Epidemiology of Covid-19 in the Philippines

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***Abstract** – On 7 March 2020, the Philippines announced the local transmission of COVID-19. I described the characteristics and epidemiological time-to-event distributions for laboratory-confirmed cases in the Philippines recorded as of 29 December 2020. The average age of 472,298 cases was 38.15 years, with 45.3% being female and 44.3% living in the National Capital Region. The age group of 30-39 years old has the highest number of total confirmed cases with the total of 111,384. The age group of 90-99 has the lowest record of confirmed cases with the total of 745. The total active cases as of 29 December 2020 is 22,746 (4.8%), 9,124 (1.94%) died, and 438,780 (93%) are total number of recovered patients. Asymptomatic patients were 2,361 (10.4%) out of 22,746 active cases; 142 (0.62%) patients were pregnant. The average age of dead patients was 62.21 years, and the average age of recovered patients was 37.52 years. The average time between confirmation of Sars-Cov2 and recovery was 11.99 days.*

***Keywords** – COVID-19; epidemiology; low- and middle-income country; Philippines; surveillance*

INTRODUCTION

On 12 March 2020, the World Health Organization (WHO) declared Coronavirus Disease 2019 (COVID-19) a global pandemic. Current and published epidemiological studies on COVID-19 have oriented to a large extent on China and other high-income countries such as South Korea, Japan, Italy, Spain, and the USA. Further research into the distribution and burden of COVID-19 in low- and middle-income countries (LMICs) will provide insight into its low-resource disease epidemiology, as the dynamics of transmission rely not only on population characteristics, but also on the capacity of the health system (e.g., access to testing) and the ability to enforce mitigation measures (e.g., community-level quarantine, social distancing). On 7 March 2020, the Philippines reported local transmission of COVID-19 and imposed enhanced community quarantines (ECQ) on half the population of the country from 20 March to 30 April. ECQ included very stringent social and physical distancing steps at the community level, such as halting public transport, banning intra-country travel, and limiting people to their homes, except for vital activities such as food and health care. I am explaining in this paper the epidemiological profile of the 472,298 confirmed cases of COVID-19 in the Philippines as of 28 December 2020.

METHODOLOGY

Methods Summary of the surveillance structure of the Philippines COVID-19 The Philippines is an archipelago of three groups of islands and 17 regions, divided into 81 provinces covering 146 cities and 1488 municipalities. Surveillance of COVID-19 is decentralized to local government units (LGUs), i.e., states, counties, and towns, as most of the delivery of healthcare services. At all administrative levels, epidemiology, and surveillance units (ESUs) exist, namely federal ESUs (RESUs), provincial ESUs (PESUs), and city/municipality ESUs (CESUs/MESUs). Units collect data and report to higher-level units for their jurisdictions: CESUs/MESUs cascade regular reports to the PESUs that cascade those to regional ESUs and

then send to the DOH-Epidemiology Bureau (EB). The provincial government does not supervise 15 cities and one municipality in the National Capital Region (NCR), as well as 37 highly urbanized cities and autonomous component cities, and reports directly to the RESUs. DOH-EB is the main national security agency for COVID-19. It collects information on confirmed and reported cases nationally and provides all LGUs with advice and assistance. DOH-EB is the main national security agency for COVID-19. It collects information on confirmed and reported cases nationally and provides all LGUs with advice and assistance. DOH-EB operates an information system patterned after influenza-like disease (ILI)/severe acute respiratory infection (SARI) surveillance for COVID-19 cases. Using case investigation forms (CIF), which report patient characteristics, epidemiological links and select clinical details, reported cases are profiled.

CASE DEFINITION, CASE DETECTION AND LABORATORY TESTING

COVID-19 cases are classified as patients with positive real-time reverse transcription polymerase chain reaction (RT-PCR) performed by DOH approved laboratories and the Tropical Medicine Research Institute (RITM). The RITM is the National Emerging and Re-emerging Diseases Reference Laboratory and it is the public health authority that accredits COVID-19 testing laboratories. The DOH restricts testing to suspicious and likely cases beginning on 9 April 2020. (1) SARI requiring hospitalization with no other aetiology that fully explains clinical presentation; (2) ILI requiring hospitalization with no other aetiology that fully explains clinical presentation AND residence or travel to a region with documented local transmission 14 days prior to symptoms OR exposure to confirmed or probable cases within 2 days prior to symptoms OR exposure to confirmed or probable cases; and (3) high-risk populations of fever, cough, shortness of breath and other respiratory symptoms, including those 60 years of age and older, comorbidity patients, women at high risk of pregnancy and health staff. Suspicious cases (1) referred for RT-PCR examination, (2) with inconclusive RT-PCR findings from a DOH-accredited laboratory, or (3)

