

Health Systems Impact of COVID-19 in the Philippines

Diana Beatriz S. Bayani and Soon Guan Tan

Abstract

Lockdowns and policy actions to curtail the transmission of COVID-19 have widespread health system, economic, and societal impacts. Health systems of low-to-middle-income countries may have fewer buffering resources and capacity against shocks from a pandemic. This paper presents a preliminary review on the collateral health systems impact of COVID-19 in the Philippines through review of academic and grey literature, supplemented by a qualitative survey. Community quarantines alongside transport and boarder restrictions have universally impacted health service access and delivery, affecting patients requiring specialist care the most. Existing record-keeping and surveillance measures were hampered as existing resources were tapped to perform COVID-19-related tasks. Local health systems reinforced gatekeeping mechanisms for secondary and tertiary care through referral systems and implemented telemedicine services to reduce face-to-face consultation. The health system impacts in the Philippines have been variegated across municipal income class and topography, contributed by long-standing symptoms of inequitable resource allocation.

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Foreword

On March 11, 2020, the World Health Organization declared COVID-19 a global pandemic. With dire predictions about how the virus could devastate populations and overwhelm health systems, many countries imposed stringent measures to limit spread and the resulting morbidity and mortality. Yet most of these policy approaches focused narrowly on potential impacts for COVID-19, without sufficient attention to how the pandemic and various response measures would have broader indirect impacts across other health needs and health services. While the evidence of disruptions to essential health services was largely anecdotal to begin with, and its health effects mostly modeled, increasingly detailed evidence is beginning to emerge from countries.

Over the past year we partnered with research institutions in Kenya, the Philippines, South Africa, and Uganda to document, from a whole-of-health perspective, what we know about the nature, scale, and scope of the disruptions to essential health services in those countries, and the health effects of such disruptions. This research provides initial insights on the observed near-term indirect health impacts of the pandemic and response measures, relying on the best available data in the months following lockdown measures. However, it is important to recognize the limitations of conducting research during a pandemic and a continuously evolving epidemiological and policy context. We plan to build on these studies as more and better data become available, and as public health responses continue until the pandemic is brought under control.

In this paper, Diana Beatriz S. Bayani and Soon Guan Tan present findings on the collateral health system impacts of COVID-19 and its mitigation strategies in the Philippines. They show us that the story is nuanced; disruptions vary by service, by geography, and by sub-populations. They also remind us that evidence of disruptions today is a leading indicator of health effects in the future.

We are hopeful that the findings from this working paper – and the project as a whole – will contribute to our global knowledge about the ongoing and lingering effects of the pandemic, and ways to mitigate these effects. It is not too late for action. Armed with the kind of evidence in this working paper, national governments and global partners must focus their efforts on the most affected, most cost-effective services, and ensure that any lost generations due to the pandemic are minimized.

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Introduction

Governments across the globe are increasingly reliant on outputs of disease modelling to assess the risk of a pandemic and the cost-benefit of action (or inaction) to mitigate novel health threats. The use of models to inform suitable policy response was particularly evident in light of response against the COVID-19 pandemic (1–4). However, to date, models have had a near singular focus on COVID-19 cases and deaths and have not accounted for the vastly different contexts of countries, including the trade-offs and economic shocks that greatly affect how mitigation strategies translate to lives saved, especially in low- and middle-income countries (LMICs) (5).

Most existing models were not designed to contextualise impacts on the wider health care system and so, do not capture indirect health effects of policies; the knock-on or collateral health effects. This omission is not without consequences. Past pandemics and outbreaks have produced substantial evidence on the indirect health impact such as secondary mortality arising from policy interventions (6). During the 2014–2015 Ebola crisis in West Africa, it was estimated that a 50 per cent reduction in access to services led to an additional 10,600 deaths just from malaria, HIV/AIDS and TB—almost equal to the 11,300 deaths directly caused by Ebola (7).

Nearly a year into the pandemic, there has been substantial evidence and reports detailing the indirect health impacts of lockdowns and travel restrictions (8–11). Beyond impacts in the health systems alone, it is clear that repercussions of policy actions can ripple into the social, behavioural, economic and environmental domains in society that translate to health outcomes immediately and in the long run. LMICs in particular, may be disproportionately impacted due to the fragility of health systems with limited capacity and resources to buffer against shocks (12).

There is a need to understand the indirect effects of not just the pandemic itself, but also unintended effects of mitigation measures that have been adopted to contain it. This knowledge can allow for context-specific, tailored mitigation and suppression strategies to be considered, with the dual goals of controlling the epidemic and averting the worst direct and indirect health impacts.

At present, much of the literature and focus has been on the effect of mitigation measures on COVID-19 cases, deaths, testing capacity and other COVID-19 related-metrics. However, there have been limited attempts to understand how these pandemic mitigation measures, applied within the context of an LMIC, can impact different aspects of the health systems and thus, the population health. Thus, this paper aims to present a preliminary review of the collateral health systems impact of COVID-19 and its mitigation strategies in the Philippines.

