



Singapore Healthcare
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Impact of COVID-19 on Acute Isolation Bed Capacity and Nursing Workforce Requirements: A Retrospective Review

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Introduction

- As the COVID-19 pandemic spread across the globe, its novelty and highly infectious nature resulted in an unprecedented demand for healthcare services.
- Late March 2020, Singapore experienced an exponential wave of COVID-19 cases.
- Nationwide initiatives were taken to rapidly create care facilities for COVID-19 patients.
- For the period 1st March 2020 to May 2020, the demand for isolation beds as well as staffing rose.

Aims

To understand the impact of COVID-19 on:

- Isolation bed capacity requirements
- Nursing workforce requirements
- Nurse: patient ratios

Methodology

- This was a retrospective review of bed capacity, bed occupancy and nursing workforce data from the isolation units of a tertiary hospital in Singapore from 23rd January 2020 to 31st May 2020.
- R v4.0.1 and tidyverse 1.3.0 library were used for data cleaning, and plotly 4.9.2.1 library for data visualisation.

Results

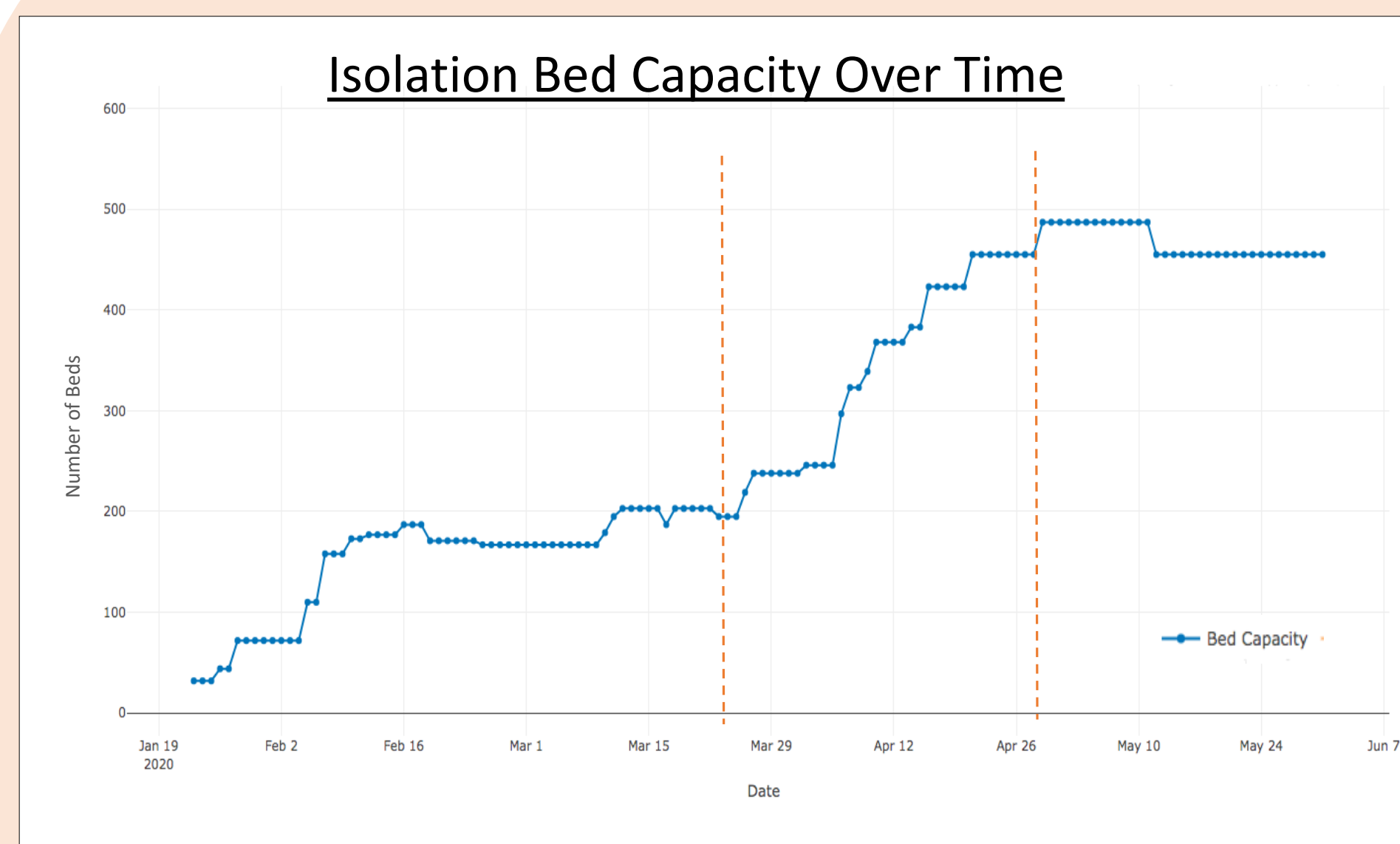


Figure 1. Graph of isolation bed capacity over time.

