

SUMMARY FOR MODELLING FOR BERMUDA

(APRIL 24, 2020)

The numbers generated through this model cannot be interpreted as predictions of what will occur during the current COVID-19 pandemic. Rather, they should be treated as estimates of what might happen, based on the assumptions used in generating these estimates and the modelling strategy used. The model aims to provide decision makers with potentially useful but heavily caveated information that will be refined as more information becomes available. The point of the model is not to predict the future, it's to influence it, help us prepare for it and choose a good course of action.

Public Health England has advised that the Reasonable Worst Case Scenario be used as a planning tool. This provides a ceiling figure for the maximum foreseeable impacts. It was recommended that a reproductive number (the average number of secondary cases generated by each infectious case) of 2.4 be used for the Worst Case Scenario.

Information for both the Worst Case Scenario and a Better Case Scenario was estimated using modelling based on modelling done by Imperial College London and incorporating local population data and mortality rates. The impacts of COVID-19 are age dependent and Public Health England has indicated that Bermuda could fare worse due to our slightly older population.

The Better Case Scenario is estimated based on the combined impact of numerous public health interventions including case isolation, quarantine of contacts, school closures and social distancing measures. A reproductive number of 1.4 was used to model this scenario.

The modelling was done using a SEIR (susceptible, exposed, infected, recovered) model with numerous assumptions, including no immunity (100% susceptibility), that symptomatic individuals are more infectious than asymptomatic individuals and that upon recovery, individuals are immune to re-infection in the short term.

The comparison of the impact of COVID-19 at Worst Case Scenario (no interventions) resulting in a peak in May to Better Case Scenario (combination of interventions) resulting in a peak in September is as follows:

Estimated Impact	Worst Case Scenario	Better Case Scenario
Infections (including asymptomatic)	54109	17540
Hospitalizations	3096	1030
Critical Care hospitalizations	981	359
Deaths	718	263

It is important to not get fixated on the exact numbers or the timing of the peak as these can change based on the local situation and interventions used. Modelling is ongoing and will be refined throughout the pandemic.

Within the current model, the reproductive number was kept constant although it is recognized that it will vary throughout the outbreak situation based on the interventions used.

The overall goal is to get the reproductive number at or below 1 which could result in interrupted transmission or prolonged lower level transmission and reduce the peak demand on healthcare services.

The World Health Organization has since stated that the most plausible scenario may involve recurring epidemic waves interspersed with lower level transmission.

There are very large uncertainties around the transmission of this virus, the likely effectiveness of different policies and the extent to which the population spontaneously adopts risk reducing behaviours. Local real-time data and intelligence is crucial to assess what is happening locally and the impact on healthcare capacity.

Figure 1. Estimates of COVID-19 infections (symptomatic and asymptomatic) per day with different transmission scenarios

