



Surge Capacity Dynamics at a COVID-19 Designated Hospital in Malaysia

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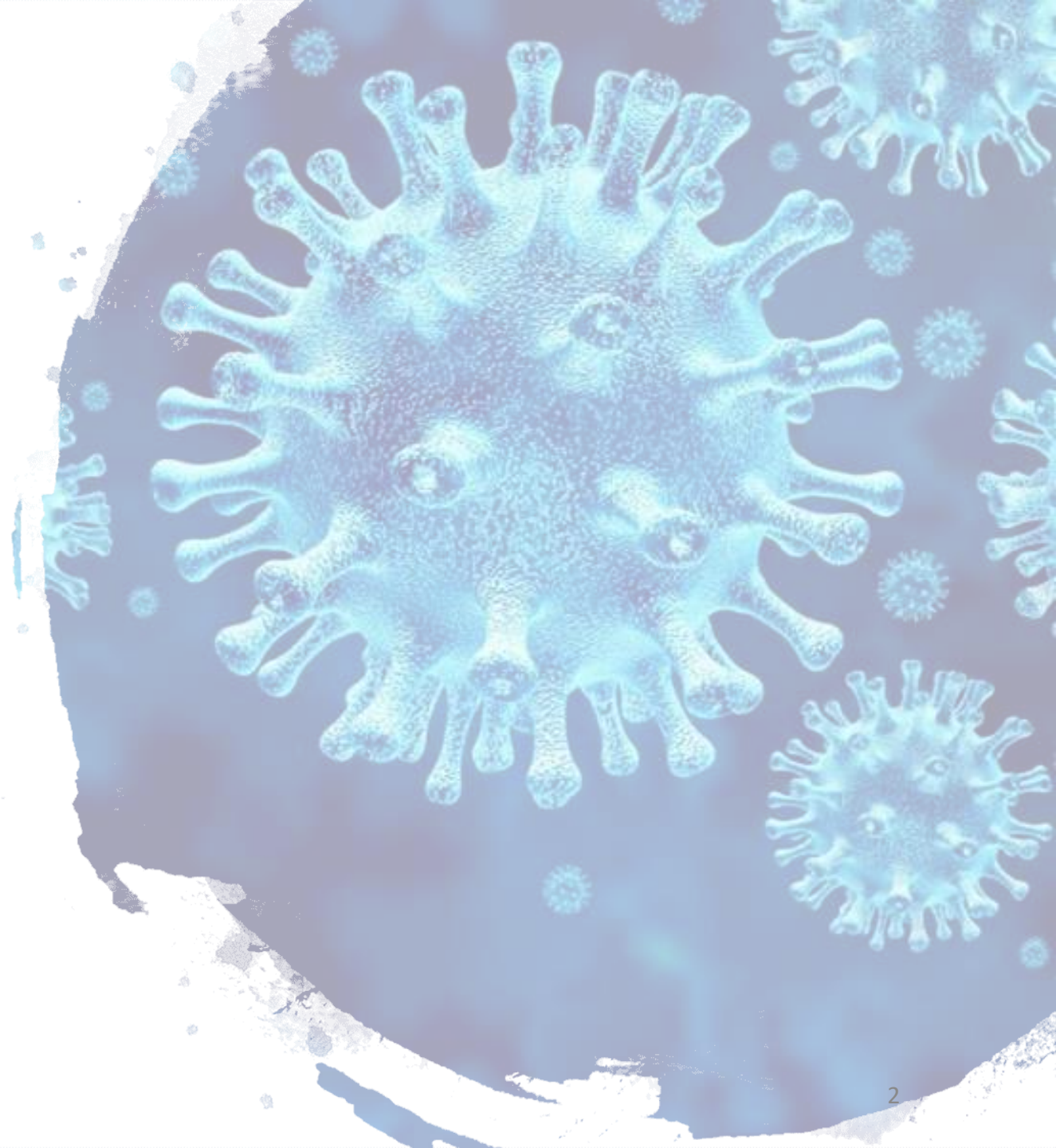
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Outline

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— Background

Building surge capacity for anticipated admission of COVID-19 patients is a critical part of hospital preparedness strategy^{1,2}

Hospital Sungai Buloh (HSgB)

- Designated COVID-19 hospital^{3,4}
- Multi-disciplinary specialty hospital pre-COVID³
- Beds capacity management to meet admissions

¹ Chopra, V. *et al.* (2020) 'How Should U . S . Hospitals Prepare for Coronavirus Disease 2019 (COVID-19)?', *Ann Intern Med.* Available at: <https://doi.org/10.7326/M20-0907>. Available at: <https://doi.org/10.7326/M20-0907>.

