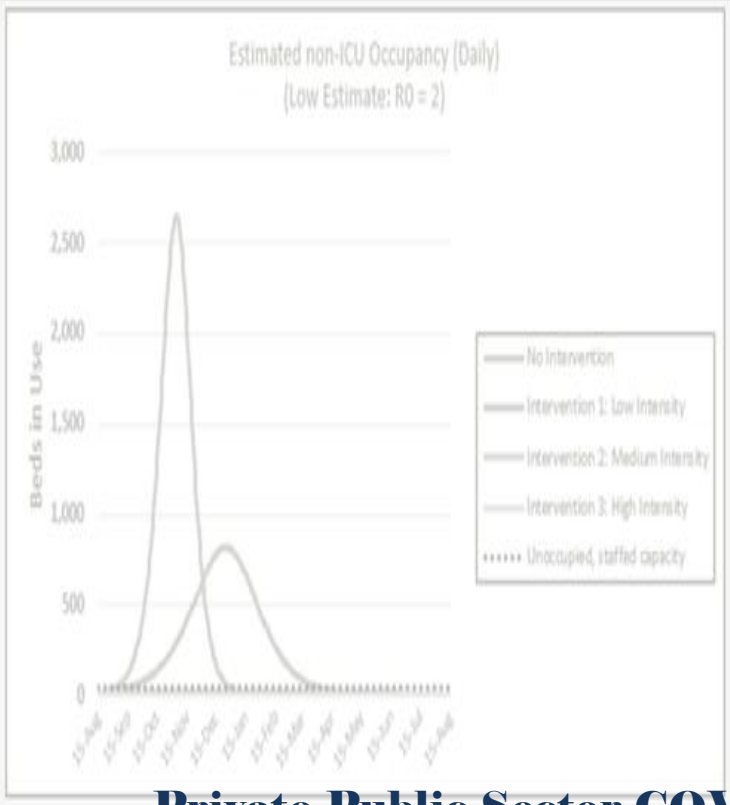
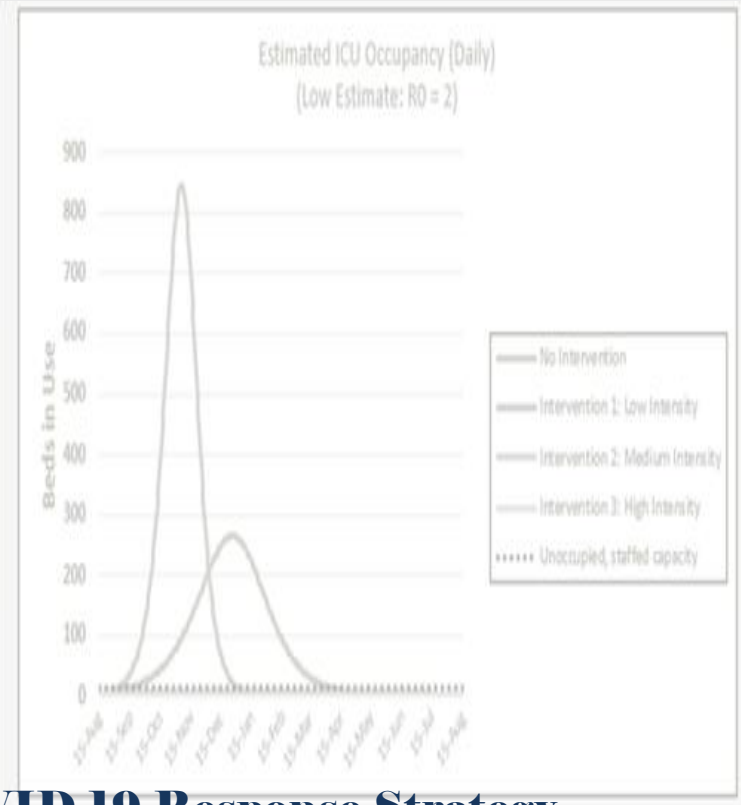
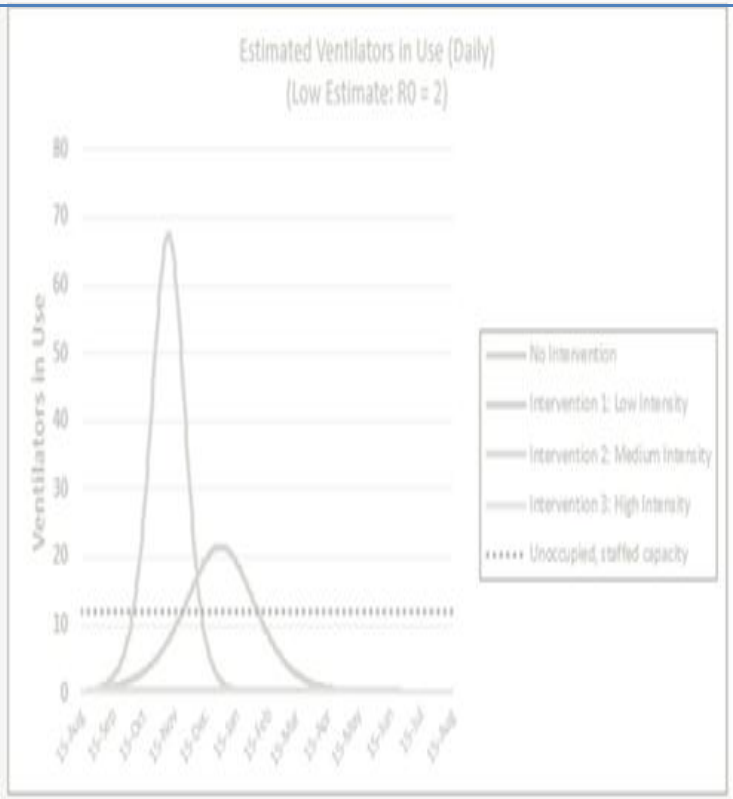
November 4, 2020





Private-Public Sector COVID 19 Response Strategy



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EXECUTIVE SUMMARY

The ***Private-Public Sector COVID 19 Response Strategy*** is designed to provide a clear road map to the private sector as to what indicators ("triggers") they should monitor so as be able to plan accordingly. This roadmap, therefore, is also aimed at producing stakeholder confidence in the Government's COVID-19 health strategy, thereby, earning this response strategy the epithet "Health Sector's Confidence Building Measures".

Part I of the Strategy makes use of the Center for Disease Control (CDC)'s Surge Capacity Assessment Tool. Using the passage of S.I. No. 119 of 2020 on August 15th as the 'starting point' for the analysis, it becomes evident that Belize's optimal option is to continue operating under *Medium-Intensive Interventions* (akin to the measures outlined in *S.I. No. 119*). The Strategy revolves around three essential pillars:

- **PILLAR 1:** Crystallizing an agreement to keep transmission levels low (an R_o of *at least* 2);
- **PILLAR 2:** Establishing agreed-upon and data-driven 'trigger points' where pre-emptive actions—informed by the baseline data in *Part I*—are executed as a collaborative response;
- **PILLAR 3:** Formalizing the partnership between private and public sectors in terms of augmenting Belize's 'surge capacity';
- **PILLAR 4:** Increasing the level of understanding of the general public as to the purpose and importance for the 'trigger points' and its connection to balancing 'lives and livelihoods'.

PILLAR 1—LOW TRANSMISSION RATES

Part I below clearly demonstrates that a low transmission rate is the ultimate defense against the spread of COVID 19. To achieve this, however, requires stakeholder commitments as well as health sector capacities. This pillar, therefore, although clearly an intuitive goal, can benefit from a formal agreement among the tripartite bodies to actively commit to voluntarily employ their best efforts to achieve this goal based on the available medical science.

PILLAR 2—TRIGGER POINTS & ZONES

The Strategy proposes a three-part "zone" system which operates on the foundation of ***S.I. No. 119***, and establishes set triggers that determine transition from one zone to the next. The BLUE ZONE is maintained as follows:

INTER-ZONE TRANSITION "TRIGGERS"				
		Triggers		
		No. ICU Beds (in Use)	No. of Non-ICU beds (in use)	No. of Ventilators (in use)
BLUE ZONE				
Stage 1 (40% capacity)	• Reduce opening hours; • Increased insistence on *remote working were possible;* • Public transportation reduced to 67% capacity; • *Reject* flights from source markets with transmission rates above 10%	**7**	**29**	**7**
Stage 2 (20% capacity)	• International flights rejected from source markets with transmission rates above 5%; • Reduced hours of non-essential businesses with risk scores > 50 points (see *Annex*).	**10**	**38**	**10**
ORANGE ZONE				
		No. ICU Beds (in Use)	**No. of Non-ICU beds (in use)**	**No. of Ventilators (in use)**
Stage 3 (< 20% capacity)	• Complete lockdown of non-essential businesses until capacity returns to > 20%	**> 10**	**> 38**	**> 10**
RED ZONE				
		No. ICU Beds (in Use)	**No. of Non-ICU beds (in use)**	**No. of Ventilators (in use)**
Stage 4 (0% capacity)	• Complete lockdown for a **fixed** 30-day period (regardless if resource capacities are restored).	All	All	All
Note: All stages consider a high transmission rate, as low-transmission projections do not exceed capacities. Additionally, medical staff requirements are also				

PILLAR 3—BUILDING UP "SURGE CAPACITY"

The first two pillars are the inherent defenses against the spread of COVID-19, *Pillar 1* being the ultimate defense, followed by public health interventions as outlined in *Pillar 2*. Pillar 3 (regardless of the transmission level) aims to bolster the health sector's "surge capacity" via an active and formalized public-private sector partnership through in-kind or cash contributions that are hypothecated towards augmenting the relevant health sector parameters.

This Pillar becomes especially important as it pertains to reopening the international airport, as the projections of *Part I* below do not include estimates as to the transmission rates' changes due to non-resident travelers. Logic dictates that any reopening should quadrate with this nature of health system investments (including human capital investments).

PILLAR 4—COMMUNICATION

Finally, *Pillar 4* is designed to communicate the elements and achievements of the first three pillars. If even purely symbolic, the *Pillar 1* stakeholder agreement (including the Opposition, civil society, and the tripartite partners) can reinvigorate the general population's dedication to preserving a low transmission rate.

Additionally, a clear comprehension of the *triggers* would enable not just the private sector but the general public to read the indicators in similar fashion to the *hurricane warning* systems. A clear understanding of the consequences associated with each stage can, if effectively communicated, engender the citizenry's intrinsic motivations to take corrective actions voluntarily.

November 4, 2020

INTRODUCTION

BACKGROUND:

The recent shutdown of virtually the entire Belizean economy (with the exception of essential goods and services such as finance, food, and the like) has left a severe impact on entrepreneurs' and associated employees' livelihoods. As far as balancing both 'lives and livelihoods' are concerned, the private sector is of the view that achieving a type of equilibrium between the twin goals is essential. However, the nature of the present pandemic demands that there be **trust** in the health system's capacity to manage an upsurge in COVID 19 cases—which is highly probably upon reopening. That trust must be built on empirical data that not only shows epidemiological statistics but also, *inter alia,* the health sector's ability to withstand a surge in critical cases of the virus, while simultaneously providing non-COVID-19 related healthcare.

PRIVATE SECTOR CONCERNS:

As it presently stands, the business community considers the answer to the following questions most pertinent to any strategic and predictable reopening:

> ***"Is there a way for the Government of Belize (GoB) to assure at any time that it can handle the highly likely influx and upsurge in COVID 19 cases upon reopening the economy (the airport, in particular)?"***

The forgoing question is premised on the following considerations:

a) The fully transparent knowledge of the Belizean health sector's capacity to manage an upswing in the number of COVID 19 cases while still providing non-COVID healthcare services[1];

b) Clear communication on the strategy governing another shutdown, which should include clear "triggers" for each stage of the 'shutdown' process. The strategy, however, should be treated as a 'working document' and should view a complete "shutdown" as a last resort, considering that the Belizean economy can hardly sustain another full State of Emergency (SOE) ***if it is not entirely warranted***.

c) There should be a clear plan on how the vaccine—when developed and secured—would be disseminated to the general population.