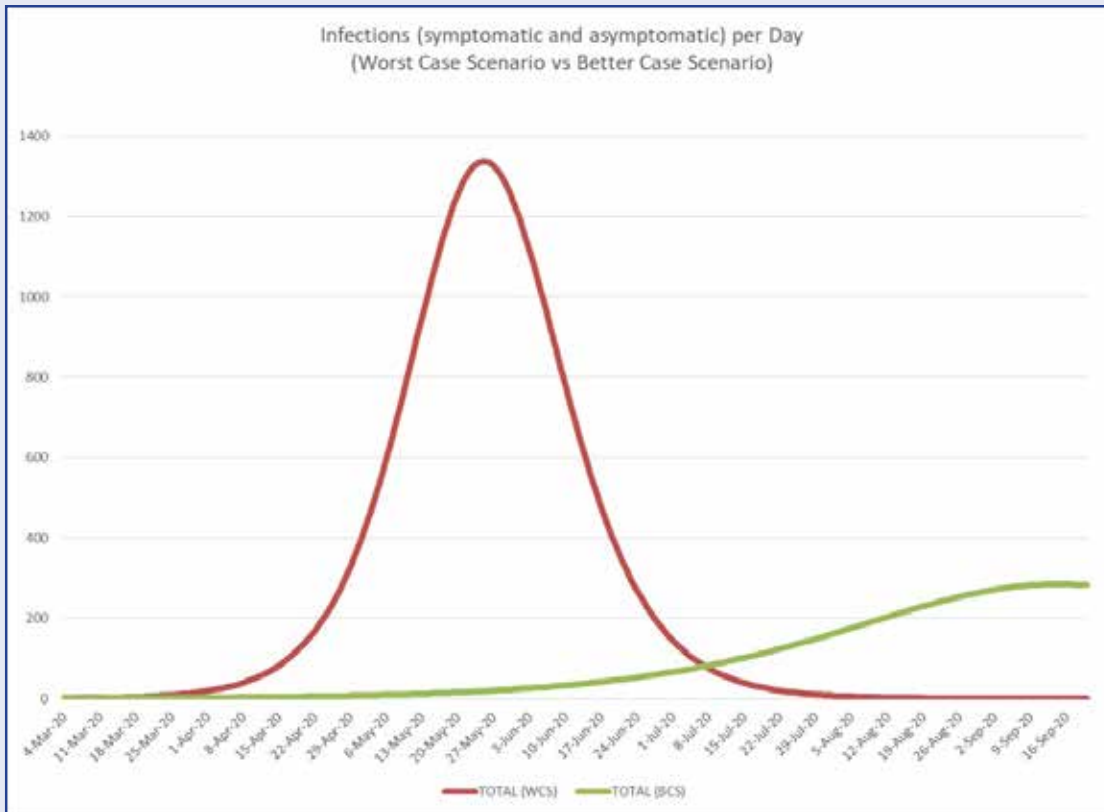


Figure 2. Estimates of COVID-19-related hospitalizations per day with different transmission scenarios