In the first two months, isolation bed capacity was low (≤ 203 beds). A sharp increase in bed capacity was seen from 195 beds on 25th March to 487 beds on 29th April 2020, after which it plateaued.

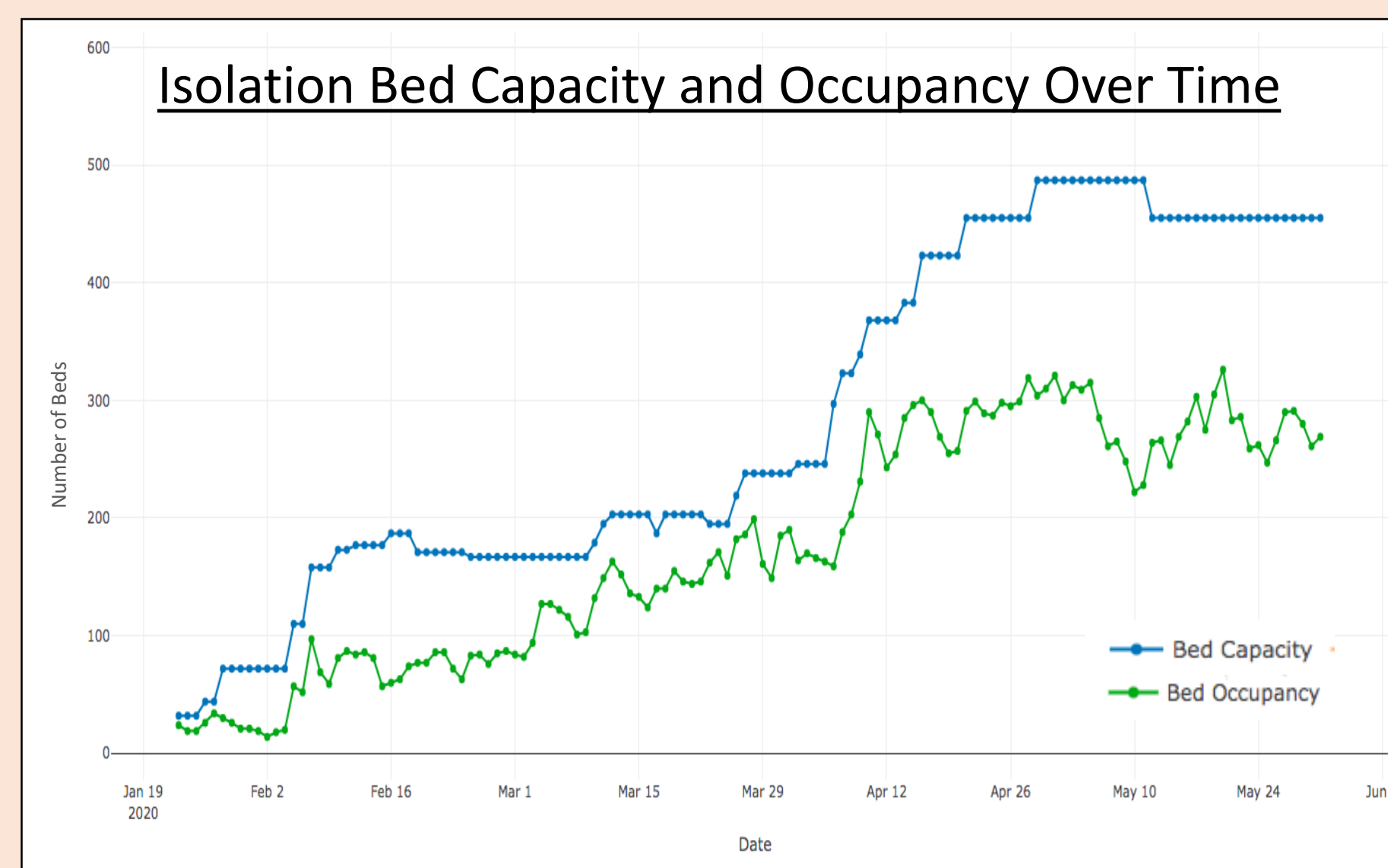


Figure 2. Graph of isolation bed capacity and occupancy over time.

Bed occupancy remained lower than bed capacity throughout January to May 2020.