[1] **Note**: The spirit of this "resource-oriented" point is reiterated in the other following comments from the Executive Council: (a) "Determining the resources we need for survival -economic and healthwise;" and (b)" total transparency, no more games with numbers, a clear-eyed approach without political filters to **evaluating shortages and the filling thereof" (***interpreted as requesting full transparency regarding the healthcare capacity).*

PART I: ASSESSMENT OF HEALTHSECTOR CAPACITY

This point raised by the business community finds congruence with the standards set by the World Health Organization (WHO) which is built on three domains:

(i) **Epidemiology**—is the epidemic controlled? (Yes or No);

(ii) **Health system**— is the health system able to cope with a resurgence of COVID 19 cases that may arise after adapting some measures? (Yes or No)

(iii) **Public Health Surveillance**—is the public health surveillance system able to detect and manage the cases and their contacts, and identify a resurgence of cases? (Yes or No).

A1—Epidemiology: Is the epidemic controlled?

The WHO criteria, establishes a key set of parameters for considerations, which include, but not limited to the following in *Table 1*:

TABLE 1—EPIDEMIOLOGICAL CRITERIA

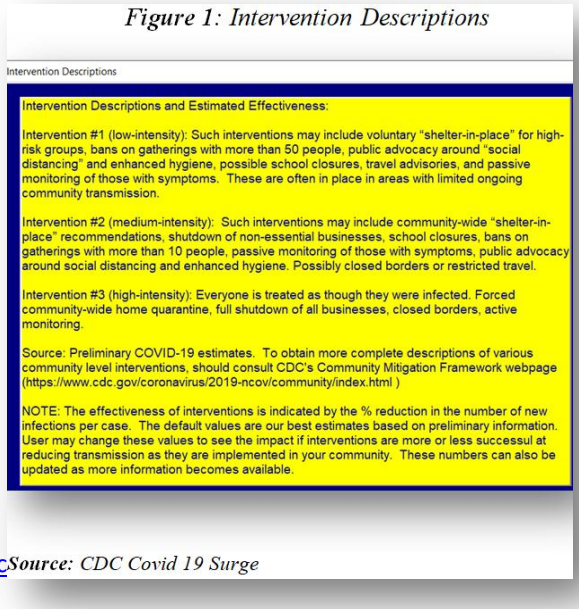
Criteria	Purpose of Indicator	Threshold/Benchmark	Belize (Yes/No) or Figures
Decline of at least 50% over a 3-week period since the latest peak and continuous decline in the observed incidence of confirmed and probable cases	This indicates a decline in transmission equivalent to a halving time of three weeks or less since the latest peak, when the testing strategy is maintained or strengthened to test a greater % of suspected cases.	Decline of at least 50% within the last three weeks	**NO**
Less than 5% of samples positive for COVID-19, at least for the last 2 weeks, assuming that surveillance for suspected cases is comprehensive	The % positive samples can be interpreted only with comprehensive surveillance and testing of suspect cases, in the order of 1/1000 population/week	5% or less	**9.8%** (553 positives of 5592 Tests)[2]
At least 80% of cases are from contact lists and can be linked to known clusters	This indicates that most transmission chains have been identified, offering the opportunity for follow-up. This may be limited by the fact that		**YES**

[2] **Note:** As of August 18th, 2020 according to the Office of the Director of Health Services (DHS)

	the information will certainly not have been collected at the height of the epidemic.		
Criteria	**Purpose of Indicator**	**Threshold/Benchmark**	**Belize (Yes/No) or Figures**
Continuous decline in the number of hospitalization and ICU admissions of confirmed and probable cases at least for the last 2 weeks	This indicates, with an approximately 1-week lag-time and providing that the criteria for hospitalization have not changed, a decline in the number of cases.		NO
Source: Criteria based on WHO Guidelines			

As *Table 1* above informs, Belize is outside the parameters of most of the selected indicators, with the exception of the health professionals being able to link at least 80% of cases to contact lists. On the basis of the foregoing, it is reasonable to expect a return to **Medium-intensity** public health measures in high-risk zones (see ***Figure 1)***. With the 'lockdown' of San Pedro (Ambergris Caye), Shipyard, Santa Martha, and Guinea Grass Villages[3], as well as the return of the curfew to the rest of the country via Statutory Instrument No. 119[4], the Government of Belize (GoB)—as of August 2020—could be said to have reinstituted Medium-intensity measures.

Figure 1: Intervention Descriptions



Source: *CDC Covid 19 Surge*

A2—Health System Surge Capacity

In addition to the Epidemiological factors, the health system's capacity to adequately manage an upsurge in cases is also pivotal. Based on information received from the Director of Health Services, Belize has a total of 48 COVID-19-specific

[3] See S.I. No. 111 of 2020 here: https://www.pressoffice.gov.bz/wp-c
Belize-Constitution-Emergency-Powers-Regulations-2020.pdf

[4] See S.I. No. 119 of 2020 here: https://www.pressoffice.gov.bz/wp-content/uploads/2019/12/SI-No-119-of-2020-Belize-Constitution.pdf

beds and 12 ventilators that are ready for use *(Manzanero, M. [2020, August 17], personal interview with NOC Representative).*

Table 2—Healthcare Statistics			
Districts	**COVID-19 Beds**	**Additional Capacity**	**No. of Ventilators**
Corozal	8		
Orange Walk	6		
Belmopan	10	30	
Dangriga	4		
San Ignacio	4		
Independence	2		
PG	2		
KHMH	12 (Considered ICU)	38[5]	12
TOTAL	**48**		
Epidemiological Rates			
General: No. of Positives requiring Hospitalization			20.0%
General: No. of Positives that would require Ventilators			5.0%
Belize: No. of Positives currently requiring hospitalized (9 of 475)			2.0%
Belize: No. of Positives currently require ventilators (2 of 475)			0.4%
Source: Interview with DHS by NOC Representative			

[5] **Note:** The Containment area adds an additional 20 beds.

This information can be utilized to gauge Belize's health system's surge capacity. To that end, this paper makes use of the COVID 19 Surge (Assessment) Tool (The Tool), developed by the Center for Disease Control (CDC)[6]. In addition to the *Table 2* statistics, the following parameters (see *Table 3*) are inputted into the Tool:

Table 3—Data Entered into Surge Assessment Tool	
Hospital Resources	
Population	400,000
Total staffed unoccupied ICU beds	12
Hospital Stays for COVID-19 Patients	
Average % of COVID 19 cases who will be admitted for hospital care	5.50%
Average length of non-ICU stay (days)	8
Average % of Covid 19 cases who will require ICU care	20%
Average duration in ICU (if no ventilator) (days)	10
Average % of COVID-19 cases in ICU that will need ventilators	5.00%
Average duration in ICU (If Ventilator is Required)	16 days
Average downtime per ventilator (i.e. decontamination/relocation)	1 day

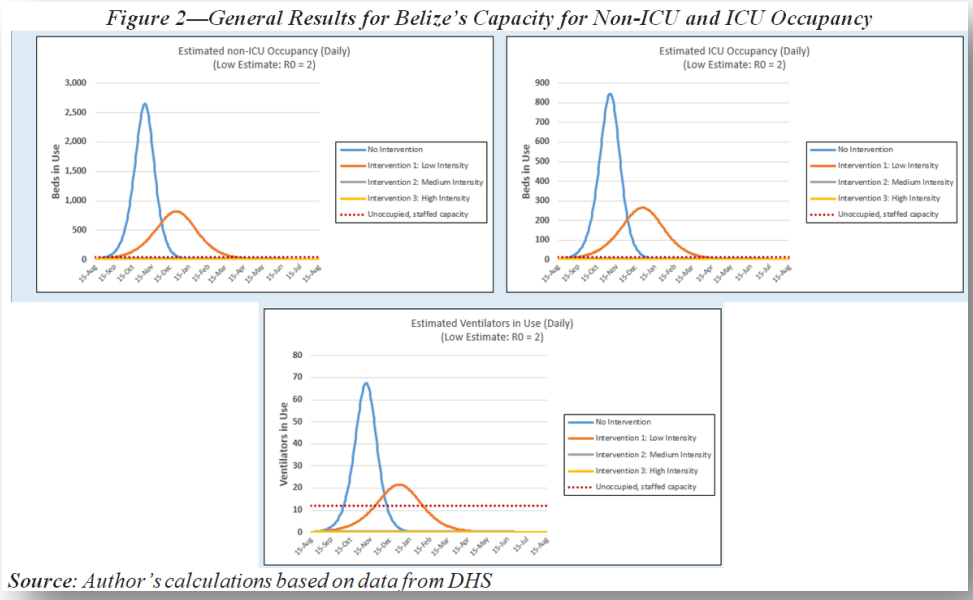
[6] **Note:** CDC Surge Assessment Capacity available here: https://www.cdc.gov/coronavirus/2019-ncov/hcp/COVIDSurge.html

Average days in use per ventilator	17 days
Date of Analysis (with default Effectiveness values)	August 15, 2020

A2.1—Results from Surge Capacity Assessment Tool

As is made conspicuous in *Figure 2* as it pertains to Intensive Care Unit (ICU), non-ICU Covid 19 hospital (bed) occupancy as well as available ventilators, any option below **Medium-Intensity** (i.e. *No Intervention* and *Low-Intensity Interventions*) are likely to result in a scenario in which the healthcare system is overwhelmed, as surge capacity is significantly overshot.

Figure 2—General Results for Belize's Capacity for Non-ICU and ICU Occupancy



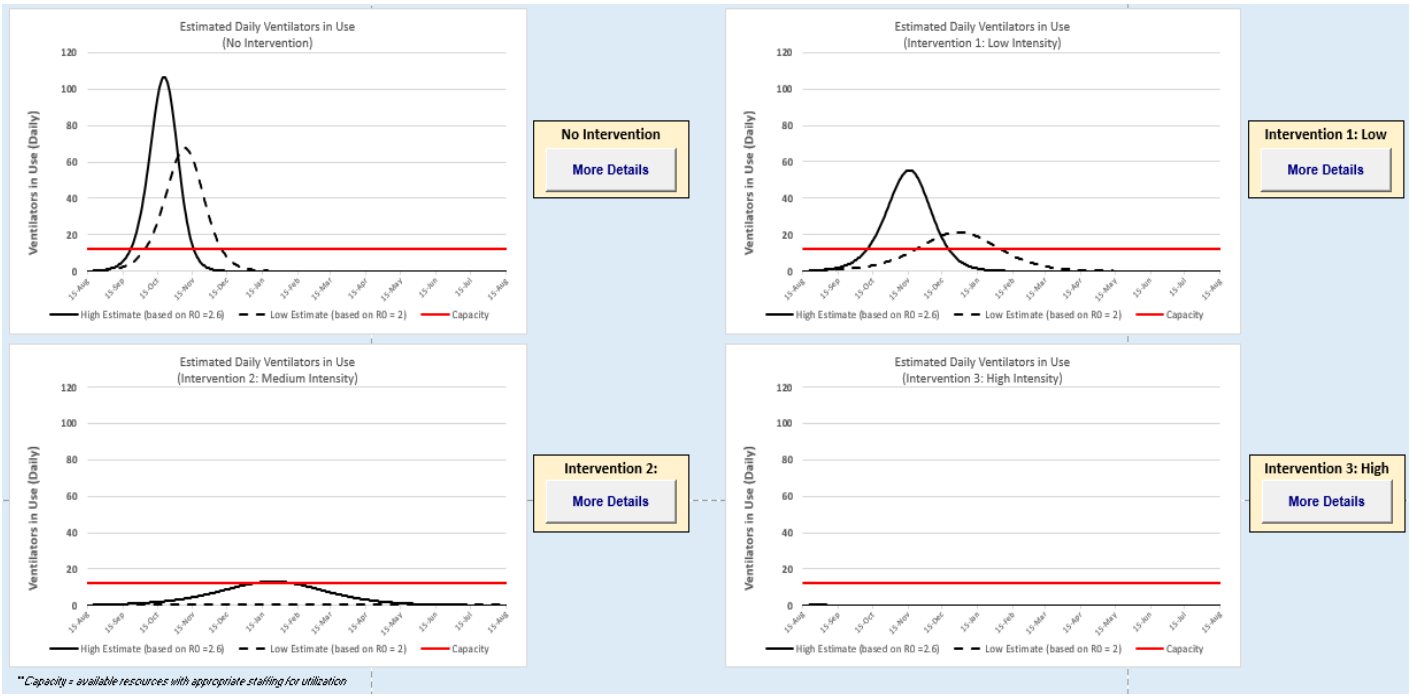
Source: Author's calculations based on data from DHS

Conversely, only *Medium- to High-Intensity* measures (under a low-transmission rate scenario) remain within the manageable zone (dubbed the "**Blue Zone**" for the rest of this document (**Note:** the "Zones" are delineated in section A2.2 below).