Country Profile

The Republic of the Philippines is an archipelago in Southeast Asia geographically divided into three island groups: Luzon, Visayas and Mindanao (13). It is subdivided into 17 administrative regions consisting of 81 provinces, 146 cities, 1,488 municipalities for economic development and coordination of national government services (14).

The Philippines is a relatively young and populous country. In 2018, the population of the Philippines is estimated to be at 105.7 million with 49.7 percent of the population is below the age of 25 and 5.2 percent of the population is aged 65 and above (15). Poverty incidence stands at 16.7 percent and subsistence incidence was 5.2 percent in 2018 (16). Over half (51.2 percent) of all the population is residing in urban areas (17). The observed life expectancy in 2017 is at 73.1 years for females and 66.6 years for males. Under-5 and Under-1 mortality rate is at 26.6 and 19.9 per 1,000 live births respective in 2017 (18).

Health Systems Context

The Philippine health system is highly decentralised and devolved, with a mix of tax-financed public sector and for-profit and non-profit private sector providers. The Department of Health (DOH) is the lead agency involved in leadership, governance and regulation in health and provision of special tertiary health care services (19). Governance of localities, alongside health services delivery, social welfare services and maintenance of municipality facilities have been largely decentralised to local government units (LGUs) by the Local Government Code of 1991 (19,20). The aim of the devolution was to achieve a responsive and efficient delivery of basic primary health care and hospital care by shifting stewardship and overall decision-making to the LGU level (20).

The Philippines has made significant strides in advancing universal health coverage (UHC) through the Universal Health Care Act (Republic Act No. 11223), which was signed into law on 20 Feb 2019 (21). Under the Act, all Filipinos are automatically enrolled into the National Health Insurance Program (NHIP), a social health insurance scheme managed by the Philippine Health Insurance Corporation (PhilHealth). Alongside major health systems reform and delineation of roles across key agencies and stakeholders, this act aims to ensure that all Filipinos are able to gain equitable access to quality and affordable health care (21).

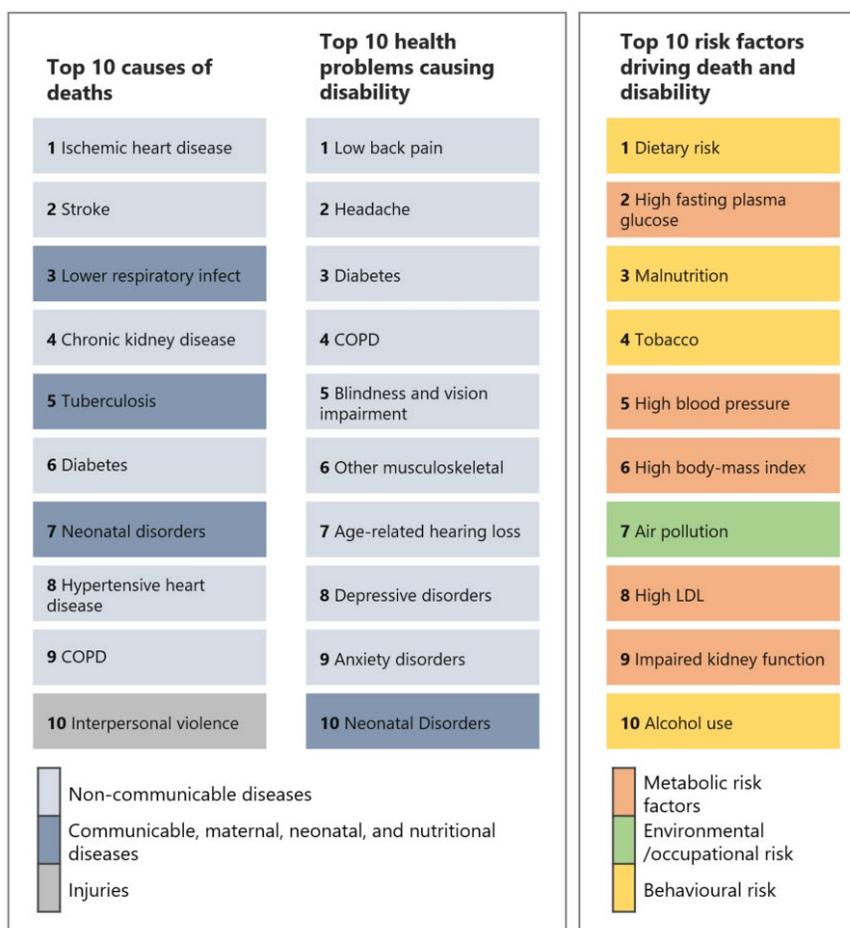
Despite significant reform in devolving health services and advancing UHC, this progress has not been uniformed. Several longstanding challenges such as highly fragmented care, maldistribution of health facilities, health human resources and financing continues to afflict the Philippine health system (20,22,23). Notably, widespread inequity persist in health services access and health outcomes across geography and socioeconomic strata (20,24–26).