with a positive RT-PCR result from a non-RITM accredited laboratory are likely cases. There were six versions of case descriptions of COVID-19 as of 29 April, and research has extended to include 17 sub-national laboratories (see Supplementary Appendix). Via many avenues, possible cases are identified. The DOH Quarantine Office recognizes individuals with symptoms such as fever, shortness of breath and respiratory issues at ports of entry and refers them to health facilities, LGU health offices or sentinel disease monitoring units (DRUs). Official case descriptions are also used by health professionals to determine possible COVID-19 cases among patients consulted or hospitalized in their facilities. For identified confirmed, suspicious, and probable COVID-19 cases, LGUs, ESUs and DRUs then perform case investigations and contact tracing. Due to active COVID-19, death was described as death and confirmed by the DOH-EB as dead. To verify whether the cause of death was linked to COVID-19, an internal team of medical experts at DOH-EB reviews death certificate data, if available, or data transmitted by the health facility or ESUs via the information system. Recovery was described as COVID-19 cases identified as DOH-EB recovered based on symptom resolution, including hospital discharge for those admitted or home quarantine termination for those not admitted, and at least one negative RT-PCR test. As part of the DOH's open data access 'DataDrop' project, updated daily at https://ncovtracker.doh, all data is available.

STATISTICAL ANALYSIS

I analysed descriptive statistics of cases, deaths and recoveries by socio-demographics, average age of dead and recovered patients, as well as the average time between confirmation and recovery and the time between confirmation and death, respectively. Histograms and graphic figures were constructed using the data from the DOH.

Table 1.
Characteristics of COVID-19 cases in the Philippines as of 29 December 2020

	All Cases	**Died**	**Mild**	**Recovered**	**Severe**	**Critical**
Age Group						
0-9	*17,048*	*111*	*683*	*16,210*	*14*	*30*
10-19	*26,166*	*71*	*1,085*	*24,982*	*11*	*17*
20-29	*123,223*	*233*	*4,530*	*118,357*	*45*	*58*
30-39	*111,384*	*452*	*4,101*	*106,704*	*58*	*69*
40-49	*75,822*	*836*	*2,799*	*71,952*	*103*	*132*
50-59	*57,681*	*1,734*	*2,263*	*53,294*	*152*	*238*
60-69	*35,188*	*2,496*	*1,645*	*30,488*	*169*	*390*
70-79	*15,566*	*2,049*	*773*	*12,351*	*125*	*268*
80-89	*5,334*	*965*	*274*	*3,905*	*44*	*146*
90-99	*745*	*171*	*32*	*513*	*8*	*21*

Table 2.
The comparative breakdown on the effects of COVID-19 on different age groups and sex.

	Total	Male	Female
Age and Sex			
0-9	17,048	9,289	5,959
10-19	26,166	13,484	12,682
20-29	123,223	64,620	58,603
30-39	111,384	62,551	48,833
40-49	75,822	43,589	32,233
50-59	57,681	30,963	26,718
60-69	35,188	18,035	17,153
70-79	15,566	7,483	8,083
80-89	5,334	2,160	3,174
90-99	745	274	471