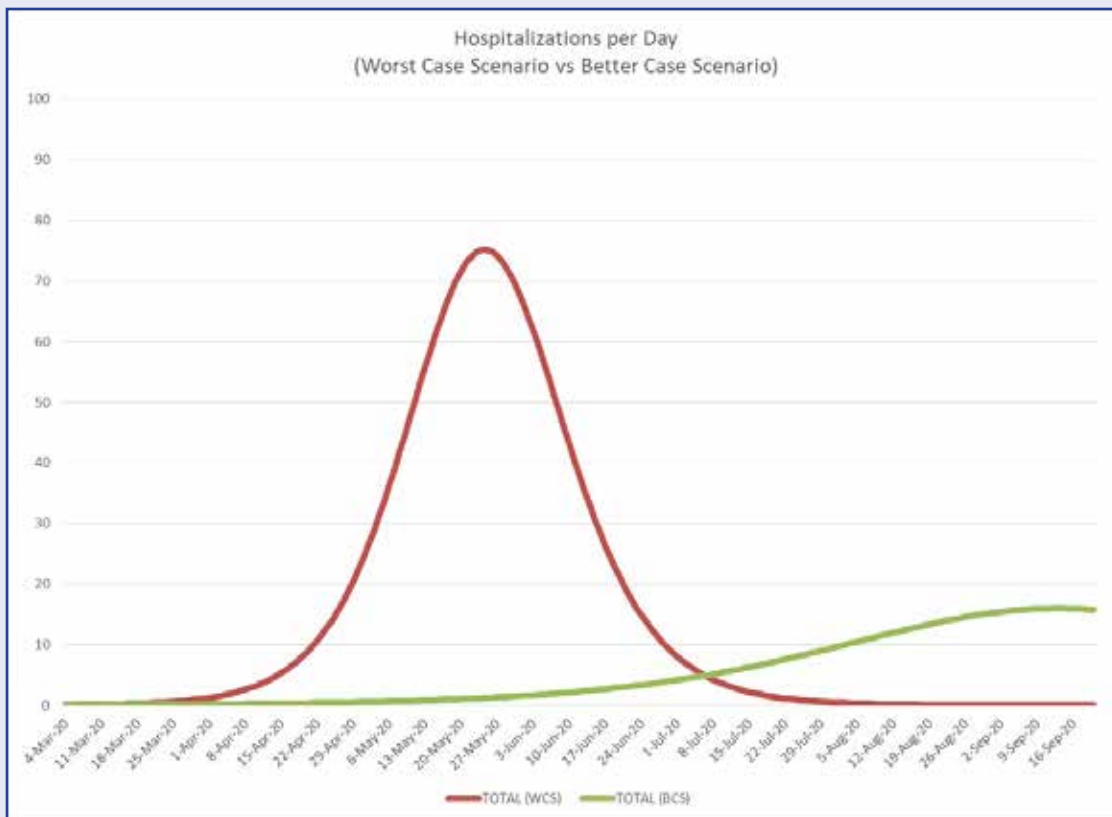


Figure 3. Estimates of COVID-19- related critical care hospitalizations per day with different transmission scenarios