² Hick, J. L. *et al.* (2020) 'Duty to Plan: Health Care, Crisis Standards of Care, and Novel Coronavirus SARS-CoV-2', *NAM Perspectives.* doi: 10.31478/202003b.

³ Hospital Sungai Buloh [Internet]. 2020. Available from: <https://hsgbuloh.moh.gov.my/index.php/ms/mengenai-kami/latar-belakang>

⁴ Ministry of Health Malaysia (2020) *Latest Updates on COVID-19, Ministry of Health, Malaysia.* Available at: <http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan>.

— Introduction

- Modelling is useful to test preparedness decisions
- Aims were to analyse:
 - i. Predicted daily bed requirement
 - ii. Actual hospital COVID-19 related admissions
 - iii. Compare trend with national COVID-19 disease dynamics

— Methodology

- Observational study design
 - COVID-19 daily admissions* recorded from Jan to May 2020
 - Bed utilisation compared with national daily new COVID-19 cases
 - Correlation between bed capacity and demand calculated against COVID-19 transmission dynamics

*Active admissions at HSgB= COVID-19 RT-PCR confirmed patients and Person Under Investigation (PUI)

— Results

Table 1: Total COVID-19 Cases in Malaysia, Active Cases and Bed Capacity in HSgB (up to May 2020)

Description	Total
Total number of COVID-19 cases (National)	N= 7819
Total number of active cases (HSgB)	N= 5760
i) COVID-19	2474 (43.0%)
ii) PUI	3286 (57.0%)
Bed capacity	
i) Pre-COVID	620
ii) During COVID	2069

Table 2: Demographic Characteristics of COVID-19 and PUI Cases Admitted to HSgB

	COVID-19 (N=2474)	PUI (N=3286)
Total	n (%)	n (%)
Age, median (min, max)	34.0 (0, 94.5)	30.8 (0, 96.4)
Age groups		
≤ 10	73 (3.1)	339 (10.3)
11 – 20	249 (10.4)	234 (7.1)
21 – 30	662 (27.8)	924 (28.1)
31 – 40	454 (19.0)	690 (21.0)
41 – 50	289 (12.1)	287 (8.7)
51 – 60	304 (12.8)	233 (7.1)
61 – 70	198 (8.3)	191 (5.8)
≥ 71	155 (6.5)	388 (11.8)
Gender		
Female	764 (30.9)	1802 (54.8)
Male	1710 (69.1)	1484 (45.2)
Nationality		
Malaysian	1709 (71.7)	2967 (90.3)
Non-Malaysian	675 (28.3)	319 (9.7)