RESULTS

Among the 472, 298 COVID-19 cases detected in the Philippines as of 29 December 2020, 45.3% were female and 44.3% lived in the NCR. Among these, 9,124 (1.94%) died and 438,780 (93%) recovered. These are patients who were confirmed to have COVID-19 via RT-PCR of specimens collected from the nose or throat. Recovered patients are those who have no or minimal symptoms and have either tested negative when a repeat RT-PCR of nasal or throat swabs was performed or completed a 14-day quarantine period. Average age for all cases, deaths and recoveries was 38.15 years, 62.21 years, and 37.52 years. There were 111,384 (23.6%) cases and 452 deaths among those aged 30–39 years. There were total of 730 severe patients. These patients have a pulse oximetry reading (SpO2) of less than 90% on room air and have more than 30 breaths per minute. These patients generally require oxygen support and hospitalization. A record of 1,369 were account to as critical patients. These are confirmed COVID-19 patients whose symptoms are so severe that they require a mechanical ventilator, medicines to maintain their blood pressure, have evidence of damage in multiple organs (liver, kidneys, heart, lungs, etc.), or require admission to the intensive care unit (ICU). There were also 18,187 total number of mild patients. These are patients with confirmed COVID-19 obvious signs and symptoms. However, these patients have an oxygen saturation of 90% and above on room air measured by pulse oximetry (SpO2), have less than 30 breaths per minute, and do not require oxygen supplementation (oxygen masks, nasal cannula). Those who died were more likely to be older, male, had trouble breathing, and had comorbidities, except for asthma, compared to all those who recovered. Meanwhile, there were 142 total number of confirmed cases who are pregnant. The average time between the confirmation and recovery was 11.99 days. The average time between confirmation and death was 11.63 days. Post humous cases were 5,282 (1.12%). This is the number of reported cases after the death of a patient.
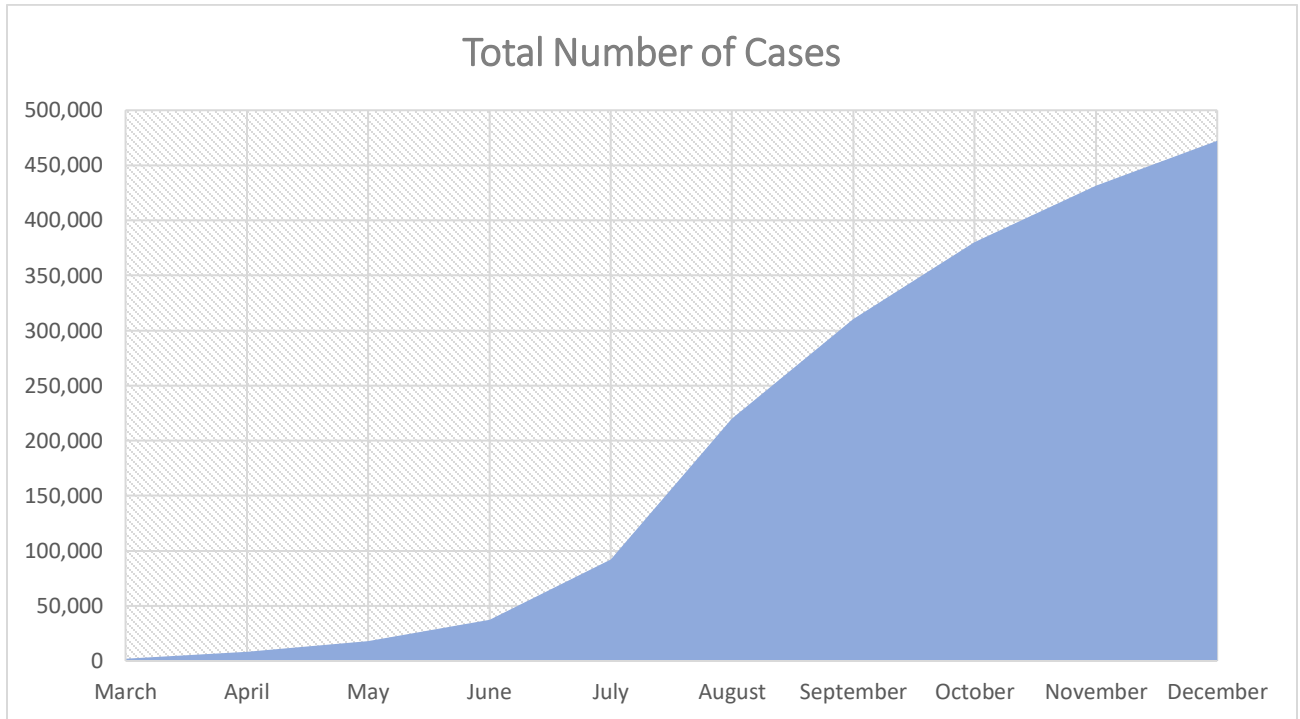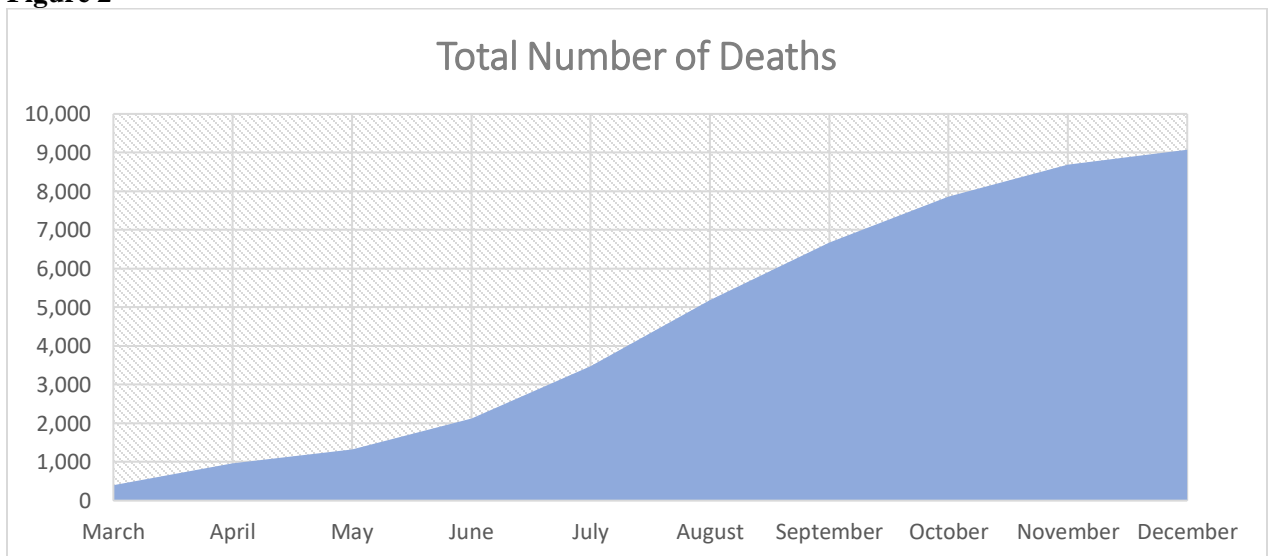
Figure 1

