staffing -17<br>Will allow for 3 RNs per shift. | Deficit-8 RNs<br>(This facility is temporarily closed and staff redirected to other areas to provide support.) |
| Accident and Emergency | Current staffing –37 RNs<br>ENAs-8<br>Additional responsibilities added to A&E due to Covid -19-<br>- Management of | Required staffing – 48 RNs 14-ENAs | Deficit of 11 RNs and 6 ENAs |

## 6.0 LIMITATIONS

The limitations encountered by the Committee were as follows:

1. **Timeliness in the receipt of data and reports.** For example, a request was made for datasets related to COVID-19 deaths and patient management on January 19 but most arrived two weeks after the request. In addition, other datasets arrived too late for us to use or were never received: data from the patients' experience while using the ambulance transfer system, patients' notes from some RHAs were not submitted to us, some critical variables could not be analysed because they were either not captured or the quality of the data entered was inconsistent e.g. ethnicity data, comorbidities for community-treated patients.

2. **Post-mortems**. No port-mortems were performed, therefore when datasets on patient care were not received no conclusions could be made with regard to deaths.

3. **Quality of the data in the datasets received.** It is not clear whether there are internal processes at the RHAs and MOH to address data quality and verification for all the COVID-19 data collected. A request was made for these processes but there was no response by the time of writing the report. Consequently, there were many instances of entries in the wrong columns in the Hospital Admissions and Patients Managed at Home datasets. One example was the presence of dates of birth and addresses in the column for sex in the Patients Managed at Home dataset.

4. **Inputs/Feedback from patients.** An online survey was conducted to obtain data from patients who were treated for COVID-19. It was not feasible to share the link directly with patients so it was placed on the website of the Trinidad and Tobago Medical Association (T&TMA) and the public was informed about the survey via a press release. The survey was open for approximately 3 days. To verify that the respondents were bona fide patients, information on the hospital where they said they were treated, their date of birth, date of admission and date of discharge were sent to the relevant RHA for verification. Of the 25 randomly selected respondents, feedback was received from the RHAs on 23. They verified that 74% were patients treated at their institutions and indicated that the other 26% were not. This could have implications for the interpretation of the findings for the online survey.

5. **While efforts were made for the data collection instruments to comprise closed questions, this was not always possible**. Open questions were used for respondents to share their experiences, views and suggestions. Due to the time constraints for the completion of the report, it was only possible to conduct preliminary analyses of these data.

6. **The Medical Notes that were sent to us did not always have the nurses' treatment charts or nurses' notes attached**. It was therefore difficult for us to confirm what medications were actually received by the patients and therefore a complete assessment of TOR#5 was not possible. We therefore relied on reports of staff and management.

7. **The medical notes reviewed were not the intended random sample. The sample of staff interviewed was also not randomly selected**. A random sample was not feasible within the time constraints as the RHAs did not have a list of admissions to facilitate this. Therefore, a convenience sample of medical notes was submitted by the RHAs and this may be subject to bias. A similar caveat applies to the selection of staff who were interviewed.

8. **Limited details of patients transported by the ambulance service (Global Medical Response of Trinidad & Tobago) including their clinical care at the time**. Unfortunately, this information was not forthcoming given the tight deadlines of the Committee so we were unable to comment further on this aspect of whether transfer of patients impacted outcomes. The clinical state of patients at the time of transport to hospital could not be determined as the GMRTT database was not shared. Therefore, we could not verify the impression of clinical staff that patients arrived at hospital later in the course of their illness during the last surge.

9. **Laboratories and diagnostic imaging service were not assessed.** Due to time constraints we could not make any assessment of laboratory and imaging services except through conversations with RHA staff about the functioning of these entities.

## 7.0 RECOMMENDATIONS

1. **Data management system, data verification**: The hallmark of a modern health care system is information management, which allows continuous assessment of the effectiveness of the provision of health care vis-à-vis national expenditure. We had a lot of difficulty in accessing data for example the patient records. There is an urgent need for electronic medical records. The ambulance transfer database, community care database and the hospital care databases need to be urgently linked to support cost-effective and oriented patient outcomes.

2. **NCDs management:** The high rates of NCDs among the patients who died or who were hospitalized for COVID-19 were notable. More attention needs to be paid from a young age to the prevention and management of NCDs to ensure that our citizens become and remain healthy. Preventive management needs to be aimed at children, adolescents and young adults. A national survey of NCDs is urgently required and the data used to guide the review and revision of health promotion and treatment programs.

   It is likely that citizens with NCDs would again be at increased risk for poor outcomes if and when there is another event such as the COVID-19 pandemic. The clinical staff who have been hired temporarily and whose contracts would be discontinued at the end of the pandemic should be redeployed to respond to the NCD morbidity debt that has accumulated during this pandemic.

3. **Dedication of frontline staff:** We were impressed with the application of the nurses, doctors, paramedical and support staff who managed COVID-19 patients. However, at some RHAs, some of the staff in the frontline felt abandoned by the leadership. We recommend the RHAs implement a ***specific feedback system*** to monitor the needs of the staff on the frontline.

