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Background

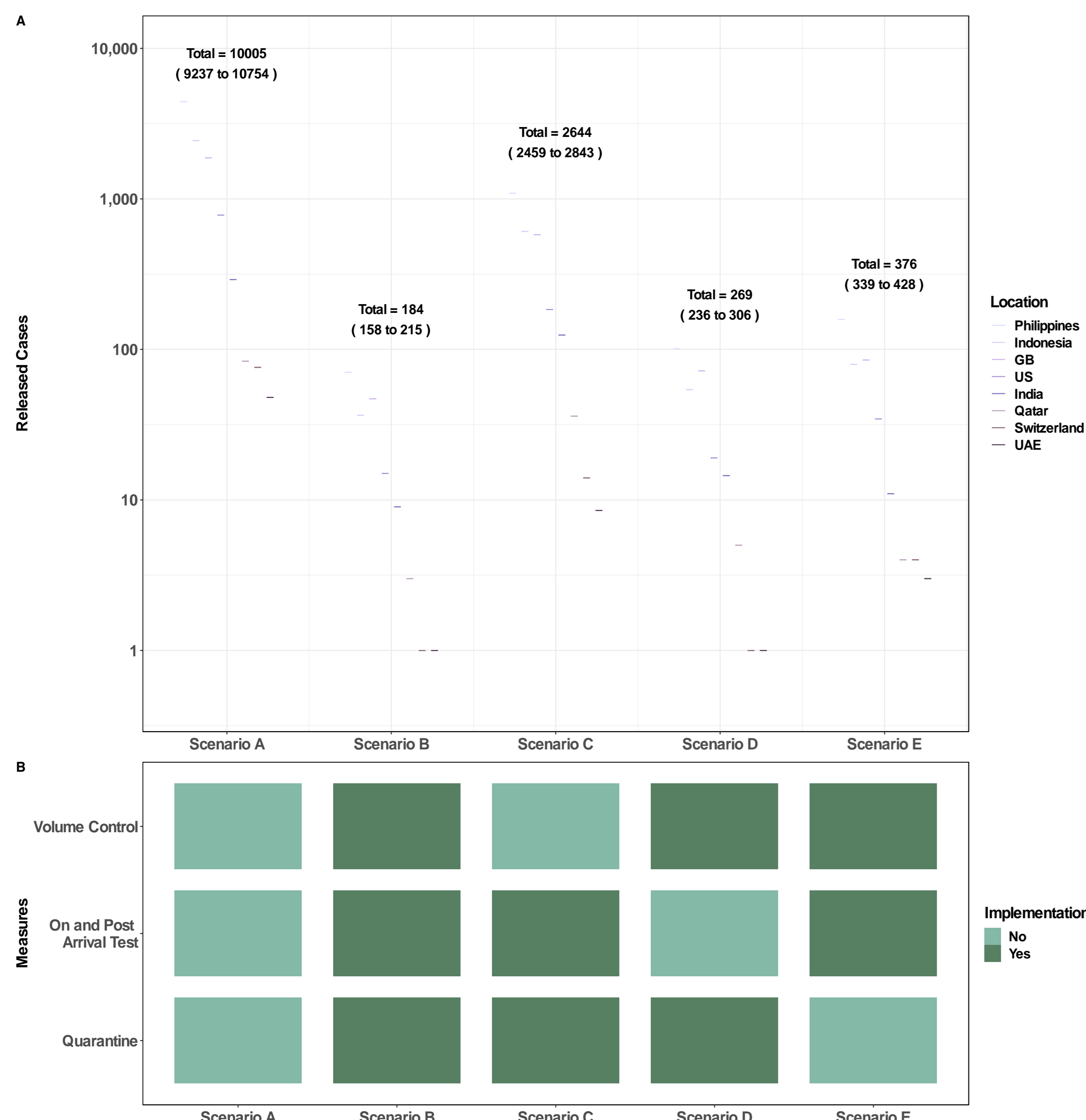
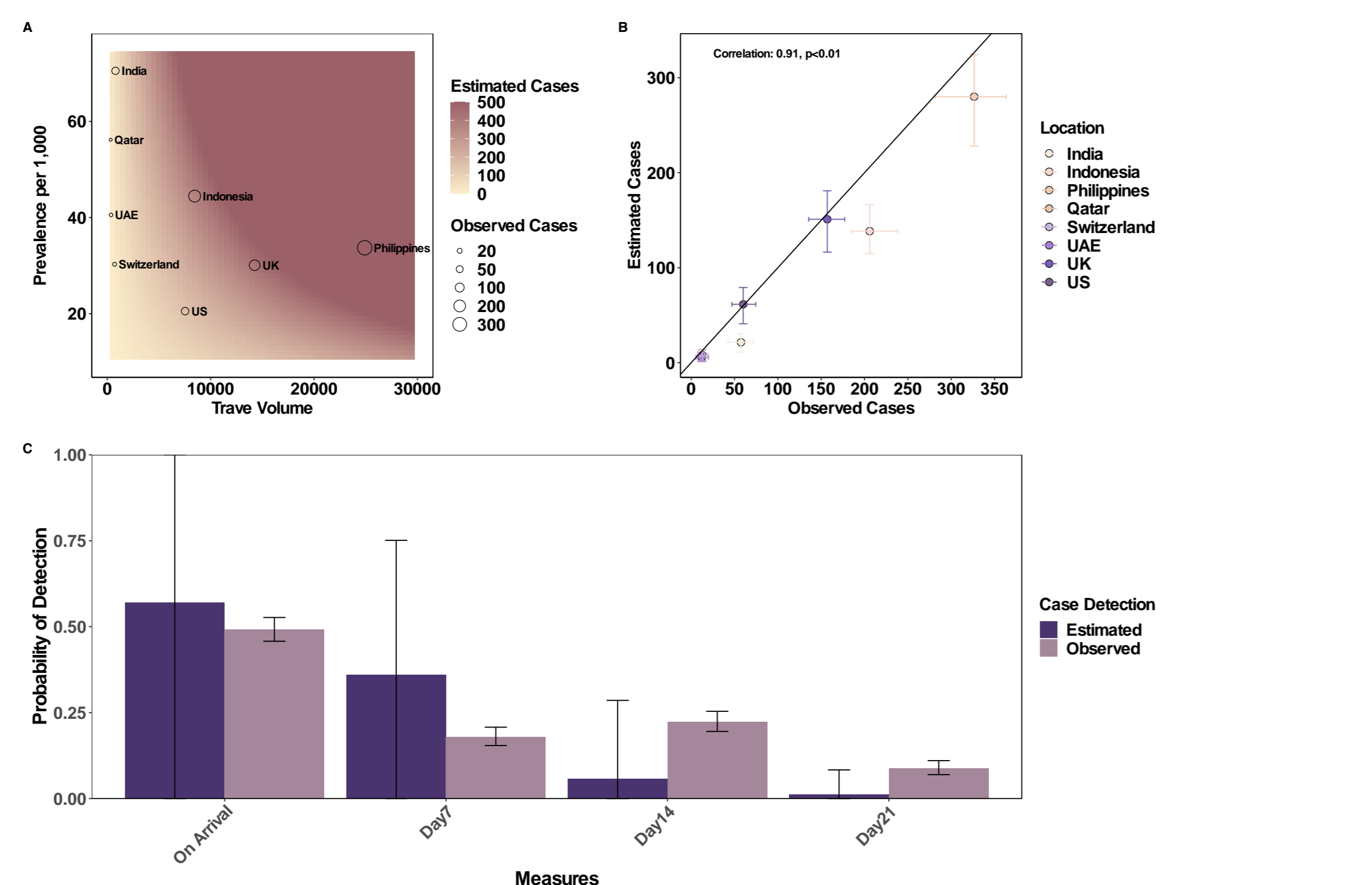
Assessing the real-world effectiveness of COVID-19 border control measures has been challenging due to limited import cases among travelers. This study retrospectively evaluates the impact of these measures in Hong Kong from 2020-2022.