Total Number of Cases

Figure 2

Total Number of Deaths

Figure 3

Total Number of Recoveries per Day
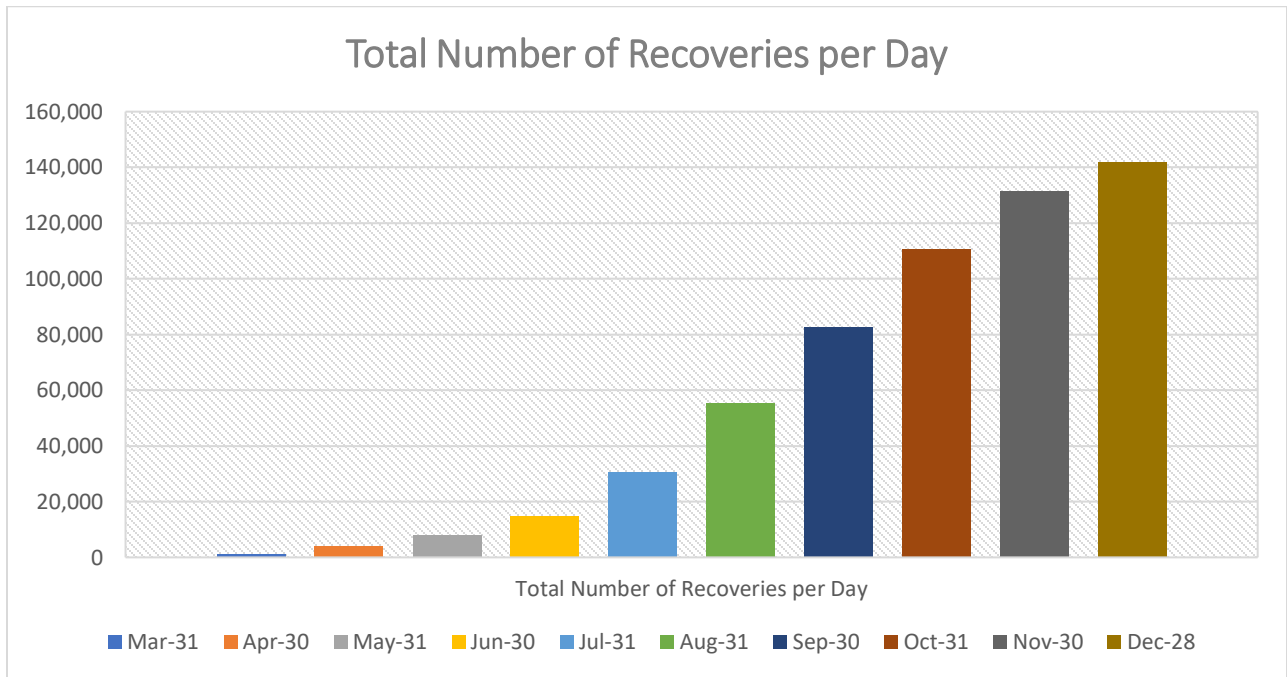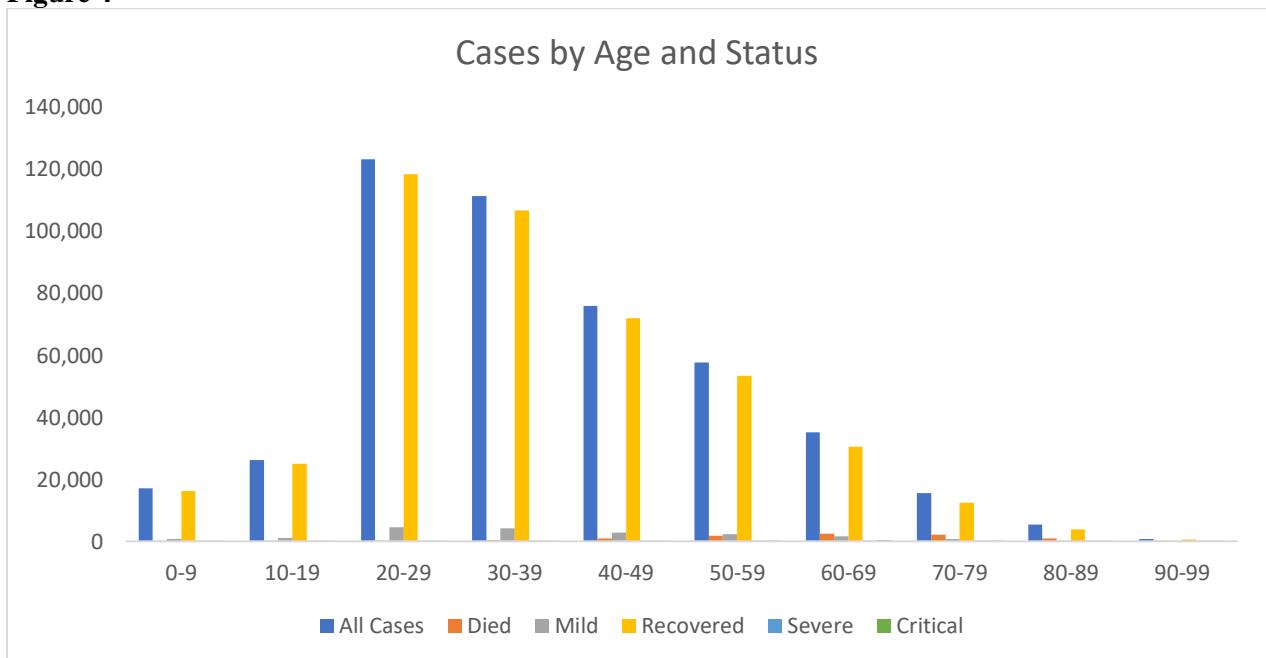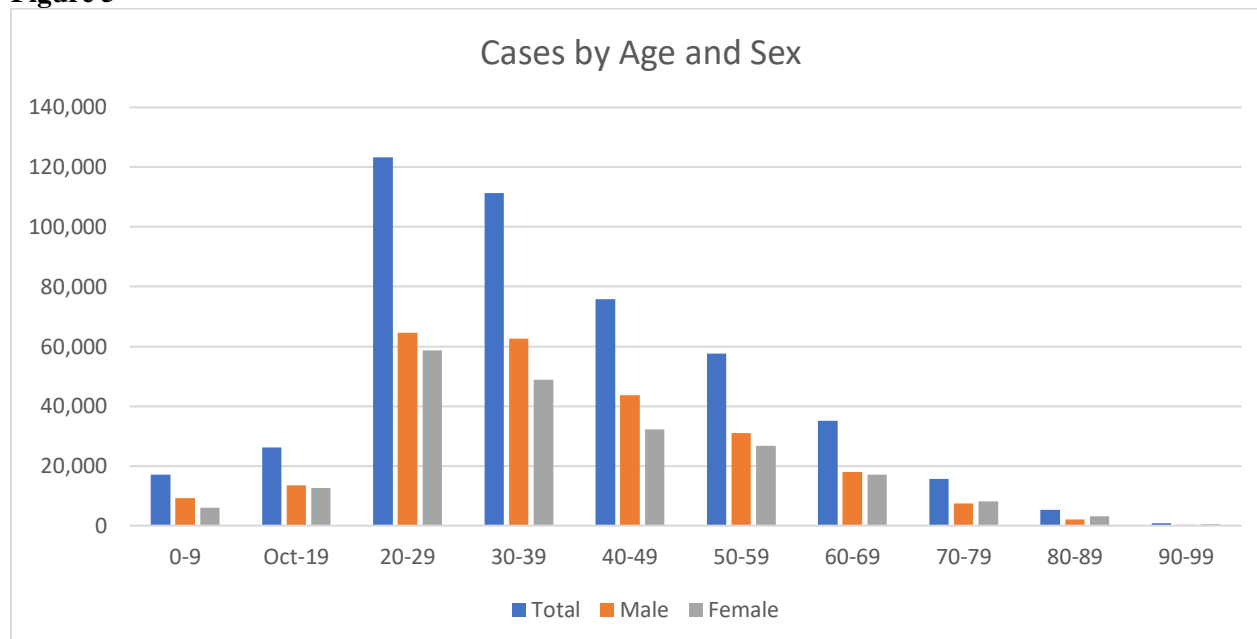
Figure 4