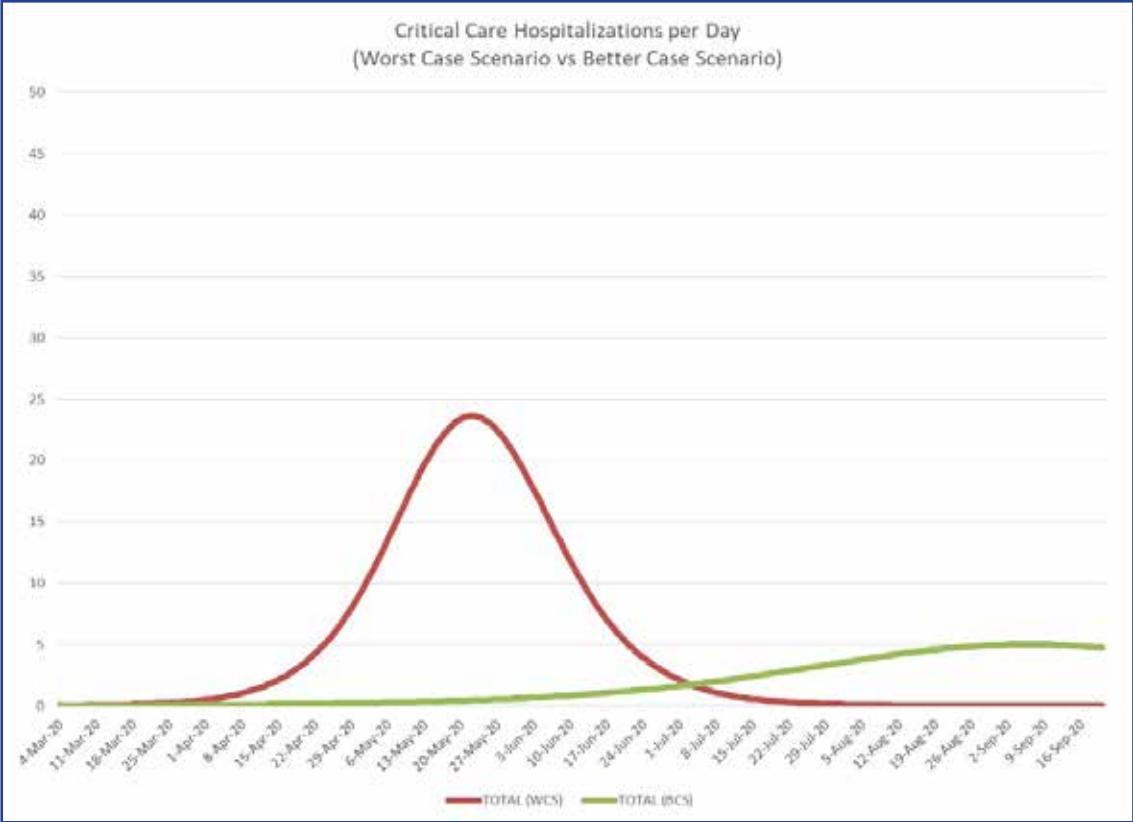
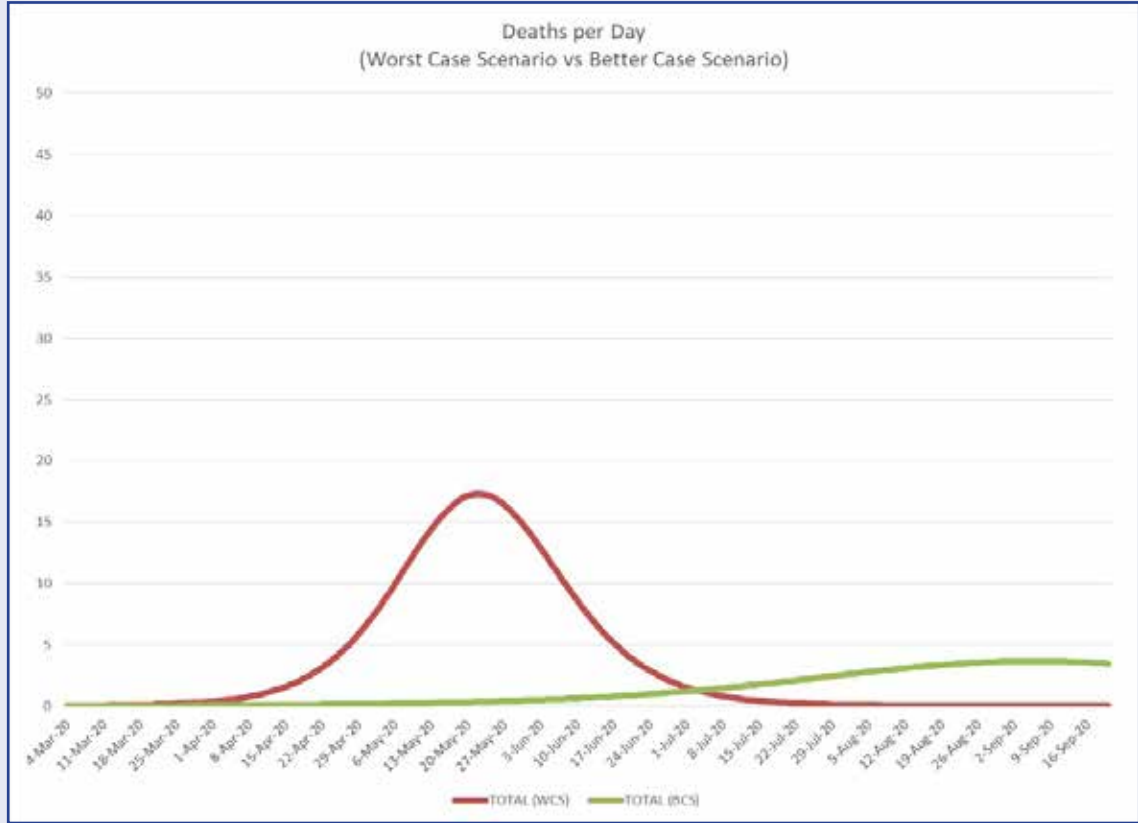


Figure 4. Estimates of COVID-19-related deaths per day with different transmission scenarios



References:

Ferguson NM, Laydon D, Nedjati-Gilani G, Imai N, Ainslie K, Baguelin M, Bhatia S, Boonyasiri A, Cucunubá Z, Cuomo-Dannenburg G, Dighe A (2020) Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. Imperial College COVID-19 Response Team, London, March, 16. <https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-NPI-modelling-16-03-2020.pdf>

World Health Organization. (2020). Considerations in adjusting public health and social measures in the context of COVID-19: interim guidance, 16 April 2020. World Health Organization. <https://apps.who.int/iris/handle/10665/331773>.