A2.2—Ventilators

Arguably one of the most essential medical equipment for managing the current pandemic, Belize reportedly has **twelve (12) ventilators** in operation. *(Some unconfirmed reports suggest that there are possibly up to 20 in country).*

Figure 3—Ventilator Demand under Different Scenarios



The "**Blue Zone**", as far as ventilation is concerned, is clearly maintained under "**Intervention 2: Medium Intensity**" (bottom-left graph in *Figure 3*), when considering a low-transmission assumption (represented by the dotted lines), and approaches the "**Orange Zone**" under the high-transmission-rate assumptions. The health system would enter into "**Red Zones**" under either a "No Intervention" or a "Low-Intensity" intervention as shown in the top-left and top-right graphs, respectively.

The zones referenced above are defined as follows:

- **Blue Zone**: Implies a situation where even at peak, the demand on the health system's resources are sufficiently below maximum capacity, thereby, enabling it to absorb at least a 20% increase in COVID 19 case loads (see WHO guidelines).

- **Orange Zone**: speaks to a scenario in which the demand and supply side are at virtual equilibrium, thereby, indicating that the health system **cannot** absorb at least a 20% increase in positive cases.

- **Red Zone**: is a scenario in which there is significant excess demand on the healthcare system, in which there are not enough beds, ventilators, and staff, and the like, to manage the outbreak.

Subject to a high-transmission rate assumption (i.e. 2.6 infections per case), *Figure 3's* medium-intensity scenario—all things being equal—projects that the peak "**Orange Zone**" would not be reached until **early January 2021**, and would remain at peak **until mid February 2021**. Under a low-transmission (i.e. 2 new infections per case) scenario, it remains within the "**Blue Zone**" until **August 15, 2021**—a full 365 days.

There is prudence; however, in looking more intently at the **high-transmission** rate scenarios under the Medium Intensity intervention (see *Table 4*).

Table 4—Peak Daily Ventilators in Use

Type of Intervention	Low Transmission	High Transmission
No Intervention	68	107
Intervention 1: Low Intensity	22	55
Intervention 2: Medium Intensity	**0**	**13**
Intervention 3: High Intensity	0	0

At medium-intensity, restrictive public health measures and high transmission, the peak ventilator demand of 13 would occur in **162 days (**from August 15th, 2020): That is, it would peak around **January 24, 2021**. Additionally, equilibrium (i.e. a demand of 12) would be met on January 7, 2021, again, with all things being constant.

Given the foregoing (high transmission) assumptions, the CDC model predicts a total of 94 patients needing ventilation over the next year (from August 15th 2020 to same date in 2021). Approximately thirty percent (30%) of those patients would not be able to access the ventilator as needed, thereby, signifying that the **healthcare system would only be able to support 70.7% of the ventilator demand**, as the period of "over capacity" would last for approximately 37 days (see *Table 5*).

Table 5—Total Patients Needing Ventilation

	LOW Transmission	HIGH Transmission
Intervention 2: Medium Intensity	**7**	**94**
# days Over Capacity	0	37
# Patients w/o Ventilators	0	27
% of Patients Ventilated as Needed	100.0%	70.7%

A2.3—ICU Demand

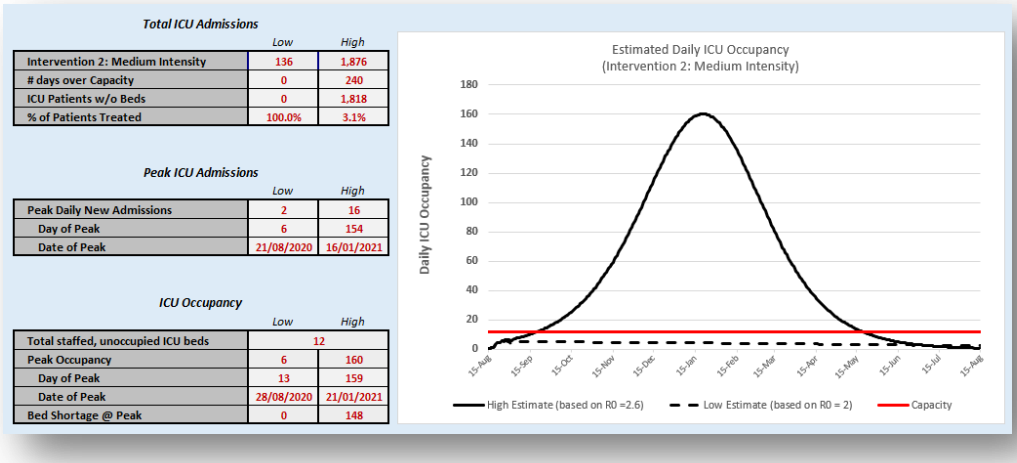
Next in line is the health system's ability to satisfy ICU demand given the number of ICU beds (which is assumed at 12 out of the total of 48 beds identified for COVID 19 patients).

Table 6—Total Intensive Care Unit Admissions

	LOW Transmission	HIGH Transmission
Intervention 2: Medium Intensity	**136**	**1,876**
# days Over Capacity	0	240
# Patients w/o Beds	0	1,818
% of Patients Treated	100.0%	3.1%

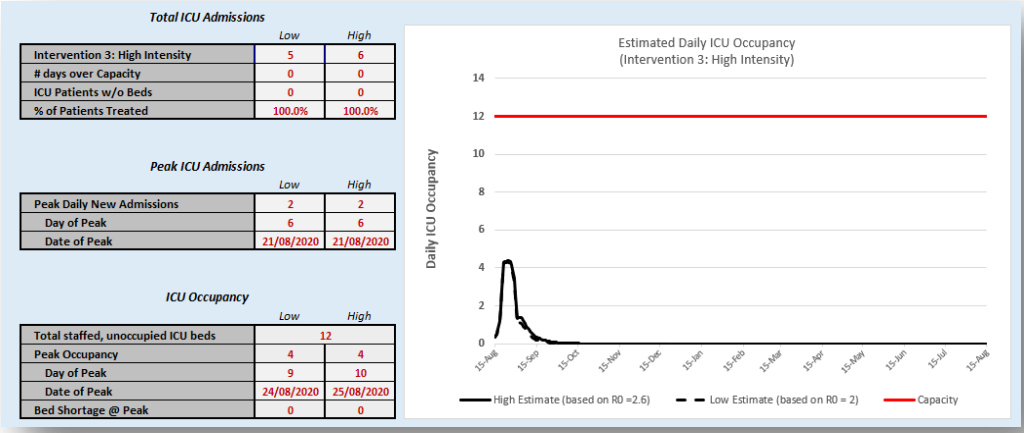
Table 6 reveals that under the high transmission scenario Belize's health system would be palpably overwhelmed, as only 3.1% of ICU patients would be able to be treated. Conversely, if transmissions are kept on the lower end (with infected persons only infecting an additional 2.0 persons or less) current capacity would be sufficient.

Figure 4—ICU Demand (Intervention 2: Medium Intensity)



Of course, the predicted outcomes change considerably under a **High Intensity scenario.**

Figure 5—ICU Demand (Intervention 3: High Intensity)



Total ICU Admissions

	Low	High
Intervention 3: High Intensity	5	6
# days over Capacity	0	0
ICU Patients w/o Beds	0	0
% of Patients Treated	100.0%	100.0%

Peak ICU Admissions

	Low	High
Peak Daily New Admissions	2	2
Day of Peak	6	6
Date of Peak	21/08/2020	21/08/2020

ICU Occupancy

	Low	High
Total staffed, unoccupied ICU beds	12	
Peak Occupancy	4	4
Day of Peak	9	10
Date of Peak	24/08/2020	25/08/2020
Bed Shortage @ Peak	0	0

As *Figure 5* demonstrates, at **high-intensity** public health restrictions (see *Figure 1* above), ICU admissions peak at four, and remain subdued and well below the 12-ICU-bed capacity. **Consequently, if low transmissions cannot be achieved, then the natural recourse would be to contemplate a complete shutdown**.

The data illustrated in *Figure 5* also speaks to the fact that even the current outbreak can be contained and its trend reversed substantially. There is, of course, precedent for this, as Belize had experienced more than 50 days without any new positive COVID 19 case as a result of the April 1st lockdown.

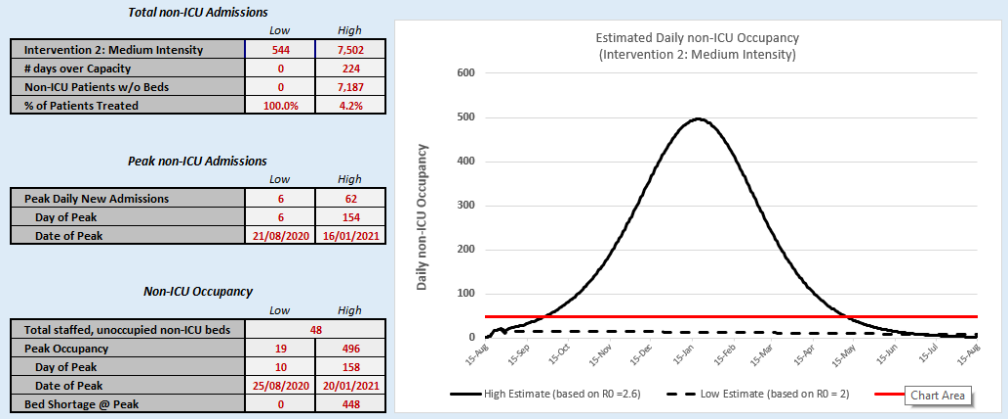
A2.3—Non-ICU Demand

Table 7—Non-ICU Demand

Type of Intervention	Low Transmission	High Transmission
No Intervention	14,143	16,060
Intervention 1: Low Intensity	9,282	13,261
Intervention 2: Medium Intensity	**544**	**7,502**
Intervention 3: High Intensity	22	24

At a low transmission rate, total non-ICU cases would approximate 544 cases, with peak occupancy estimated at 19 patients by late August 2020. The high transmission scenario is palpably different: Cases are almost 14 times higher and severely outstrips the health sector's capacity.

Figure 6—non-ICU Demand (Intervention 2: Medium Intensity)



Total non-ICU Admissions

	Low	High
Intervention 2: Medium Intensity	544	7,502
# days over Capacity	0	224
Non-ICU Patients w/o Beds	0	7,187
% of Patients Treated	100.0%	4.2%

Peak non-ICU Admissions

	Low	High
Peak Daily New Admissions	6	62
Day of Peak	6	154
Date of Peak	21/08/2020	16/01/2021

Non-ICU Occupancy

	Low	High
Total staffed, unoccupied non-ICU beds	48	
Peak Occupancy	19	496
Day of Peak	10	158
Date of Peak	25/08/2020	20/01/2021
Bed Shortage @ Peak	0	448

As illustrated in *Figure 6*, under the *low-transmission* supposition, there is no shortage of non-ICU bed capacity, and 100% of patients would be able to receive this level of treatment. Under the high-transmission alternative, however, only 4.2% of patients are estimated as being able to access requisite treatment. Similar to the situation with ICU-beds, **high-intensity** also drastically improves the prognosis.

PART II—Recommendations for Building Confidence

Part I of this document provides an estimate as it pertains to Belize's health sector's 'surge capacity' as it relates to an influx of COVID 19 cases. Principally, it is observed that whether or not Belize can adequately manage an upsurge demands rests on two general elements: (i) The level of intensity of the public health restrictions, and (ii) the transmission rate. There is, of course, a third rung in the ladder: (iii) the augmenting of the healthcare capacities.

Before proceeding any further, the following points must be underscored:

- The projections in *Part I* do not take into account a return of international arrivals (including tourists) following a reopening of the Phillip Goldson International Airport (PGIA)[7].

- While the assumed coefficients and parameters are based on empirical averages from epidemiological studies, each country is unique and should be guided by its own idiosyncratic variables.