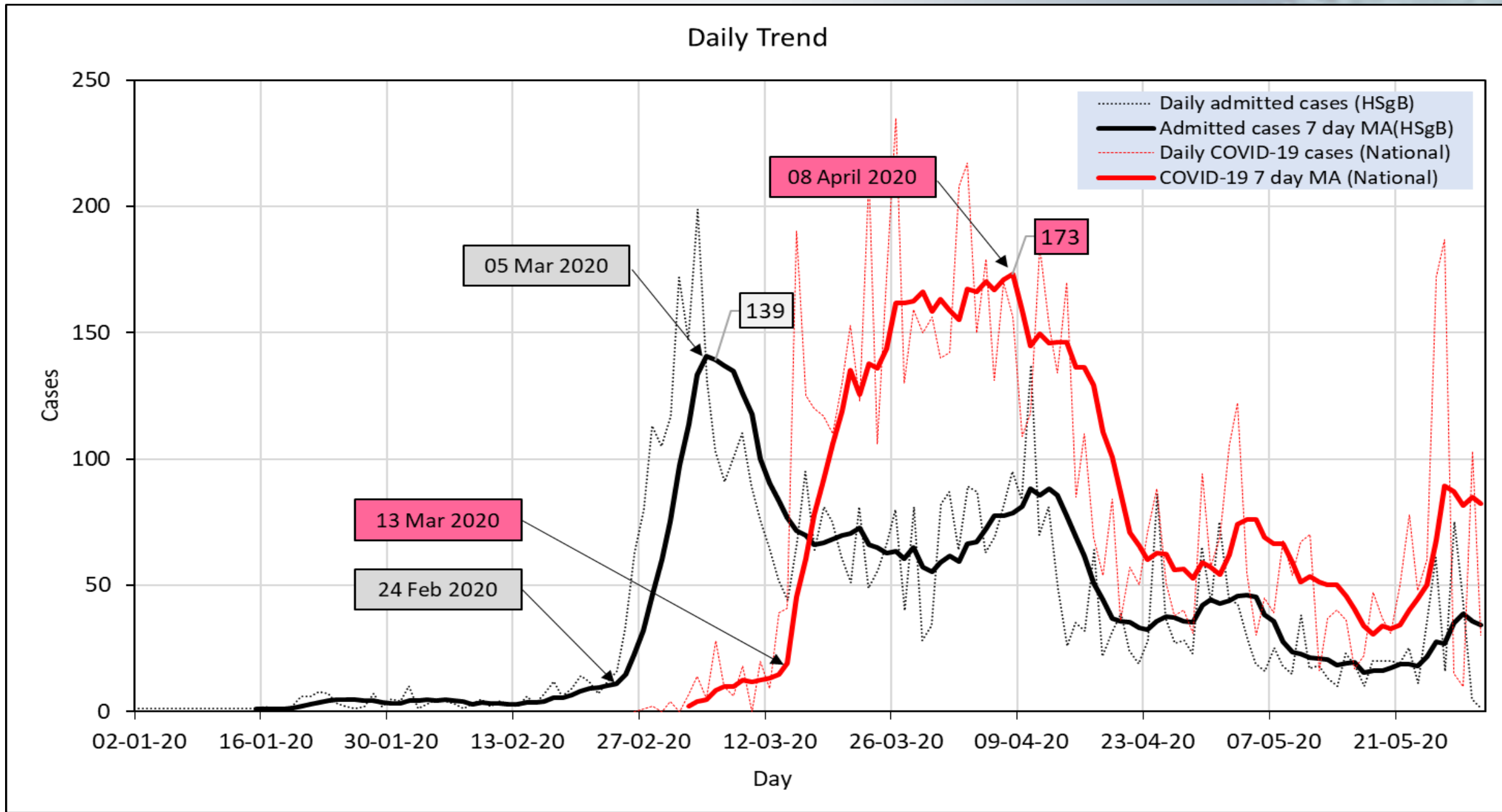


Fig. 1: Daily Trends of Active Cases in HSgB and COVID-19 Cases in Malaysia

- During the Movement Control Orders (MCO), 10-20% of COVID-19 cases were admitted to HSgB on average