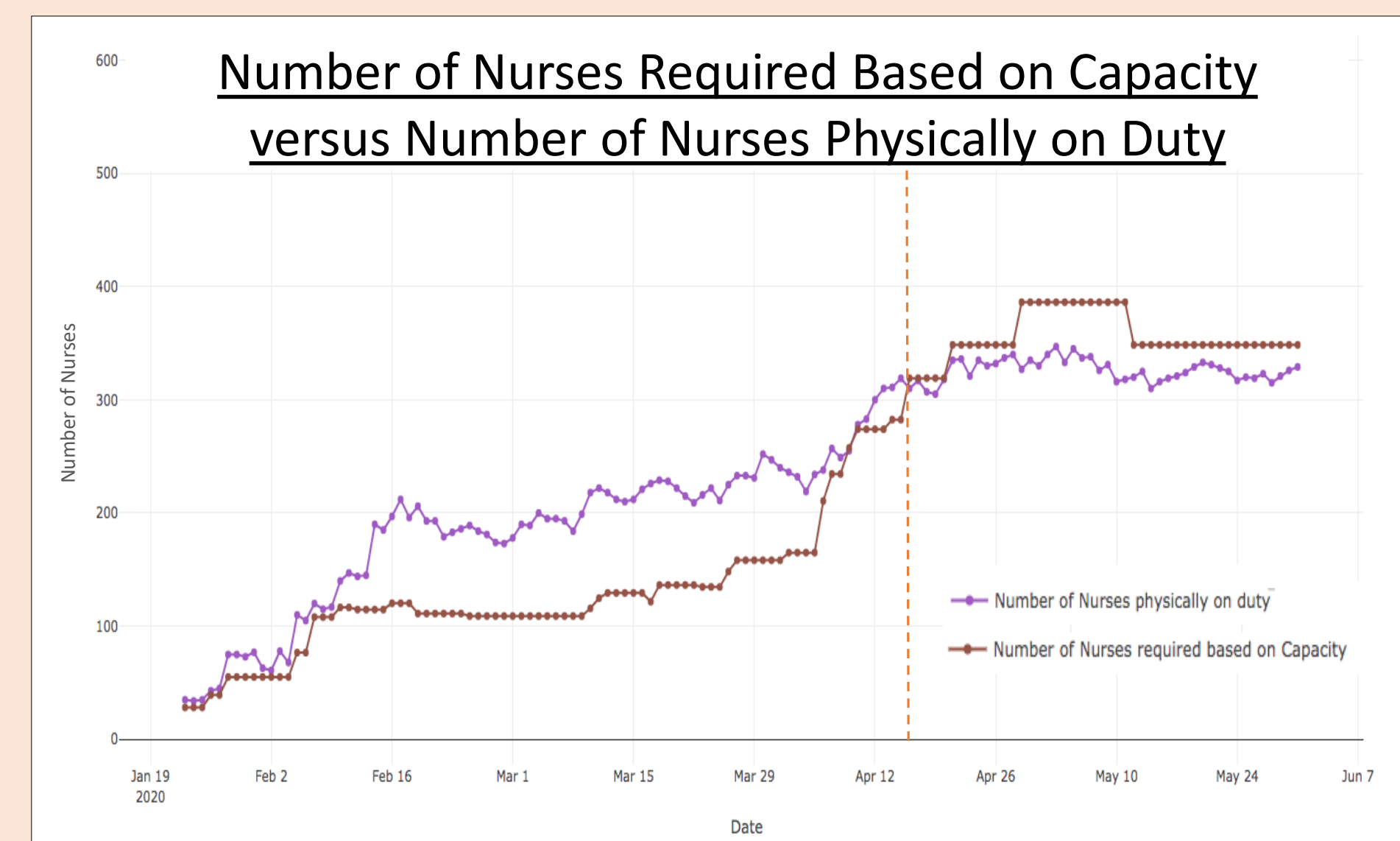


Figure 3. Number of nurses required based on capacity versus number of nurses physically on duty.

After 16th April 2020, we experienced a shortfall of 1.1 to 70.2 nurses in isolation wards. Due to low occupancy rates, nurse: patient ratio remained acceptable (minimum nurse: patient ratio=0.26). The dotted line on the graph illustrates the point at which the nursing workforce was unable to meet the number of nurses required based on capacity in the isolation wards.

Conclusion

- COVID-19 caused drastic changes in bed capacity and nursing workforce requirements.
- The isolation capacity increased in response to the COVID-19 situation in Singapore to a point where the nursing workforce was unable to meet the required headcount for the isolation wards.
- Fortunately, due to low occupancy rates, the nurse: patient ratio was not adversely affected.
- Responding to a pandemic requires significant resources and planning. Building a model to plan and predict the optimal nursing workforce required for a future pandemic is recommended.