[7] **Note:** See list of control measures instituted at regional airports here: https://www.universalweather.com/blog/caribbean-coronavirus-covid-19-impact-on-business-aviation/

It is also worth reminding at this juncture the guiding question raised by the business community:

> ***"Is there a way for the Government of Belize (GoB) to assure at any time that it can handle the highly likely influx and upsurge in COVID 19 cases upon reopening the economy (the airport, in particular)?"***

The constituent elements that engender the preceding inquiry are revisited in *Table 8 below*.

Table 8—Building blocks of Problem Statement

Constituent Elements	***Section Covered***	***Observed Answers***
a) The fully transparent knowledge of the Belizean health sector's capacity to manage an upswing in the number of COVID 19 cases while still providing non-COVID healthcare services;	Part I	While not fully transparent, the available data provides a succinct answer: ***It depends.***
b) Clear communication on the strategy governing another shutdown, which should include clear "triggers" for each stage of the 'shutdown' process. The strategy, however, should be treated as a 'working document' and should view a complete "shutdown" as a last resort, considering that the Belizean economy can hardly sustained another full State of Emergency (SOE) if it is not entirely warranted.	Part II: A1	Yes. Using estimates of *Part I*, it is possible to establish a **coding system** that clearly communicates the approaching need for increased set restrictions.

B2—the Code System: "Color Zones"

As outlined in *Part I*, the zones are defined as follows:

- **Blue Zone**: Implies a situation where even at peak, the demand on the health system's resources are sufficiently below maximum capacity, thereby, enabling it to absorb at least a 20% increase in COVID 19 case loads (see WHO guidelines).

- **Orange Zone**: speaks to a scenario in which the demand and supply side are at virtual equilibrium, thereby, indicating that the health system **cannot** absorb at least a 20% increase in positive cases.

- **Red Zone**: is a scenario in which there is significant excess demand on the healthcare system, in which there are not enough beds, ventilators, and staff, and so on to manage the outbreak.

B2.1—the Blue Zone

Guided by the **Medium-Intensity** figures presented in *Part I*, the Blue Zone is based on whether or not the constituent parts of Belize's healthcare system's 'surge capacity' can withstand at least a 20% upsurge in positive COVID 19 cases. Specifically, informed by the CDC tool's results, it becomes important to ask:

- Can the country's supply of ventilators manage a 20% increase in demand? and
- Can the country's supply of ICU and non-ICU beds sustain an at least 20% upsurge in positive cases.

Attached to the preceding questions is a temporal consideration: That is, based on the model's results, is there a specific timeframe within which the health system's (including staff) natural transitions from **Blue** to Orange/Red would occur.

Table 9—Naturally Occurring Max and Peak Dates

	Date of Max Capacity		Date of Peak	
	Low Transmission	High Transmission	Low Transmission	High Transmission
Ventilators	No Shortage	January 2021	No Shortage	January 2021
Non-ICU beds	No Shortage	October 2020	No Shortage	January 2021
ICU-beds	No Shortage	October 2020	No Shortage	January 2021

Informed by data from *Part I*, ***Table 9*** outlines two sets of dates: the date of **Max Capacity** and the **Peak dates** for Ventilators, Non-ICU beds, and ICU beds. Under the "low transmission" scenario, there is no forecast shortage of any of the resources within the health system. However, under the assumption of "high transmissions" (i.e. each infected person infects at least 2.6 others), max capacities for both categories of hospital occupancies occur between October 2020 and January 2021. All peak dates for the resources are encountered in January 2021.

A plan, therefore, is most needed for the ***"High Transmission"*** scenarios. All things remaining constant (which, unfortunately, may not be likely), Belize will begin its descent towards "**Orange**" and "**Red**" zones in roughly six weeks (for Non-ICU and ICU beds). Consequently, in order to remain within the **BLUE ZONE**, the following options are the only ones deemed most viable:

(a) If the "high transmission" scenario is realized, the government should gradually and **proactively** increase the intensity of the restrictive measures from Medium-Intensity

closer[8] to High-Intensity, after having consulted with Employers. This could be dubbed the preemptive "Cooling-off" period[9].

(b) **In partnership with the private sector, procure additional resources (beds, ventilators, etc) to help augment the health sector's capacity**. However, it must be noted that based on the trajectories outlined in *Part I* under the "high transmission" circumstances, this would require a three-fold investment. For instance, peak occupancy demand for ICU hospitalizations is 160 by mid January 2021. To satisfy that demand, would require more than tripling the number of available COVID-19 beds. It needs to be determined if this (along with other resource needs) is achievable even with a public-private partnership in this regard. ***It must be underscored that there needs to also be medical staff to match the increase number of tangible medical assets***.

(c) Become strategically selective about destination/source markets from where non-Belizean travelers can originate from (see ***section B2.1.2*** and ***Table 10***).

(d) Establish a clear medical-evacuation plan for non-residents who travel to Belize, so as to mitigate the increase in patient load on the Belizean healthcare system (for further discussions).

B2.1.2—Pre-emptive Cooling Off Periods

The WHO's guidelines advise that a health system should be able to absorb ***at least* a 20%** *increase* in new cases to be considered in the **BLUE ZONE**. Informed by the CDC's model output in *Part I*, the following strategies are recommended:

(a) In agreement with the private sector, the Government should institute a pre-planned and built-in "cooling-off strategy" that **complements and builds on the stipulations of S.I. No. 119 of 2020** in which businesses scale back operations to a level more stringent than the *Medium-Intensity* measures but less than that which is characteristic of "High Intensity" protocols. This is outlined in *Table 10* below.

[8] **Note:** The use of the word "closer" is purposeful, as this is used to signify increasingly stringent measures, but not necessarily a complete lockdown **unless** it is clearly warranted.

[9] **Note:** The working analogy behind the "cooling-off" period is that of an industrial machine that can operate for 10 hours straight, but overheats at the tenth hour. Thereafter, it must be shut down for 48 to 72 hours. However, if it is shutoff at the ninth hour, it can resume operations within 24 hours, and even half that time if it is turned off at the eight hour of operation.

TABLE 10—BLUE ZONE PRE-EMPTIVE *COOLING OFF* STRATEGY &TRIGGERS					
			Cooling-Off Triggers		
Cool-off Phases	**Cooling Off Measure**	**Description**	**Non-ICU Beds (in use)**	**ICU-Beds (in use)**	**Ventilators (in use)**
Stage 1 (40% capacity)	• Reduced work hours for non-essential businesses with COVID risk profile scores above 50 points (see Annex); • Increased insistence on Remote work, especially for small office spaces. • Public Transportation operates at 67% capacity, while maintain PPE and physical distancing protocols. • International flights.	• Work hours are reduced for most non-essential businesses from average 8 hours to 5 hours if risk levels surpass 50 points on the risk profile in the Annex; • Remote work for occupations that can operate under such conditions become mandatory, particularly for offices spaces where physical distancing is impossible; • Public transportation averages at about 60 seating capacity. Buses of this standard size would operate with only 40 passengers, allowing for two persons per seat. This would require Government subsidy to help incentive bus owners to operate at reduced revenues. • The airport, if reopened, should reject flights from any market with transmission rates above **10%** (while maintaining the health and physical distancing protocols).	**7**	**29**	**7**
Stage 2 (20% capacity)	• International flights suspended for origin markets with uncontrolled transmission rates of COVID 19. • Reduced hours of non-essential businesses with risk profiles above 50	• The airport, if reopened, should discontinue accepting flights from source markets with transmission rates above the WHO **5%** threshold. • Non-essential businesses with the identified risk profile are obligated to reduce number of	**10**	**38**	**10**

	points (see ***Annex***);	days of operation to no more than two/three days for a fourteen-day period, in addition to reduced hours from *Stage 1*. Any business no compliant should be ordered complete closed.			

B2.1.3—Resource Building: Public-Private Partnership

Table 10 is based on the assumption that the current capacity remains unchanged; however, there is utility in considering a public-private partnership in which the business community contributes either in-kind or in cash towards bolstering the health system's capacity. Of course, the principal difficulty is the matter of human capital in the medical sector; however, consultative sessions between the two parties could also explore the best way to coordinate on this critical component.

This resource building becomes especially important as it pertains to reopening the international airport. As mentioned earlier, *Part I* to this report is premised on only local, community transmission, without factoring in international travelers. As a result, it stands to reason that all key resources (beds, ventilators, staff, etc) should be increased by an additional 20% before any "reopening" can seriously be reconsidered. (Additionally, local transmission rates should be low. It is illogical to risk importing cases in an environment that already has high transmission).

Table 11—Health System Threshold for PGIA Reopening

	Ventilators	**ICU beds**	**Non-ICU Beds**
Increase by 20%	15	15	58
By Date:	November 15th 2020	September 15th 2020	September 15th

It must be clearly stated at this juncture that a mere 20% increase, under a *high transmission rate* scenario is hardly sufficient to satisfy "Peak Daily non-ICU" occupancy, for instance, which peaks at 496 in early January 2021, according to the CDC model. For that reason, there is value in considering the public-private partnership as a continuous arrangement as opposed to a one-off event. Said differently, there should be regular intervals at which these types of collaboration and contributions are **systematically**[10] repeated.

B2.2—the Orange Zone & Red Zone

The Orange Zone is 'triggered' whenever capacity actually falls below the 20% threshold. At this stage, it is strongly advised that a complete shutdown of non-essential businesses be revisited, and preference be given to **High-Intensity** restrictions. As shown in *Part I,* High-

[10] **Note:** The word "systematically" is used to speak to the need for a formal arrangement as opposed to individual companies acting independent of each other.

Intensity measures have the ability to significantly reduce the transmission rate, and at a juncture where the limit has been breached, rapid and assertive remedies are required. This includes complete closure of the PGIA to international flights. The *High-Intensity* measures would only remain in place for fourteen days or until the absorption capacity returns to at least 20% and with less than 5% of COVID 19 tests returning positive results.

The **Red Zone** is to be triggered when max capacity is met or surpassed by patient demand. At this stage, a full lockdown is to be deemed mandatory for a fixed period of one month, regardless of any other improvement in the health system's resources.

B2.3—Transparency and Communication Strategy

In order to remain in the BLUE ZONE, the ultimate strategy is to ensure that the general population works to ensure a low transmission rate by taking the appropriate health and safety precautions. To achieve that level of behavioral change, the citizenry must be intrinsically motivated to do their part. Enforcement and *mano-duro* policies, while equally useful, can only go so far.

A GOB-BCCI communication strategy should target the following objectives:

- Disseminate—in close collaborate with the Office of the Director of Health Services—the projections outlined in *Part I of this* document so as to generate an appreciation among the general public of Belize's health system "surge capacity" and instill an understanding of the thresholds.

- Generate an appreciation among the citizenry that closure of the economy (the "Orange Zone") is harmful to livelihoods, but can become the only recourse if the populace ignores safety protocols, thereby, leading to a 'high-transmission' as opposed to a low transmission scenario.

- Connected to the immediately preceding point, engender a clear understanding among the public of the importance of having a *Low-Transmission* scenario as discussed in *Part I.* It must be made abundantly clear that once achieved, this would be the optimal outcome in which the health system can comfortably cope with COVID 19 for the next 365 days (see *Table 9*).

ANNEX A: Updated Calculations from CDC Covid 19 Surge Tool

The following is the updated data regarding the available healthcare resources. This more recent data was inputted into the CDC's *Covid 19 Surge Capacity Tool*; therefore, the results below shall differ from those presented in the principal document above, as it reflects a more contemporary outlook. This is especially true as it pertains to the number of cases reported in the month of October 2020. Finally, the "Date of Analysis" is based on the intervention implemented on **October 16th, 2020**.