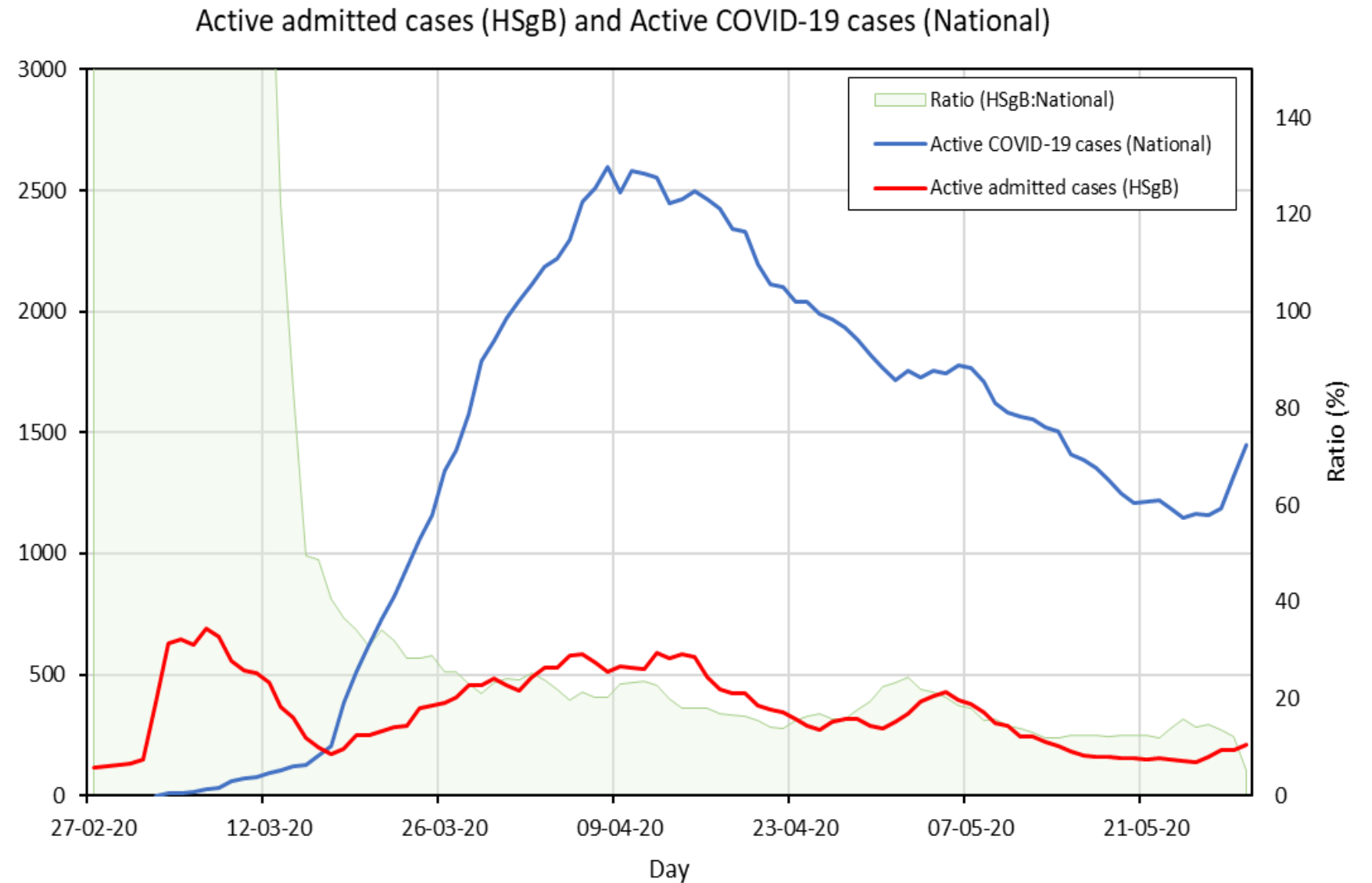


Fig. 2: Active Cases Admitted to HSgB vs. Active COVID-19 Cases at National Level

- A two-phase relationship was found between active cases admitted to HSgB and COVID-19 cases at the national level