4. **Supplies from C40:** The frontline staff need 24 hours per day x 365 days support during the pandemic. We recommend that C40 should be continuously open, seven days per week.

5. **Oxygen:** At two sites we saw large oxygen concentrators which meant that these sites had less dependence on importation of liquid oxygen from elsewhere. We recommend that the oxygen requirements of all large institutions be reviewed with consideration of purchasing oxygen concentrators.

6. **Mental health support of staff is critical**:
    a) at one site there was a staff psychology service – we thought that this was a very good practice and should be encouraged at all sites.
    b) job security – short locum and lack of job security took a mental health toll on young doctors and young nurses. We recommend that such staff should be given contracts for a minimum of one year.

7. **On site recreational facilities for all RHAs**: At one site we saw a recreational facility for staff where open air gym exercises could be done. This was also a good practice for implementation at other sites.

8. **Meals:**
    a) Of the patients who participated in the survey, 49% felt that the meals were poor or very poor. In a qualitative analysis of open ended responses, patients were very concerned about the quality and timing of meals. Staff also told us that because of low nurse to patient ratios, meals could be very late. We recommend the use of specific patient care assistants to help with feeding and distribution of meals.
    b) Staff assigned to distant facilities reported inability to procure meals when on service to the RHAs. We recommend that meals should be provided for such staff who work in isolated areas.

9. **Communications with patients:** Anecdotal reports suggested that in the past, there has been severe dislocation between families and their loved ones admitted to hospital. Of the patients who participated in the survey, 60% were satisfied with communication with their doctors but a qualitative analysis showed recurrent complaints about communication with family. When we toured sites as well as during the staff interviews, we were told that there was a policy of telephone (+/- video) communication between doctors and next of kin on a daily basis. At one site the policy seemed to be for communication three days per week. We suspect that there has been recent

improvement based on prior criticisms by patients. We feel that the RHAs should aim for a target of more than 90% satisfaction in the area of effective communication. We recommend much more emphasis on patient communication and there should be daily communication with next of kin across all RHAs.

10. **Empathy:** In the qualitative analysis of the responses of the patients who participated in the online survey, concerns about empathy were highlighted. We recognize that with the surges that occurred, the staff were under tremendous stress in providing care. However, we must recall that the health care system is devoted to exactly that – care – and we urge all health care providers to remember this in all circumstances.

11. **Accommodation:** Participants of the online survey of patients ranked accommodation highly among their concerns. The major areas of dissatisfaction were facilities under the tents and bathroom facilities (temporary accommodations). We noted the complaints of two patients whose attorney submitted the documents on their behalf (please see the appendix). On the days on which we did our tours we did not see any overcrowding and facilities seemed adequate but at that stage, the surge was decreasing. However, the temporary accommodations need to be improved to more readily respond to surges.

12. **Sites within hospital where demise occurs.** Data on hospital deaths provided to us did not allow for us to discern where death occurred in the hospital: whether in the tents (biocontainment units), A&E, wards, ICU or step-down facility. We recommend that data on site of demise should be added to the national database as this would allow for site-specific evaluation of quality of care.

13. **Tocilizumab:** Tocilizumab is given at an advanced stage of COVID-19. Most staff were very impressed by its effects and perhaps C40 needs to increase purchasing of this drug. Though it is an expensive drug there is a cost-benefit to be realized from its use. We recommend that the policy regarding Tocilizumab use be reviewed.

14. **National Policy regarding ICU admissions and care of the elderly**: It was noted that 15.2% of paediatric admissions were to ICU compared with 1.2% of persons over 80 years of age. This was remarkable given the high death rates amongst the elderly. It was

also noted that there were special paediatric ICU beds whereas there were no such facility for the elderly. In addition, the demand for paediatric ICU beds was in absolute terms much smaller than that for adult ICU beds. We did not find any mention of a national policy regarding admissions to ICU for persons of different ages, and recommend that such a policy needs to be articulated.

15. **Views of relatives of COVID-19 patients.** This is an area that needs further investigation. We could not assess their views due to the time constraints of this rapid assessment. We noted that relatives had no or limited access to patients during admission. We recommend a formal survey of the views of relatives of patients who were cared for in the parallel health care system.

16. **Self-Assessment:** Further external assessments of the health care system should be preceded by a written self-assessment. The latter is the vision, the mission, the methods by which the mission is accomplished and a review of the outcomes of these processes. This would allow for the ready availability of data and facilitate a better outcome of external assessments. For example, to evaluate the ambulance transfer system it would have been useful to see in writing what the Ministry intended and their view of whether it was implemented, including the data that would support such views. An external assessor could then review the data objectively applying the standards that the Ministry had agreed to.

## 8.0 APPENDIX

Document submitted by Attorney Ganesh Saroop

Letter to Prof Seemungal 10.2.2022 - Final 1.pdf - OneDrive (live.com)

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