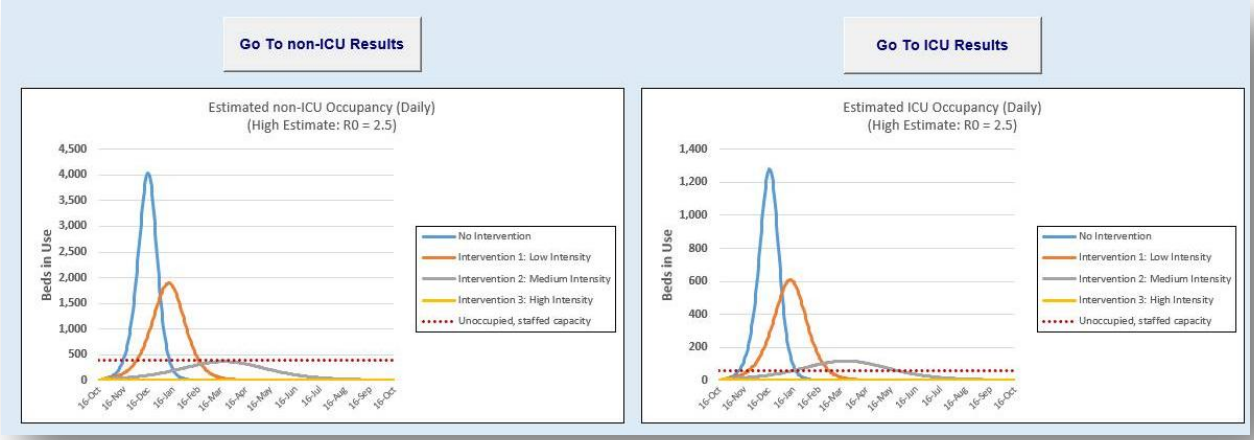
Table A1—Updated Healthcare Statistics

Districts	Total Non-ICU Beds	COVID 19 Beds	Ventilators
Northern Region	87	17	1
Western Region	79	10	2
Central	134	12	12
Southern	83	16	1
TOTAL	**383**	**55**	**16**
Epidemiological Rates			
General: No. of Positives requiring Hospitalization			20.0%
General: No. of Positives that would require Ventilators			5.0%
Belize: No. of Positives currently requiring hospitalized (9 of 475)			2.0%
Belize: No. of Positives currently require ventilators (2 of 475)			0.4%

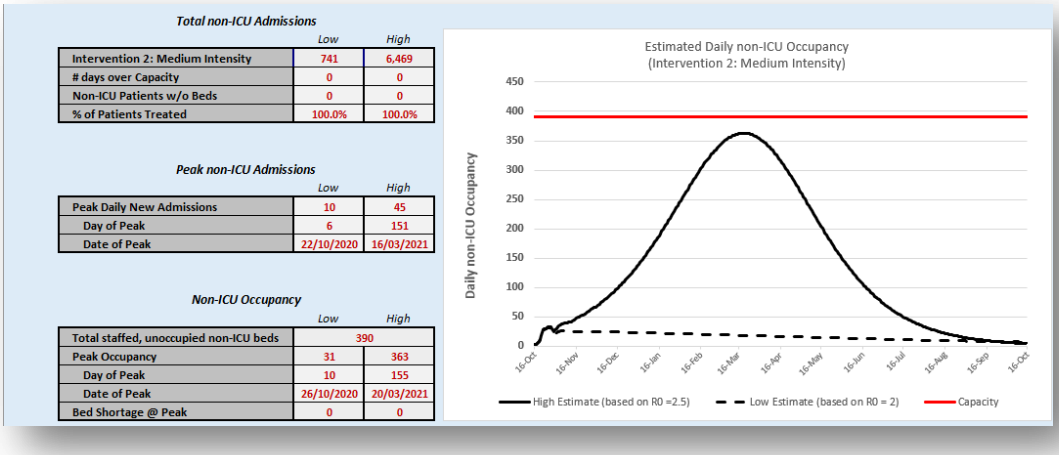
Source: Interview with DHS by NOC Representative

Non-ICU and ICU Beds Results

As was done in the principal document, there is little need to focus on any other intervention



intensity other than "Medium Intensity"[11] as that is the level of public health restrictions that Belize currently operates under, at least officially. In the images above, the transmission rate (R_0 = 2.5) indicates that, all things remaining constant, peak capacity for **Non-ICU beds** would be reached near mid March 2021.



Fortunately, given the total number of hospital beds, at no point is the capacity for Non-ICU beds surpassed under the "business as normal" scenario. However, it must be noted that if the peak points are strictly associated with mild cases of COVID 19, it cannot be ignored that other, non-COVID patients must also be able to access healthcare services.

[11] **Note:** Under *Medium Intensity* the R_0 is assumed to have been cut in half; therefore, should be closer to 1.25.

ICU Occupancy

While non-ICU occupancy falls below capacity, the same cannot be said for ICU admissions—which by definition are more serious COVID 19 cases. The model predicts that in mid March 2021 Belize's peak daily "New Admissions" would be as high as eleven (11) new serious cases of Covid 19 patients.

Total ICU Admissions

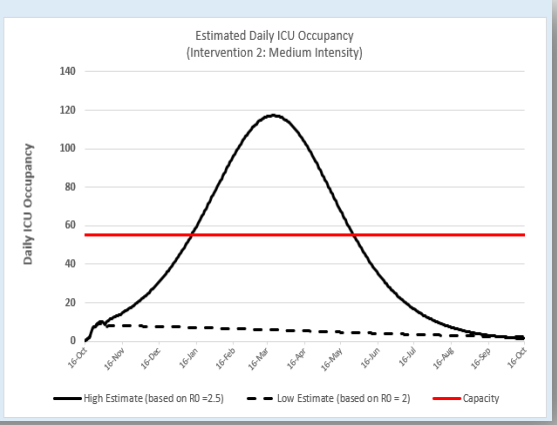
	Low	High
Intervention 2: Medium Intensity	185	1,617
# days over Capacity	0	134
ICU Patients w/o Beds	0	1,196
% of Patients Treated	100.0%	26.0%

Peak ICU Admissions

	Low	High
Peak Daily New Admissions	3	11
Day of Peak	6	151
Date of Peak	22/10/2020	16/03/2021

ICU Occupancy

	Low	High
Total staffed, unoccupied ICU beds	55	
Peak Occupancy	9	117
Day of Peak	13	156
Date of Peak	29/10/2020	21/03/2021
Bed Shortage @ Peak	0	62



Given the number of available ICU beds, the model estimates that—under the "high transmission" scenario of R_0 of 2.5—only 26% of total number of patients that require intensive care would be able to gain access to hospital resources due to shortages. Said differently, this implies that 74% of COVID positive patients that would require ICU care would not be able to due to limited supply.

Now, it must be noted that the model may very well be defined as being very "conservative", as by mid November 2020, it estimates less than twenty (20) ICU cases, before the exponential growth commences. It cannot be overlooked that in an ***October 30th 2020*** interview, Director of Health Services (DHS) Dr. Marvin Manzanero gave the following statement to the media[12]:

> "We have now 12 patients at Karl Heusner Covid Unit. … Twelve is the maximum number we have in that specific area. I think we need to stress that. So any other patients that require to come to Karl Heusner starts to now overflow into different segments of that same layout. … the northern regional hospital went yesterday morning [from] having one patient to now 8. They still **have a space of 3**. The San Ignacio Community Hospital has **2 patients**….and they have **2 beds available**. The Corozal Community Hospital has **2 patients** hospitalized and they **have 4 beds available**, and Western Health Region has **2 patients with 4 beds** available. …Our hospital capacity has not be overwhelmed as yet, but we are close to getting to full bed occupancy that is specific for COVID 19

Looking at the numbers quoted by the DHS, there were 26 patients at that time. Notably, the model **DOES NOT** predict ICU occupancy above 20 until late November or early December 2020. Consequently, the actual transmission rate may very well be higher than the one being employed in the model. Additionally, it must be noted that the number of patients mentioned do

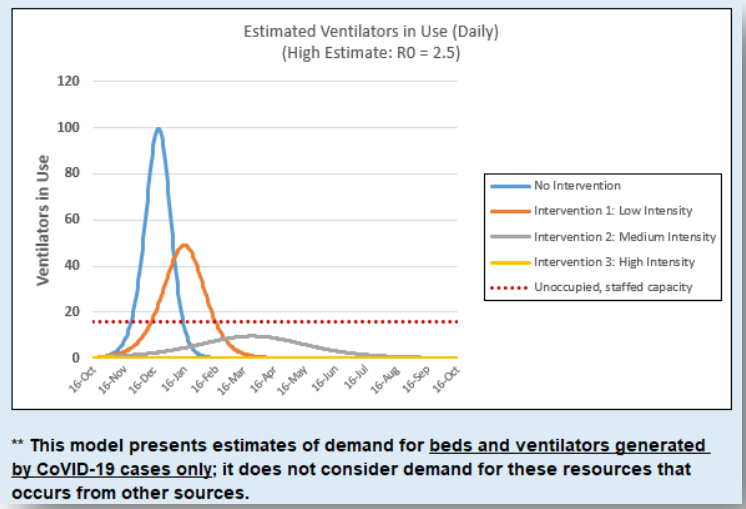
[12] Source: http://www.7newsbelize.com/sstory.php?nid=55273&frmsrch=1

not include the more than 60 deaths reported as of November 3rd, which could bring the number of "serious" cases to date to more than 85.

The reason for the discrepancy is likely associated with the fact that under the "Medium Intensity" public health measures, it is **assumed that citizens shall comply** and that the transmission rate would effectively fall to an R_0 *of 1.25*. However, under a scenario where the rules are disregarded, the measures would be less effective. **This, of course, raises a compliance and enforcement issue**, where the former is based on whether or not citizens can intrinsically appreciate the purpose for the restrictive measures and the latter involving the role of the government.

Ventilators

The immediately preceding discussion regarding the actual transmission rate is especially useful when looking at the matter of ventilators. The question to be asked is whether or not Belize is truly under the "Medium Intensity" Scenario that should produce an R_0 *of 1.25*, or due to the **compliance** it should be considered at being at the R_0 associated with *Low Intensity* public health measures (R_0 = 1.77).



In any event, the number of ventilators appears sufficient even at peak in mid March 2021 as long as the *de jure* "Medium Intensity" measures match the *de facto* reality. This, of course, is no longer the case if the *actual* scenario is closer to the "Low Intensity" interventions.

Annex B: Occupations' COVID-19 Risk Profiles

OCCUPATION	SCORES
Dental Hygienists	99.7
Respiratory Therapy Technicians	95
Sports Medicine Physicians	94.6
Dental Assistants	92.5
Radiation Therapists	92.4
Oral and Maxillofacial Surgeons	92.3
Dentists, General	92.1
Obstetricians and Gynecologists	91.8
Dermatologists	91.1
Orderlies (Patient Care Assistants)	90.2
Acute Care Nurses	90.1
Family and General Practitioners	90.1
Ophthalmologists	88.4
Urologists	88.3
Registered Nurses	86.1
Hospitalists	85.3
Pediatricians, General	85.1
Respiratory Therapists	84.2
Radiologic Technicians	84.1
Licensed Practical and Licensed Vocational Nurses	82.1
Critical Care Nurses	81.7
Orthodontists	81.3
Radiologic Technologists	81.2
Nurse Midwives	81.1
Surgical Technologists	80.7
Diagnostic Medical Sonographers	80.5
Allergists and Immunologists	80.3
Physical Therapist Aides	80.3
Physician Assistants	80
Acupuncturists	79.9
Internists, General (Internal Medicine)	79.9
Cardiovascular Technologists and Technicians	79.3
Physical Therapist Assistants	79.3
Physical Therapists	78.7
Occupational Therapy Aides	78
Occupational Therapists	77.8
Surgical Assistants	77.7
Prosthodontists	76.9
Surgeons	76.3

Flight Attendants	75.7
Anesthesiologists	75.4
Chiropractors	75.1
Occupational Therapy Assistants	75
Veterinary Assistants and Laboratory Animal Caretakers	75
Nuclear Medicine Technologists	74.8
Naturopathic Physicians	74.6
Neurodiagnostic Technologists	74.5
Nursing Assistants	72.5
Medical Assistants	72.2
Orthoptists	72.2
Midwives	71.9
Emergency Medical Technicians and Paramedics	70.8
Nurse Anesthetists	70.8
Athletic Trainers	70.6
Podiatrists	70.2
Veterinarians	70.1
Neurologists	70
Psychiatric Technicians	69.8
Barbers	69.1
Physical Medicine and Rehabilitation Physicians	69
Psychiatric Aides	69
Ophthalmic Medical Technologists	68.5
Phlebotomists	68.2
Skincare Specialists	68.1
Special Education Teachers, Preschool	67.4
Bus Drivers, School or Special Client	67.3
Anesthesiologist Assistants	67.2
Home Health Aides	66.4
Veterinary Technologists and Technicians	66
Endoscopy Technicians	65.8
Kindergarten Teachers, Except Special Education	65.8
Patient Representatives	65.1
Speech-Language Pathology Assistants	64.9
Personal Care Aides	64
Medical Equipment Preparers	63.9
Medical and Clinical Laboratory Technologists	63.7
Municipal Firefighters	63.3
First-Line Supervisors of Food Preparation and Serving Workers	62.9
Recreational Therapists	62.8
Hearing Aid Specialists	62.7