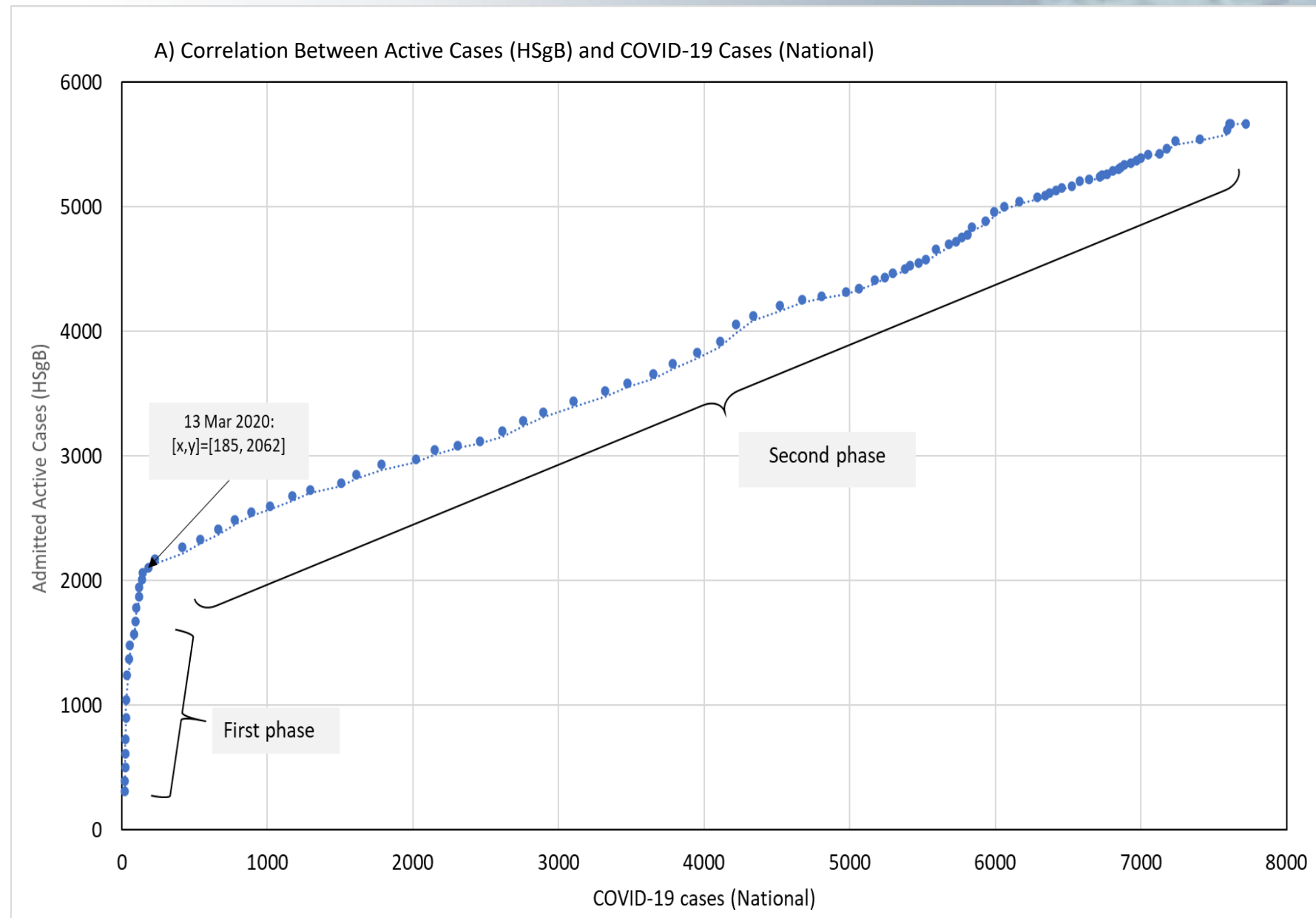


Fig. 3 (A): Correlation Between Active Cases Admitted to HSgB and COVID-19 Cases at National Level

- The first phase occurred from end-Feb to mid-March 2020, and can be accurately modelled using a logarithmic function, with $r=0.982$

