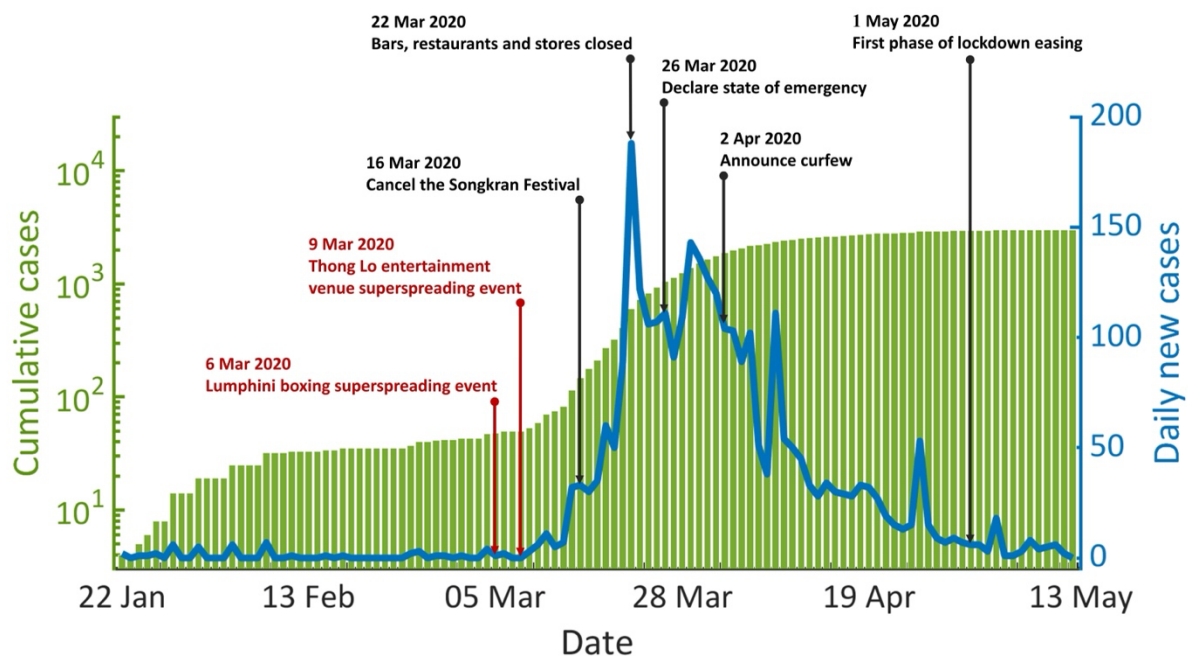


Reconstruction of the transmission dynamics of the first COVID-19 epidemic wave in Thailand

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Rationale and objective: Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARSCoV-2), was first identified in Wuhan, China, in late December 2019. Thailand was the first country reporting the first COVID-19 infected individual outside mainland China. Here we delineated the course of the COVID-19 outbreak together with the timeline of the control measures and public health policies employed by the Thai government during the first wave of the COVID-19 outbreak in Thailand.

Summary: Based on the comprehensive epidemiological data, we reconstructed the dynamics of COVID-19 transmission in Thailand using a stochastic modeling approach. Our stochastic model incorporated the effects of individual heterogeneity in infectiousness on disease transmission, which allows us to capture relevant features of superspreading events. We found that our model could accurately capture the transmission dynamics of the first COVID-19 epidemic wave in Thailand. The model predicted that at the end of the first wave, the number of cumulative confirmed cases was 3,091 (95%CI: 2,782–3,400). We also estimated the time-varying reproduction number (R_t) during the first epidemic wave. We found that after implementing the nationwide interventions, the R_t in Thailand decreased from the peak value of 5.67 to a value below one in less than one month, indicating that the control measures employed by the Thai government during the first COVID-19 epidemic wave were effective.



Graphical summary: The first wave of COVID-19 outbreak in Thailand. The blue line illustrates the number of daily new locally transmitted cases during the first epidemic wave (from 22 January to 13 May 2020). The green bar shows the corresponding number of cumulative cases. The black arrows indicate the time points at which control measures were implemented, while the time points of the large cluster outbreaks are shown using the red arrows.

Outcome: Understanding of COVID-19 transmission dynamics and assessment on the effectiveness of the control measures and public health policies employed by the Thai government during the first wave of the COVID-19 outbreak in Thailand.

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Related SDGs goal: 3. Good health and well-being.

Related publications:

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