Pharmacy Technicians	62.5
Ophthalmic Medical Technicians	62.3
Hairdressers, Hairstylists, and Cosmetologists	62.2
Clinical Nurse Specialists	62
Transportation Security Screeners	61.4
Dancers	61
First-Line Supervisors of Correctional Officers	61
Nurse Practitioners	60.9
Optometrists	60.9
Immigration and Customs Inspectors	60.8
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	60.7
Exercise Physiologists	60.7
Correctional Officers and Jailers	60.4
Social and Human Service Assistants	60.3
Sheriffs and Deputy Sheriffs	59
Pharmacy Aides	58.8
Municipal Fire Fighting and Prevention Supervisors	58.3
Healthcare Social Workers	58.2
Childcare Workers	58
Special Education Teachers, Kindergarten and Elementary School	57.2
Pharmacists	56.9
Orthotists and Prosthetists	56.7
Shampooers	56.6
Music Therapists	56.1
Amusement and Recreation Attendants	56
Slot Supervisors	55.9
Teacher Assistants	55.8
Education Administrators, Preschool and Childcare Center/Program	55.7
Magnetic Resonance Imaging Technologists	55.6
Special Education Teachers, Middle School	55.6
Adapted Physical Education Specialists	55.2
Preschool Teachers, Except Special Education	55.2
Gaming Dealers	55
Advanced Practice Psychiatric Nurses	54.2
Elementary School Teachers, Except Special Education	53.8
Fire Investigators	53.8
Singers	52.9
Massage Therapists	52.8
Speech-Language Pathologists	52.7
Choreographers	52.4

Medical Secretaries	52.2
First-Line Supervisors of Police and Detectives	51.9
Police Patrol Officers	51.9
Transportation Attendants, Except Flight Attendants	51.8
Transit and Railroad Police	51.6
Morticians, Undertakers, and Funeral Directors	51.3
Pipelayers	51.3
Ushers, Lobby Attendants, and Ticket Takers	51.2
Radiologists	51.1
Tellers	50.9
Bailiffs	50.7
Opticians, Dispensing	50.6
Septic Tank Servicers and Sewer Pipe Cleaners	50.5
Actors	50.4
Dietetic Technicians	50.3
Gaming Surveillance Officers and Gaming Investigators	50.3
First-Line Supervisors of Personal Service Workers	50.2
Animal Control Workers	50.1
Audiologists	50
Manicurists and Pedicurists	49.5
Medical and Clinical Laboratory Technicians	49.3
Embalmers	49
Spa Managers	48.7
Nuclear Medicine Physicians	48.6
Substance Abuse and Behavioral Disorder Counselors	48.6
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	48.4
Recreation Workers	48
Bus Drivers, Transit and Intercity	47.9
Police Detectives	47.9
Coroners	47.8
Makeup Artists, Theatrical and Performance	47.8
Police Identification and Records Officers	47.7
Food Servers, Nonrestaurant	47.6
Gaming Supervisors	47.2
Stock Clerks, Sales Floor	47.2
Airline Pilots, Copilots, and Flight Engineers	46.9
Interpreters and Translators	46.8
Subway and Streetcar Operators	46.7
Middle School Teachers, Except Special and Career/Technical Education	46.6
Funeral Attendants	46.4
Licensing Examiners and Inspectors	45.9

Nonfarm Animal Caretakers	45.9
Aircraft Cargo Handling Supervisors	45.7
Dining Room and Cafeteria Attendants and Bartender Helpers	45.6
Forest Firefighters	45.6
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	45.3
Postal Service Clerks	45
Criminal Investigators and Special Agents	44.8
Gaming and Sports Book Writers and Runners	44.3
Cooks, Institution and Cafeteria	44
Gaming Cage Workers	43.9
Dietitians and Nutritionists	43.7
Waiters and Waitresses	43.6
License Clerks	43.3
Bartenders	43.1
Special Education Teachers, Secondary School	43.1
Structural Iron and Steel Workers	42.9
Art, Drama, and Music Teachers, Postsecondary	42.8
Food Preparation Workers	42.8
Low Vision Therapists, Orientation and Mobility Specialists, and Vision Rehabilitation Therapists	42.7
First-Line Supervisors of Housekeeping and Janitorial Workers	42.6
Receptionists and Information Clerks	42.6
Meeting, Convention, and Event Planners	42.4
Statement Clerks	42.2
Locker Room, Coatroom, and Dressing Room Attendants	41.9
Reservation and Transportation Ticket Agents and Travel Clerks	41.8
Cashiers	41.7
Gaming Change Persons and Booth Cashiers	41.7
Child, Family, and School Social Workers	41.6
Probation Officers and Correctional Treatment Specialists	41.6
Gaming Managers	41.2
Switchboard Operators, Including Answering Service	41.2
Adhesive Bonding Machine Operators and Tenders	41.1
Couriers and Messengers	41.1
Credit Checkers	41
Tutors	41
Air Traffic Controllers	40.9
Educational, Guidance, School, and Vocational Counselors	40.9
Nursing Instructors and Teachers, Postsecondary	40.7
Office Clerks, General	40.6

Maids and Housekeeping Cleaners	40.5
Rail-Track Laying and Maintenance Equipment Operators	40.2
Food Service Managers	40.1
Baristas	40
Telecommunications Line Installers and Repairers	40
Interviewers, Except Eligibility and Loan	39.9
Community Health Workers	39.7
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	39.6
Clinical Research Coordinators	39.5
Quality Control Systems Managers	39.4
Roustabouts, Oil and Gas	39.4
Commercial Pilots	39.2
Derrick Operators, Oil and Gas	39.2
Career/Technical Education Teachers, Secondary School	39.1
Radio Operators	38.9
Retail Salespersons	38.7
Ship and Boat Captains	38.6
Career/Technical Education Teachers, Middle School	38.5
Histotechnologists and Histologic Technicians	38.3
New Accounts Clerks	38.3
Tailors, Dressmakers, and Custom Sewers	38.3
Crossing Guards	38.2
Procurement Clerks	38.2
Driver/Sales Workers	38.1
Costume Attendants	38
Fire Inspectors	38
Loan Interviewers and Clerks	37.7
Health Specialties Teachers, Postsecondary	37.6
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	37.5
Elevator Installers and Repairers	37.4
Administrative Law Judges, Adjudicators, and Hearing Officers	37.3
Cooks, Restaurant	37.3
Fitness Trainers and Aerobics Instructors	37.3
Secondary School Teachers, Except Special and Career/Technical Education	37.3
Telemarketers	37.3
Brokerage Clerks	37.2
Rough Carpenters	37.2
Tire Repairers and Changers	37.2
Dispatchers, Except Police, Fire, and Ambulance	37.1

Chefs and Head Cooks	37
Stationary Engineers and Boiler Operators	37
Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation	37
Pile-Driver Operators	36.9
Real Estate Sales Agents	36.9
Combined Food Preparation and Serving Workers, Including Fast Food	36.8
Counter and Rental Clerks	36.8
Parking Lot Attendants	36.8
Mental Health Counselors	36.6
Manufactured Building and Mobile Home Installers	36.5
Radio, Cellular, and Tower Equipment Installers and Repairers	36.5
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	36.5
Construction Laborers	36.3
Postmasters and Mail Superintendents	36.3
Meat, Poultry, and Fish Cutters and Trimmers	36.2
Microbiologists	36.2
Broadcast News Analysts	36.1
Control and Valve Installers and Repairers, Except Mechanical Door	36.1
Coaches and Scouts	35.8
Library Assistants, Clerical	35.8
Musicians, Instrumental	35.8
Roof Bolters, Mining	35.8
Cooks, Short Order	35.4
Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	35.4
Concierges	35.3
First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	35.3
Fish and Game Wardens	35.2
Taxi Drivers and Chauffeurs	35.2
Forest Fire Fighting and Prevention Supervisors	35.1
General and Operations Managers	35.1
Helpers--Extraction Workers	35.1
Railroad Brake, Signal, and Switch Operators	34.8
Recreation and Fitness Studies Teachers, Postsecondary	34.8
Maintenance and Repair Workers, General	34.7
Cement Masons and Concrete Finishers	34.6
Wholesale and Retail Buyers, Except Farm Products	34.6
Agents and Business Managers of Artists, Performers, and Athletes	34.5

Marriage and Family Therapists	34.5
Self-Enrichment Education Teachers	34.4
Cytogenetic Technologists	34.3
Funeral Service Managers	34.3
Telecommunications Equipment Installers and Repairers, Except Line Installers	34.3
Civil Engineering Technicians	34.2
Copy Writers	34.2
Health Educators	34.2
Highway Maintenance Workers	34.1
Insurance Appraisers, Auto Damage	34
Eligibility Interviewers, Government Programs	33.9
Packers and Packagers, Hand	33.9
Service Unit Operators, Oil, Gas, and Mining	33.9
Helpers--Carpenters	33.8
Light Truck or Delivery Services Drivers	33.8
Hotel, Motel, and Resort Desk Clerks	33.7
Retail Loss Prevention Specialists	33.7
Ship Engineers	33.6
Art Therapists	33.5
Demonstrators and Product Promoters	33.5
First-Line Supervisors of Animal Husbandry and Animal Care Workers	33.5
Human Resources Assistants, Except Payroll and Timekeeping	33.5
Laundry and Dry-Cleaning Workers	33.5
Chief Executives	33.4
Directors- Stage, Motion Pictures, Television, and Radio	33.2
Instructional Coordinators	33.2
Librarians	33.2
Motorboat Operators	33.2
Parts Salespersons	33.1
Rehabilitation Counselors	33.1
Boilermakers	33
Bill and Account Collectors	32.9
Computer Science Teachers, Postsecondary	32.9
Fiberglass Laminators and Fabricators	32.9
Sailors and Marine Oilers	32.9
Securities and Commodities Traders	32.8
Transportation Managers	32.7
Electricians	32.6
Forest and Conservation Workers	32.5
Home Appliance Repairers	32.5

Tank Car, Truck, and Ship Loaders	32.5
Sales Agents, Financial Services	32.4
Farm Labor Contractors	32.3
Refuse and Recyclable Material Collectors	32.3
Vocational Education Teachers, Postsecondary	32.3
Commercial Divers	32.2
Fishers and Related Fishing Workers	32.1
Loss Prevention Managers	32
Police, Fire, and Ambulance Dispatchers	32
Producers	32
Gem and Diamond Workers	31.9
Nannies	31.9
Tax Examiners and Collectors, and Revenue Agents	31.9
Construction Carpenters	31.8
First-Line Supervisors of Mechanics, Installers, and Repairers	31.8
Food Cooking Machine Operators and Tenders	31.7
Government Property Inspectors and Investigators	31.7
Refractory Materials Repairers, Except Brickmasons	31.7
Mental Health and Substance Abuse Social Workers	31.6
Mechanical Engineering Technologists	31.4
Education Administrators, Elementary and Secondary School	31.3
Program Directors	31.3
Signal and Track Switch Repairers	31.3
Adult Basic and Secondary Education and Literacy Teachers and Instructors	31.2
Bakers	31.2
Fashion Designers	31.2
Plumbers	31.2
Real Estate Brokers	31.2
Technical Directors/Managers	31.2
Wind Turbine Service Technicians	31.2
Computer User Support Specialists	31.1
Dental Laboratory Technicians	31.1
Forensic Science Technicians	31.1
Helpers--Painters, Paperhangers, Plasterers, and Stucco Masons	31.1
Mechanical Engineers	31.1
Baggage Porters and Bellhops	31
Preventive Medicine Physicians	31
Billing, Cost, and Rate Clerks	30.9
Psychiatrists	30.9
Directors, Religious Activities and Education	30.8