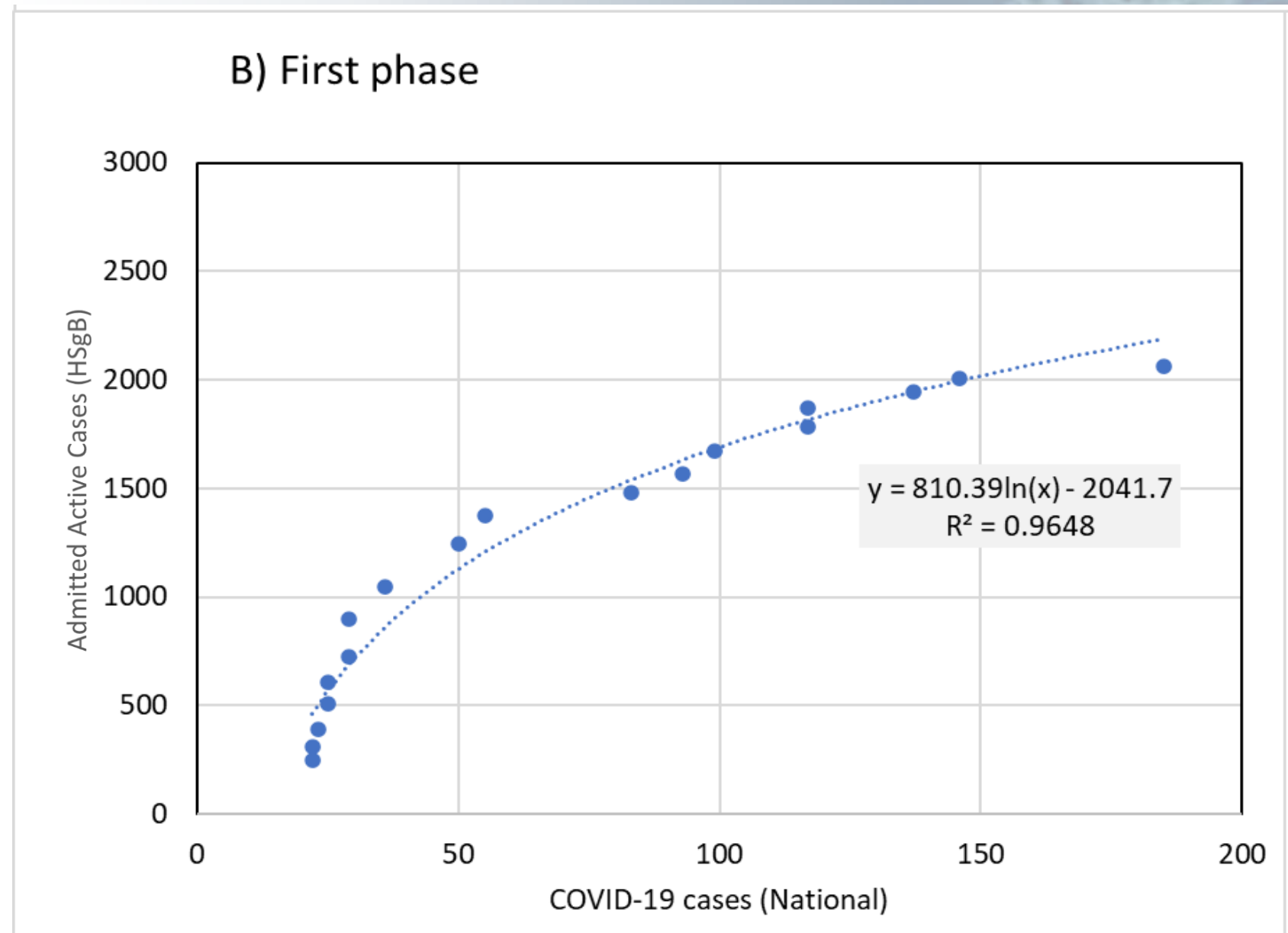


Fig. 3 (B): Graph of Active Cases Admitted to HSgB Against COVID-19 Cases at National Level Before MCO

- The relationship changed from logarithmic to linear during the second phase
- There was high correlation ($r=0.998$) between national cumulative COVID-19 cases and hospital admission