Objectives

This study aims to investigate the effectiveness of each individual border control measure implemented in Hong Kong. With a scenario-based analysis, we intend to provide a optimal policy combination that can effectively reduce the released infected traveler to the community.

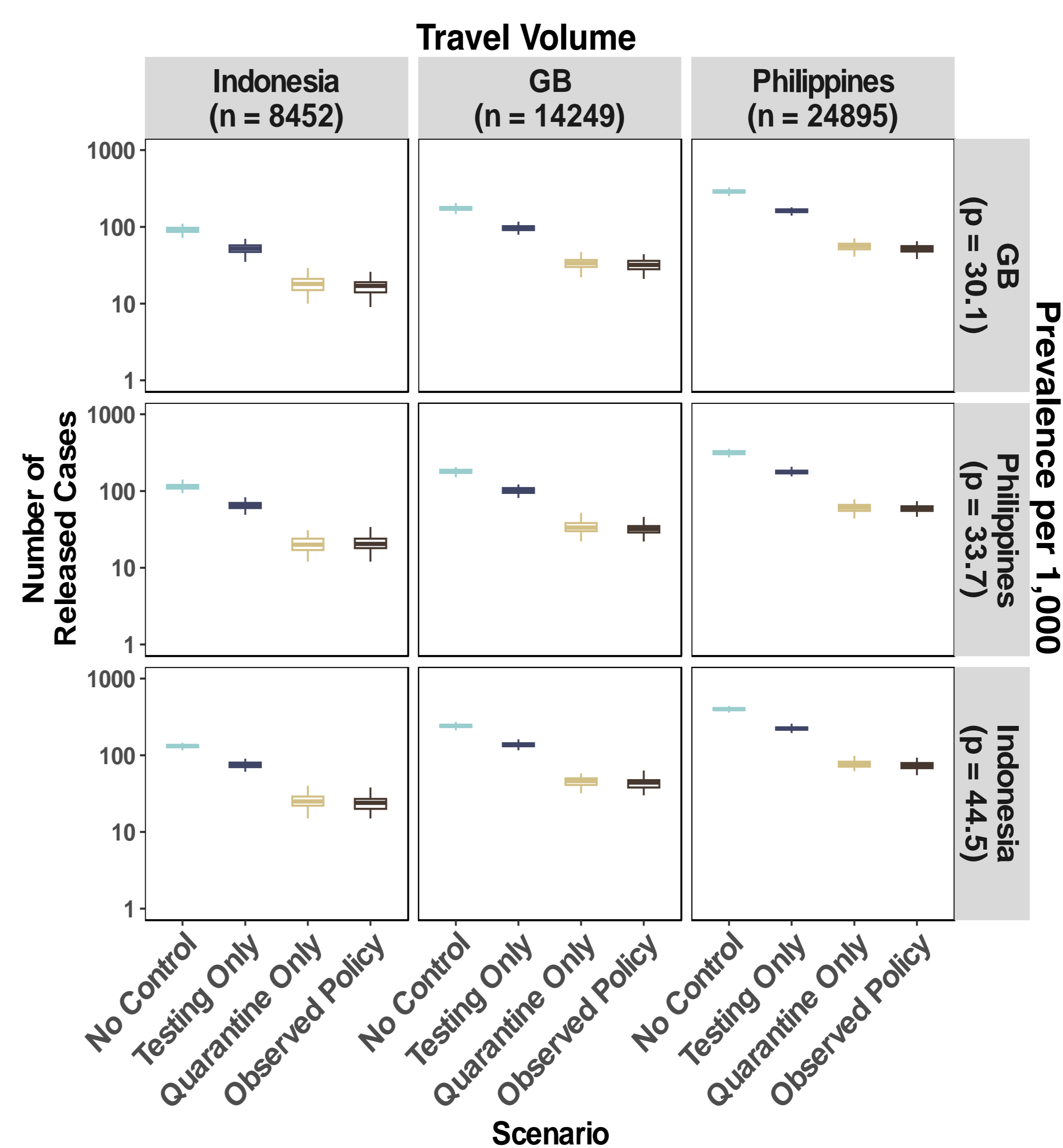
Methods

Data on imported COVID-19 cases, including departure origins and time from arrival to report, was compiled. Monthly travel data were derived using origin-specific bookings and an average travel cancellation rate. The level of travel control measures was obtained from Government press. To estimate the prevalence of COVID-19 cases among inbound travelers, we used a Bayesian framework that accounted for the disease history and testing sensitivity and fitted to cases detected on arrival and travel volumes.¹ We compared the number of prevented infections under the implemented measures to a scenario where no measures were taken. We also conducted counterfactual analysis to examine the independent and marginal effects of individual measures. The top ten countries in terms of imported cases were included.



Results

Compared to a no-control scenario, the observed control measures in Hong Kong have prevented 98.0% to 98.4% cases imported. Counterfactual analysis showed that without travel volume reduction, Hong Kong could have experienced 12.8 to 16.7 times more imported cases. Absence of frequent post-arrival testing or mandated quarantine would have resulted in 1.2 to 1.8 times and 1.8 to 2.4 times more cases, respectively. Pre-arrival measures detected 63.9% of infections (95% CI: 48.1% - 78.3%) before arrival, with diminishing marginal effectiveness observed for measures implemented upon arrival. Furthermore, when quarantine measure is in place, adding the testing measure has no contribution to the border control effectiveness.



Conclusion

Our findings suggested that decreasing inbound travel volume had the greatest impact on reducing the imported COVID-19 cases, regardless of other post-arrival measures. Mandating quarantine can further reduce the chances of cases entering the community. A thorough understanding of the effectiveness of these measures can inform tailored and effective pandemic travel control strategies.

References

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