First-Line Supervisors of Production and Operating Workers	30.8
Floral Designers	30.8
Solar Energy Installation Managers	30.8
Tour Guides and Escorts	30.8
Order Clerks	30.7
Court Clerks	30.6
Customer Service Representatives	30.6
First-Line Supervisors of Construction Trades and Extraction Workers	30.6
Marking Clerks	30.6
Mine Cutting and Channeling Machine Operators	30.6
Clergy	30.5
Farmworkers, Farm, Ranch, and Aquacultural Animals	30.4
Sales Managers	30.4
Cargo and Freight Agents	30.3
Models	30.3
Agricultural Inspectors	30.2
Music Directors	30.2
Credit Authorizers	30.1
Lodging Managers	30.1
Pilots, Ship	30.1
Sheet Metal Workers	30
First-Line Supervisors of Retail Sales Workers	29.8
Judges, Magistrate Judges, and Magistrates	29.8
Mail Clerks and Mail Machine Operators, Except Postal Service	29.8
Nuclear Power Reactor Operators	29.8
Buyers and Purchasing Agents, Farm Products	29.7
Refrigeration Mechanics and Installers	29.7
Stonemasons	29.7
Airfield Operations Specialists	29.6
Computer Network Support Specialists	29.6
Photographic Process Workers and Processing Machine Operators	29.5
Clinical Psychologists	29.4
Emergency Management Directors	29.4
First-Line Supervisors of Non-Retail Sales Workers	29.4
Mechanical Engineering Technicians	29.4
Model Makers, Metal and Plastic	29.4
Dishwashers	29.3
Medical Appliance Technicians	29.2
Millwrights	29.2
Floor Layers, Except Carpet, Wood, and Hard Tiles	29.1

Social and Community Service Managers	29
Camera Operators, Television, Video, and Motion Picture	28.9
Freight Forwarders	28.9
Public Relations and Fundraising Managers	28.9
Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	28.8
Neuropsychologists and Clinical Neuropsychologists	28.8
Electric Motor, Power Tool, and Related Repairers	28.7
Merchandise Displayers and Window Trimmers	28.7
Molding and Casting Workers	28.7
Locksmiths and Safe Repairers	28.6
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	28.5
Rotary Drill Operators, Oil and Gas	28.5
Pump Operators, Except Wellhead Pumpers	28.4
Computer Operators	28.3
Wind Energy Operations Managers	28.3
Word Processors and Typists	28.2
Fitness and Wellness Coordinators	28.1
Freight and Cargo Inspectors	28
Helpers--Electricians	28
Petroleum Pump System Operators, Refinery Operators, and Gaugers	28
Food Batchmakers	27.9
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	27.9
Executive Secretaries and Executive Administrative Assistants	27.8
Loan Counselors	27.8
Loan Officers	27.8
Roofers	27.8
Animal Trainers	27.6
Radio and Television Announcers	27.6
Residential Advisors	27.6
Biological Science Teachers, Postsecondary	27.5
Forest Fire Inspectors and Prevention Specialists	27.5
Locomotive Engineers	27.5
Model Makers, Wood	27.5
Advertising Sales Agents	27.4
Credit Counselors	27.3
Engine and Other Machine Assemblers	27.3
Quality Control Analysts	27.3
Riggers	27.3
Automotive and Watercraft Service Attendants	27.2

Talent Directors	27.2
Recycling Coordinators	27.1
Chemical Equipment Operators and Tenders	26.9
Cytotechnologists	26.9
Data Entry Keyers	26.9
Inspectors, Testers, Sorters, Samplers, and Weighers	26.9
Crane and Tower Operators	26.8
Human Resources Specialists	26.8
Nuclear Equipment Operation Technicians	26.8
Labor Relations Specialists	26.7
Industrial Production Managers	26.6
Municipal Clerks	26.6
Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	26.5
Pipe Fitters and Steamfitters	26.5
Radio Mechanics	26.5
Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	26.5
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	26.5
Home Economics Teachers, Postsecondary	26.4
Order Fillers, Wholesale and Retail Sales	26.4
Railroad Conductors and Yardmasters	26.4
Solar Sales Representatives and Assessors	26.4
Counseling Psychologists	26.3
Gas Compressor and Gas Pumping Station Operators	26.3
First-Line Supervisors of Office and Administrative Support Workers	26.2
Glaziers	26.2
Heating and Air Conditioning Mechanics and Installers	26.2
Security and Fire Alarm Systems Installers	26.2
Electrical and Electronics Installers and Repairers, Transportation Equipment	26.1
Paralegals and Legal Assistants	26.1
Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	26
Biological Technicians	26
Continuous Mining Machine Operators	26
Range Managers	26
Training and Development Managers	26
Insulation Workers, Mechanical	25.9
Medical and Health Services Managers	25.9
Correspondence Clerks	25.8
Distance Learning Coordinators	25.8

Rail Yard Engineers, Dinkey Operators, and Hostlers	25.8
Reporters and Correspondents	25.8
Compliance Managers	25.7
Ophthalmic Laboratory Technicians	25.7
Production, Planning, and Expediting Clerks	25.7
Industrial Machinery Mechanics	25.6
Insurance Adjusters, Examiners, and Investigators	25.6
Paper Goods Machine Setters, Operators, and Tenders	25.6
Laborers and Freight, Stock, and Material Movers, Hand	25.5
Slaughterers and Meat Packers	25.5
Foundry Mold and Coremakers	25.4
Marine Architects	25.4
Accountants	25.2
Audio and Video Equipment Technicians	25.2
Butchers and Meat Cutters	25.2
Meter Readers, Utilities	25.2
Outdoor Power Equipment and Other Small Engine Mechanics	25.2
Environmental Engineering Technicians	25.1
Medical Scientists, Except Epidemiologists	25.1
Biofuels Processing Technicians	25
Claims Examiners, Property and Casualty Insurance	25
Customs Brokers	25
Security Managers	25
Nursery and Greenhouse Managers	24.9
Biofuels Production Managers	24.8
Medical Transcriptionists	24.8
Park Naturalists	24.8
Segmental Pavers	24.8
Shoe and Leather Workers and Repairers	24.8
Chemical Plant and System Operators	24.7
Excavating and Loading Machine and Dragline Operators	24.7
Mates- Ship, Boat, and Barge	24.7
Sales Agents, Securities and Commodities	24.7
Biomass Plant Technicians	24.6
Network and Computer Systems Administrators	24.6
Insurance Sales Agents	24.5
Power Distributors and Dispatchers	24.5
Tree Trimmers and Pruners	24.5
Athletes and Sports Competitors	24.3
Door-To-Door Sales Workers, News and Street Vendors, and Related Workers	24.3

Proofreaders and Copy Markers	24.3
Umpires, Referees, and Other Sports Officials	24.2
Mechatronics Engineers	24.1
Construction Managers	24
Fence Erectors	24
Maintenance Workers, Machinery	24
Financial Managers, Branch or Department	23.9
Industrial Engineering Technicians	23.9
Patternmakers, Metal and Plastic	23.9
Security Guards	23.9
Weatherization Installers and Technicians	23.9
Advertising and Promotions Managers	23.8
Biomass Power Plant Managers	23.8
Criminal Justice and Law Enforcement Teachers, Postsecondary	23.8
Film and Video Editors	23.8
Marketing Managers	23.8
Mechanical Door Repairers	23.8
Travel Agents	23.8
File Clerks	23.7
Logisticians	23.7
Biologists	23.6
First-Line Supervisors of Aquacultural Workers	23.6
Pathologists	23.6
Bicycle Repairers	23.5
Hydroelectric Plant Technicians	23.5
Timing Device Assemblers and Adjusters	23.5
Anthropology and Archeology Teachers, Postsecondary	23.4
Computer Programmers	23.4
Electro-Mechanical Technicians	23.4
Graders and Sorters, Agricultural Products	23.4
Recycling and Reclamation Workers	23.4
Forging Machine Setters, Operators, and Tenders, Metal and Plastic	23.2
Genetic Counselors	23.2
Pest Control Workers	23.2
Sociology Teachers, Postsecondary	23.2
Property, Real Estate, and Community Association Managers	23.1
Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders	23.1
Lawyers	23
Painters, Construction and Maintenance	23

Area, Ethnic, and Cultural Studies Teachers, Postsecondary	22.9
Art Directors	22.9
Brickmasons and Blockmasons	22.9
Chemical Technicians	22.9
Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	22.9
Training and Development Specialists	22.8
Agricultural Technicians	22.7
Energy Auditors	22.7
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	22.7
Occupational Health and Safety Specialists	22.7
Sawing Machine Setters, Operators, and Tenders, Wood	22.7
Architecture Teachers, Postsecondary	22.6
Office Machine Operators, Except Computer	22.6
Power Plant Operators	22.6
Public Address System and Other Announcers	22.6
Audio-Visual and Multimedia Collections Specialists	22.5
Insurance Claims Clerks	22.5
Team Assemblers	22.5
Water and Wastewater Treatment Plant and System Operators	22.4
Auditors	22.3
Photographers	22.3
Sales Engineers	22.3
Communications Teachers, Postsecondary	22.2
Compensation, Benefits, and Job Analysis Specialists	22.2
Public Relations Specialists	22.2
Purchasing Managers	22.2
Risk Management Specialists	22.2
Bookkeeping, Accounting, and Auditing Clerks	22.1
Energy Brokers	22.1
Fabric and Apparel Patternmakers	22.1
First-Line Supervisors of Logging Workers	22.1
Food Science Technicians	22.1
Postal Service Mail Sorters, Processors, and Processing Machine Operators	22
Law Teachers, Postsecondary	21.9
Recreational Vehicle Service Technicians	21.9
Payroll and Timekeeping Clerks	21.8
Automotive Glass Installers and Repairers	21.7
Avionics Technicians	21.7
Graduate Teaching Assistants	21.7

Locomotive Firers	21.7
Electrical and Electronics Repairers, Commercial and Industrial Equipment	21.6
Education Administrators, Postsecondary	21.5
Equal Opportunity Representatives and Officers	21.5
Operating Engineers and Other Construction Equipment Operators	21.5
Helpers--Installation, Maintenance, and Repair Workers	21.4
Landscaping and Groundskeeping Workers	21.4
Motorboat Mechanics and Service Technicians	21.4
Online Merchants	21.4
Textile Bleaching and Dyeing Machine Operators and Tenders	21.4
Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers	21.3
Hunters and Trappers	21.2
Helpers--Roofers	21.1
Industrial Truck and Tractor Operators	21.1
Insurance Underwriters	21.1
Logistics Managers	21.1
Rail Car Repairers	21
Chemists	20.9
Mobile Heavy Equipment Mechanics, Except Engines	20.9
Nuclear Monitoring Technicians	20.9
Cleaners of Vehicles and Equipment	20.8
Computer and Information Research Scientists	20.8
English Language and Literature Teachers, Postsecondary	20.8
Explosives Workers, Ordnance Handling Experts, and Blasters	20.8
Human Resources Managers	20.8
Petroleum Engineers	20.8
Automotive Specialty Technicians	20.7
Video Game Designers	20.7
Compensation and Benefits Managers	20.6
Forest and Conservation Technicians	20.6
Radio Frequency Identification Device Specialists	20.6
Supply Chain Managers	20.6
Administrative Services Managers	20.5
Chief Sustainability Officers	20.5
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	20.5
Private Detectives and Investigators	20.5
Electronic Home Entertainment Equipment Installers and Repairers	20.4
Industrial Engineers	20.4

Packaging and Filling Machine Operators and Tenders	20.4
Telecommunications Engineering Specialists	20.4
Aerospace Engineers	20.3
Assessors	20.3
Budget Analysts	20.3
Computer and Information Systems Managers	20.3
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	20.3
Legal Secretaries	20.2
Personal Financial Advisors	20.2
Paving, Surfacing, and Tamping Equipment Operators	20.1
Bioinformatics Technicians	20
Commercial and Industrial Designers	20
Credit Analysts	20
Electromechanical Engineering Technologists	20
Industrial Safety and Health Engineers	20
Mathematical Science Teachers, Postsecondary	20
Occupational Health and Safety Technicians	20
Reinforcing Iron and Rebar Workers	20
Tax Preparers	20
Travel Guides	20
Validation Engineers	20
Editors	19.9
Library Technicians	19.9
Mixing and Blending Machine Setters, Operators, and Tenders	19.9
Computer Systems Analysts	19.8
Informatics Nurse Specialists	19.8
Cabinetmakers and Bench Carpenters	19.7
Cost Estimators	19.7
Education Teachers, Postsecondary	19.6
Farm and Home Management Advisors	19.6
Geothermal Technicians	19.6
Solar Thermal Installers and Technicians	19.6
Medical Equipment Repairers	19.4
Multimedia Artists and Animators	19.4
Physics Teachers, Postsecondary	19.4
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	19.4
Shipping, Receiving, and Traffic Clerks	19.4
Sound Engineering Technicians	19.4
Aircraft Mechanics and Service Technicians	19.3
Electromechanical Equipment Assemblers	19.3