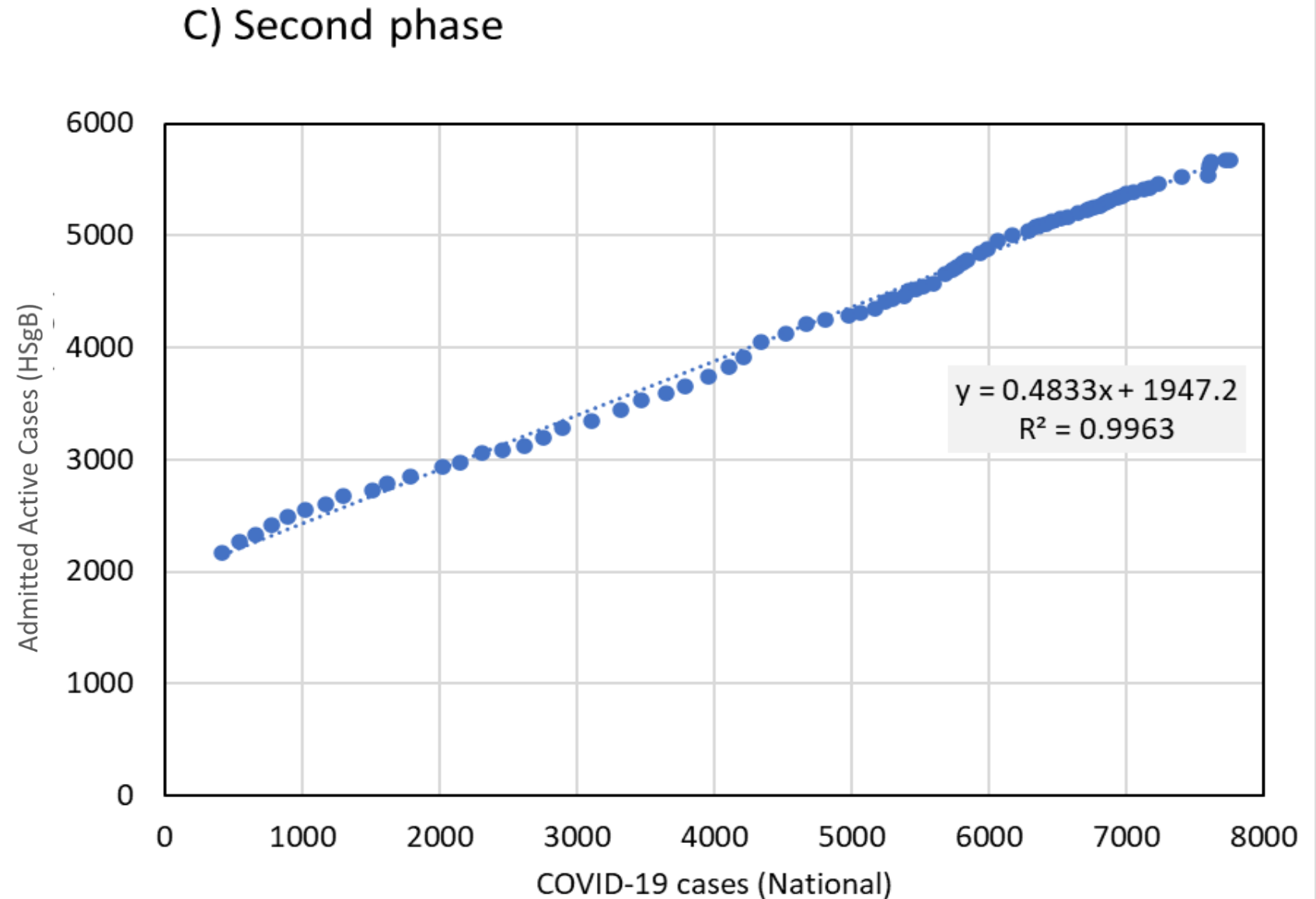


Fig. 3 (C): Graph of Active Cases Admitted to HSgB Against COVID-19 Cases at National Level During MCO