Cases by Age and Status

Figure 5

Discussion

This overview of the confirmed recorded cases since March 2020 of the COVID-19 outbreak in the Philippines provides a unique perspective on the transmission of COVID-19 in a health system with limitations in surveillance, testing and service delivery. Such information may aid modelling or data analyses efforts for outbreak response in the Philippines and countries with similar health system constraints as studies of the pandemic outside of high-income countries and in LMICs have been limited. Our results support findings that COVID-19 disproportionately burdens young adults and adult age groups, respectively. The age groups of 20-29/30-39 years old were the group of people that is currently working, or they frequently went out of their house to go to their work. There is a corresponding risk of going outside each person's home. Outbreak epicentres in the Philippines were urban centres, such as NCR and Cebu City, where NCR alone accounted for more than two-thirds of all cases. NCR is the fifth most densely populated metropolis in the world. The first few cases were likely imported into these urban centres, as approximately one-tenth of the population are migrant workers, and 8 million tourists visit annually.

The cases are progressively increasing since Mach 2020. I have found out that despite the quarantine and health protocols being mandated, the number of people being infected was not decreasing. We can assume for the following months that the number of cases will be higher. This is also affected by some parameters like the laboratory facilities, the waiting time between the RT-PCR Test Procedure and the respected laboratory results. On the other hand, I have found out that the number of people being recovered was also increases. This may be due to the change of classifications and descriptions of a patient labelled as recovered as per WHO. Recovered patients are patients who were confirmed to have COVID-19 via RT-PCR of specimens collected from the nose or throat. Recovered patients are those who have no or minimal symptoms and have either tested negative when a repeat RT-PCR of nasal or throat swabs was performed or completed a 14-day quarantine period.

The total number of deaths was also increasing. The average age of dead patients was 62.21 years. My results support the findings that COVID-19 burdens older age groups. This is also affected by some health variables because elderly patients have a decrease immune system, and they

are prone to such respiratory and other communicable or non-communicable diseases.

In the Philippines, surveillance delays were prominent due to the limited healthcare system capacity which affects the timeliness of decisions to suppress the outbreak. For example, on 7 March, the DOH officially reported local transmission upon public announcement of the sixth case [39, 40], but our findings suggest that the exponential growth period likely began more than 3 weeks earlier. Delays also affect rapid isolation of suspected cases. To reduce health-seeking behavioural delays, the National Health Insurance Program, of which all Filipinos are members under the newly passed Universal Health Care Law, has made laboratory testing free, and covers most of the community isolation and hospitalisation costs since mid-April. To reduce diagnostic delays, the Philippines has slowly expanded laboratory capacity from just one laboratory in February. More isolation facilities, such as stadiums, hotels, and schools, have been set-up for mild cases to save limited hospital resources for severe and critical cases. Information systems are being strengthened to allow synchronised reporting of cases at all ESU levels in real time.

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