Financial Analysts	19.3
Food Scientists and Technologists	19.2
Anthropologists	19.1
Hydroelectric Production Managers	19
Information Technology Project Managers	19
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	18.9
Cutters and Trimmers, Hand	18.9
Geophysical Data Technicians	18.9
Industrial-Organizational Psychologists	18.9
Library Science Teachers, Postsecondary	18.9
Treasurers and Controllers	18.9
Cartographers and Photogrammetrists	18.8
Court Reporters	18.8
Electrical Power-Line Installers and Repairers	18.8
Environmental Scientists and Specialists, Including Health	18.8
Fundraisers	18.8
Logging Equipment Operators	18.8
Set and Exhibit Designers	18.8
Engineering Teachers, Postsecondary	18.7
Mine Shuttle Car Operators	18.7
Fabric Menders, Except Garment	18.6
Agricultural Equipment Operators	18.5
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	18.5
Architects, Except Landscape and Naval	18.5
Insurance Policy Processing Clerks	18.4
Musical Instrument Repairers and Tuners	18.4
Grinding and Polishing Workers, Hand	18.3
Hazardous Materials Removal Workers	18.3
Log Graders and Scalers	18.3
Chemistry Teachers, Postsecondary	18.2
Cooks, Fast Food	18.2
Geothermal Production Managers	18.2
Logistics Engineers	18.2
Aviation Inspectors	18.1
Cooling and Freezing Equipment Operators and Tenders	18.1
Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	18.1
Medical Records and Health Information Technicians	18.1
Storage and Distribution Managers	18.1
Earth Drillers, Except Oil and Gas	18
Electronic Equipment Installers and Repairers, Motor Vehicles	18

Hoist and Winch Operators	18
Arbitrators, Mediators, and Conciliators	17.9
Environmental Science Teachers, Postsecondary	17.9
Landscape Architects	17.9
Aerospace Engineering and Operations Technicians	17.8
Bus and Truck Mechanics and Diesel Engine Specialists	17.8
Layout Workers, Metal and Plastic	17.8
Plasterers and Stucco Masons	17.8
Carpet Installers	17.7
Printing Press Operators	17.7
Soil and Water Conservationists	17.5
Curators	17.4
Water/Wastewater Engineers	17.3
Broadcast Technicians	17.1
Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	17.1
Investment Fund Managers	17.1
Painting, Coating, and Decorating Workers	17.1
Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	17
Electronics Engineering Technicians	17
Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	17
Motorcycle Mechanics	17
Urban and Regional Planners	17
Automotive Master Mechanics	16.9
Aquacultural Managers	16.7
City and Regional Planning Aides	16.7
Clinical Data Managers	16.7
Logistics Analysts	16.7
Manufacturing Engineers	16.7
Metal-Refining Furnace Operators and Tenders	16.6
Psychology Teachers, Postsecondary	16.5
Furniture Finishers	16.4
Structural Metal Fabricators and Fitters	16.4
Archeologists	16.3
Parking Enforcement Workers	16.2
Animal Scientists	16.1
Automotive Engineering Technicians	16.1
Cutting and Slicing Machine Setters, Operators, and Tenders	16.1
Electrical Drafters	16.1
Historians	16.1
Industrial Engineering Technologists	16.1

Postal Service Mail Carriers	16.1
Regulatory Affairs Managers	16.1
Coin, Vending, and Amusement Machine Servicers and Repairers	16
Electrical Engineering Technologists	16
Precision Agriculture Technicians	16
Upholsterers	16
Woodworking Machine Setters, Operators, and Tenders, Except Sawing	16
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	15.9
Geography Teachers, Postsecondary	15.9
Interior Designers	15.9
Photonics Engineers	15.9
Purchasing Agents, Except Wholesale, Retail, and Farm Products	15.9
Electrical Engineers	15.8
Technical Writers	15.8
Heavy and Tractor-Trailer Truck Drivers	15.7
Helpers--Production Workers	15.7
Computer-Controlled Machine Tool Operators, Metal and Plastic	15.6
Geneticists	15.6
Information Security Analysts	15.6
Insulation Workers, Floor, Ceiling, and Wall	15.6
Intelligence Analysts	15.6
Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	15.6
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	15.5
Sewing Machine Operators	15.5
Welders, Cutters, and Welder Fitters	15.5
Pressers, Textile, Garment, and Related Materials	15.4
Construction and Building Inspectors	15.3
Electronics Engineers, Except Computer	15.3
Machinists	15.3
Transportation Planners	15.3
Automotive Body and Related Repairers	15.2
Business Continuity Planners	15.2
Energy Engineers	15.2
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	15.2
Robotics Technicians	15.2
Statistical Assistants	15.2
Transportation Engineers	15.2

Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	15.1
Machine Feeders and Offbearers	15.1
Terrazzo Workers and Finishers	15.1
Economics Teachers, Postsecondary	15
Non-Destructive Testing Specialists	15
Regulatory Affairs Specialists	15
Software Developers, Systems Software	15
Bridge and Lock Tenders	14.9
Forestry and Conservation Science Teachers, Postsecondary	14.9
Social Work Teachers, Postsecondary	14.9
Tile and Marble Setters	14.9
Environmental Engineers	14.8
Farm Equipment Mechanics and Service Technicians	14.8
School Psychologists	14.8
Software Quality Assurance Engineers and Testers	14.8
Biochemical Engineers	14.7
Biofuels/Biodiesel Technology and Product Development Managers	14.7
Brownfield Redevelopment Specialists and Site Managers	14.7
Document Management Specialists	14.7
Physicists	14.7
Software Developers, Applications	14.7
Drywall and Ceiling Tile Installers	14.6
History Teachers, Postsecondary	14.6
Product Safety Engineers	14.6
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	14.6
Traffic Technicians	14.6
Wellhead Pumpers	14.6
Biomedical Engineers	14.5
Database Administrators	14.5
Market Research Analysts and Marketing Specialists	14.5
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	14.4
Patternmakers, Wood	14.4
Dredge Operators	14.3
Solar Photovoltaic Installers	14.3
Museum Technicians and Conservators	14.2
Security Management Specialists	14.2
Animal Breeders	14.1
Management Analysts	14.1
Solar Energy Systems Engineers	14.1

Zoologists and Wildlife Biologists	14
Foreign Language and Literature Teachers, Postsecondary	13.9
Print Binding and Finishing Workers	13.9
Computer, Automated Teller, and Office Machine Repairers	13.7
Natural Sciences Managers	13.7
Philosophy and Religion Teachers, Postsecondary	13.7
Chemical Engineers	13.6
Conveyor Operators and Tenders	13.5
Electrical Engineering Technicians	13.5
Electronics Engineering Technologists	13.5
Semiconductor Processors	13.5
Bioinformatics Scientists	13.4
Agricultural Sciences Teachers, Postsecondary	13.3
Civil Engineers	13.3
Epidemiologists	13.3
Etchers and Engravers	13.3
Remote Sensing Technicians	13.3
Tool Grinders, Filers, and Sharpeners	13.3
Climate Change Analysts	13.1
Fire-Prevention and Protection Engineers	13.1
Gas Plant Operators	13.1
Sustainability Specialists	13.1
Automotive Engineers	13
Geographers	13
Manufacturing Production Technicians	13
Mining and Geological Engineers, Including Mining Safety Engineers	13
Nanotechnology Engineering Technicians	12.9
Pourers and Casters, Metal	12.9
Tire Builders	12.9
Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	12.8
Graphic Designers	12.8
Civil Drafters	12.7
Environmental Restoration Planners	12.7
Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders	12.6
Glass Blowers, Molders, Benders, and Finishers	12.6
Business Intelligence Analysts	12.5
Database Architects	12.5
Fraud Examiners, Investigators and Analysts	12.5
Human Factors Engineers and Ergonomists	12.5
Survey Researchers	12.5

Web Developers	12.5
Title Examiners, Abstractors, and Searchers	12.4
Electronic Drafters	12.2
Loading Machine Operators, Underground Mining	12.2
Prepress Technicians and Workers	12.2
Robotics Engineers	12.2
Motion Picture Projectionists	12.1
Nanotechnology Engineering Technologists	12.1
Stock Clerks- Stockroom, Warehouse, or Storage Yard	12.1
Financial Examiners	12
Architectural and Engineering Managers	11.9
Solderers and Brazers	11.9
Surveyors	11.8
Textile Knitting and Weaving Machine Setters, Operators, and Tenders	11.6
Wind Energy Project Managers	11.6
Desktop Publishers	11.3
Coil Winders, Tapers, and Finishers	11.2
Pesticide Handlers, Sprayers, and Applicators, Vegetation	11.2
Cooks, Private Household	11.1
Farm and Ranch Managers	11.1
Materials Engineers	11.1
Paperhangers	11.1
Political Science Teachers, Postsecondary	11.1
Architectural Drafters	11
Rock Splitters, Quarry	11
Geographic Information Systems Technicians	10.9
Stone Cutters and Carvers, Manufacturing	10.9
Social Science Research Assistants	10.7
Business Teachers, Postsecondary	10.6
Camera and Photographic Equipment Repairers	10.6
Environmental Science and Protection Technicians, Including Health	10.6
First-Line Supervisors of Agricultural Crop and Horticultural Workers	10.6
Nursery Workers	10.5
Agricultural Engineers	10.3
Computer Systems Engineers/Architects	10.3
Water Resource Specialists	10.3
Mechanical Drafters	10.2
Instructional Designers and Technologists	10.1
Wind Energy Engineers	10.1
Appraisers, Real Estate	10

Geodetic Surveyors	10
Web Administrators	10
Farmworkers and Laborers, Crop	9.9
Nuclear Engineers	9.9
Fuel Cell Engineers	9.7
Nanosystems Engineers	9.7
Surveying Technicians	9.7
Watch Repairers	9.7
Fine Artists, Including Painters, Sculptors, and Illustrators	9.6
Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	9.3
Shoe Machine Operators and Tenders	9.3
Manufacturing Engineering Technologists	9.1
Foresters	9
Political Scientists	8.9
Floor Sanders and Finishers	8.8
Mapping Technicians	8.7
Search Marketing Strategists	8.7
Archivists	8.6
Precious Metal Workers	8.4
Materials Scientists	8.3
Judicial Law Clerks	8.2
Biostatisticians	8
Craft Artists	8
Potters, Manufacturing	8
Environmental Compliance Inspectors	7.9
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	7.7
Textile Cutting Machine Setters, Operators, and Tenders	7.6
Sewers, Hand	7.5
Electrical and Electronic Equipment Assemblers	7.4
Painters, Transportation Equipment	7.3
Geospatial Information Scientists and Technologists	7.2
Hydrologists	7.2
Marine Engineers	7.2
Tool and Die Makers	7.2
Industrial Ecologists	6.9
Jewelers	6.9
Statisticians	6.7
Biochemists and Biophysicists	6.1
Computer Hardware Engineers	6.1
Microsystems Engineers	6.1

Music Composers and Arrangers	6.1
Sociologists	6.1
Environmental Economists	6
Remote Sensing Scientists and Technologists	6
Molecular and Cellular Biologists	5.8
Actuaries	5.2
Atmospheric and Space Scientists	5
Poets, Lyricists and Creative Writers	4.9
Soil and Plant Scientists	4.9
Computer Network Architects	4.8
Mathematicians	4.3
Geoscientists, Except Hydrologists and Geographers	4.2
Operations Research Analysts	3.5
Geological Sample Test Technicians	3.3
Data Warehousing Specialists	2.9
Financial Quantitative Analysts	2.9
Fallers	2.8
Photonics Technicians	2.7
Tapers	2.3
Astronomers	2
Economists	1.5