- Bed capacity and bed activation were planned ahead of time

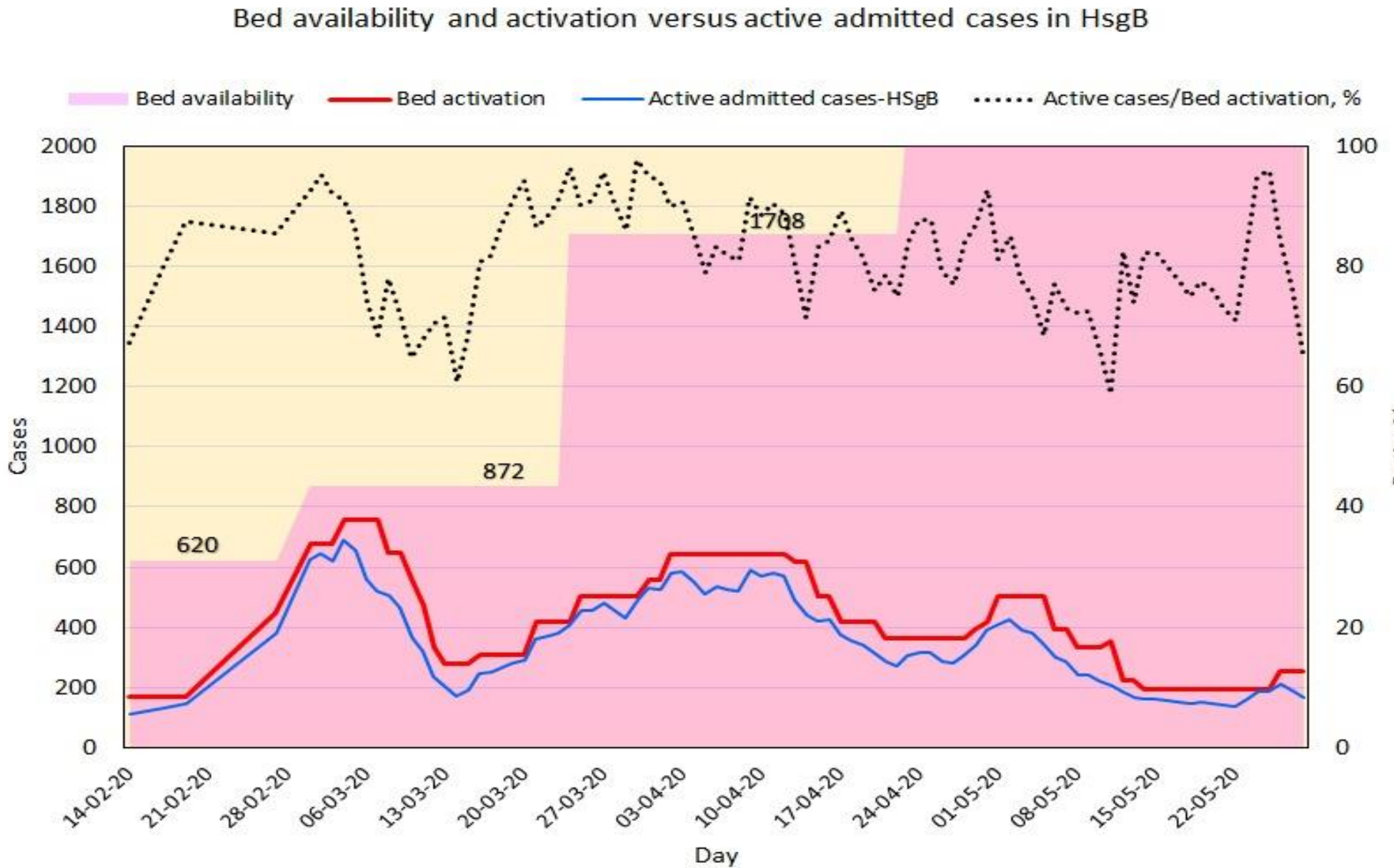


Fig. 4: Bed Availability and Activation vs. Active Cases Admitted to HSgB

— Discussion

- The trend reflected COVID-19 daily cases detected from contact tracing and screening strategies
- Sudden surge of local transmissions occurring from mass religious gathering
- Traveling bans, Movement Control Orders (MCO) and public health measures were implemented in response to surge dynamics

— Conclusion

- Hospital bed capacity was suitably expanded to time for the surge of COVID-19 admissions
- Daily national COVID-19 cases provide a guide for hospital preparedness decisions through modelling system
- The modelling approach should take into consideration for the surge in disease dynamics

— Acknowledgement

- We thank the Director General of Health Malaysia for his permission to present this research



Thank you

