Untangling SARS-CoV-2 epidemic control – lessons from Vietnam

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The COVID-19 pandemic is an unprecedented challenge for governments and their public health care infrastructures across the globe. Policy decisions addressing the pandemic have had far-reaching impacts on the health, economic stability, and socio-economic status of citizens, and there is an urgent need to analyze the effectiveness of individual countries' policies on SARS-CoV-2 containment. This is complicated by the wide heterogeneity in the timing, type and stringency of containment policies internationally [1]. Countries also vary dramatically in pre-existing social policies, government type, formal political institutions, and state capacity, and politics inevitably inform the effectiveness of chosen responses [2]. Despite the difficulty in extrapolating measures from one country to the next, evidence-based analysis of practices that have successfully resulted in containment are needed to inform pandemic responses across international borders.

The article by Pham and colleagues, "The first 100 days of SARS-CoV-2 control in Vietnam" in this issue of *Clinical Infectious Diseases* offers such an analysis. The article chronicles the public health measures implemented in Vietnam and their correlation with population mobility proxies, COVID-19 case numbers, and trends in daily reproduction number (R). Vietnam, despite confronting a resurgence of COVID-19 cases in July 2020, reported no COVID-19 deaths between January and June 2020. This impressive achievement is despite recording its first case as early as January 23rd, 2020, sharing a contiguous border with China, being a low-middle income country with over 97 million inhabitants and not having imposed a nationwide lockdown except for a 3-week period early April.

Phams's work suggest that two intersecting elements of Vietnam's response were particularly important to pandemic control. First, that there was a strong coordinated public health response - the country was prepared, willing and able to intervene early to contain the epidemic. By the end of January, the government had restricted international travel, closed schools and universities, implemented detailed contact tracing and testing, and launched a nationwide public information campaign. Until April 15th, only 270 COVID-19 cases were reported of which the majority were among incoming travelers and 107 were due to domestic transmission.

Second, the response explicitly addressed the biologic possibility of asymptomatic and pre-symptomatic SARS-CoV-2 transmission by quarantining individuals not based on clinical (having symptoms) but on epidemiological (having been exposed to an infected individual) grounds. In doing so, they rapidly built on an emerging evidence base that suggests that asymptomatic, pre-symptomatic, and mildly symptomatic infections are significant drivers of SARS-CoV-2 community transmission [3,4]. Public health authorities required incoming travelers as well as all direct and indirect contacts of cases to undergo a minimum 14-day quarantine and serial testing resulting in the quarantine of over 200,000 individuals. This caution was born out by the finding that 74% of quarantined cases developed symptoms after isolation, and 43% of cases never developed symptoms.

Despite offering strong suggestions, the authors are unable to pinpoint which specific elements of Vietnam's early response were most likely to have contributed to control of infection. This is due to the descriptive nature of the study and the complexity of untangling simultaneous, layered and intersecting public health interventions. [5]In addition, even though the Vietnamese economy is expected to rebound quickly and still grow in 2020 [6] the cost to the health system, individuals and society at large of quarantining about 1000 people for each COVID-19 case identified are unknown. These limitations complicate both interpretation and extrapolation of the findings. Numerous modeling studies have used estimates of immunity, transmissibility, and mobility networks to improve understanding of effective individual components of SARS-CoV-2 pandemic control. They have highlighted the importance of several measures adopted by Vietnam - the early detection and isolation of cases, implementing social and physical distancing measures in relation to the timing and size of outbreaks, and instituting travel restrictions [3,7–9]. However models are constrained by major gaps in our knowledge about the transmission of and immunity to SARS-CoV-2 [10]. Perhaps more importantly, models cannot fully account for state capacity and how effective governance, public trust, and compliance to health policies intersect with this biology. Therefore, there remains much to learn from descriptions, such as Pham's, of individual countries that have successfully controlled SARS-CoV-2 spread within their borders.

As Vietnam is confronting a new wave of infections and the global daily toll of COVID-19 is rising , the article by Pham is reassuring in its illustration of how effective public health responses can control SARS-CoV-2 transmission and save lives - even in highly populous, low-middle income settings. State capacity and willingness to implement rapid, coordinated public health responses, coupled with the flexible adoption of policy to address new insights into SARS-CoV-2 biology – such as the importance of pre-symptomatic and asymptomatic transmission - remain relevant for all countries grappling with COVID-19 control. One hopes that investment in resilient public health infrastructures and effective responses to health crises can be legacy and counterpart to the painful collective global memory of loss that COVID-19 has imposed.

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