Several macro indicators highlight the extent of inequity in the system. Health facilities resources and workforce remains variable across geographic regions. National data reflect an average of 10.1 hospital bed per 10,000 people in the Philippines in 2015, however, disaggregated data indicate that resources are concentrated in urbanised regions, mostly in the National Capital Region (NCR). (19). In the same vein, healthcare workforce distribution

in the Philippines is also highly inequitable. In 2017, there are 3.9 doctors for 10,000 people nationally, but disaggregate statistics reveal that the density ranged from 10.6 per 10,000 in the NCR to 3.1 and 0.9 in Western Visayas (Region VI) and Autonomous Region in Muslim Mindanao respectively (19).

Against the backdrop of these health reforms and challenges, the Philippines is facing a triple burden of disease of communicable disease (CD), non-communicable diseases (NCDs) and natural disasters (typhoons, floods, earthquakes) (22,27). The leading cause of death, disability and the underlying risk factors are presented in Figure 1. In sum, the deficiencies in the health systems discussed above, coupled with the triple burden of disease poses a fundamental challenge in priority setting, not only in terms of financing healthcare but also in the delivery of services and implementation of programmes. This proves to be even more difficult in a crisis of a large scale such as the COVID-19 pandemic, where existing inequities were further exposed and exacerbated by many of these perennial weaknesses.

Figure 1. Top 10 causes of death, disability (years lived with disability) and risk factors contributing to most the most death and disability (Disability Adjusted Life Years (DALYs)) combined in the Philippines, 2017, all ages number



Source: Institute for Health Metrics and Evaluation (18).

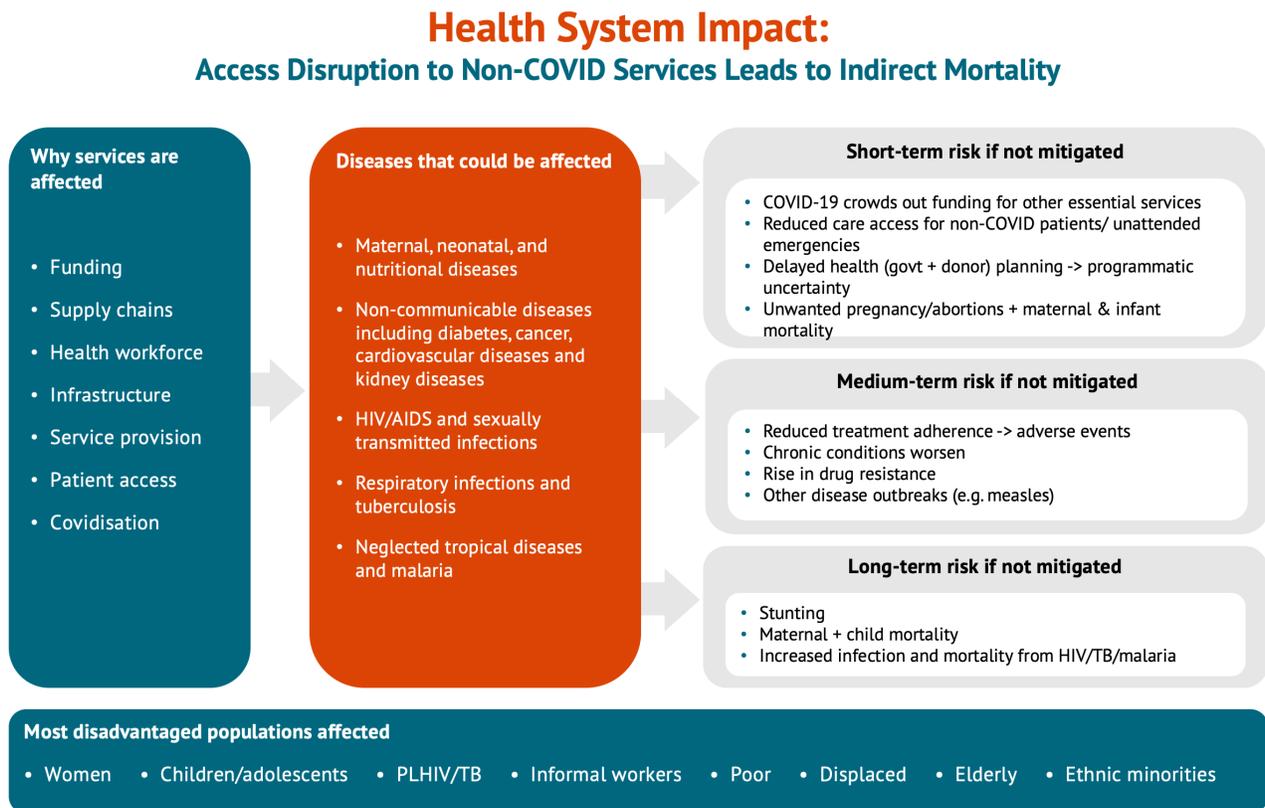
Note: COPD, Chronic obstructive pulmonary disease; LDL, Low-density lipoprotein.

Materials and Methods

Conceptual Framework

We applied a conceptual framework (Figure 2) developed from previous review work (28). The framework examines the indirect short to long term impacts of pandemic mitigation measures on health systems if left unmitigated. The purpose of this framework is to help identify broad areas of health and health care that may be affected by disruptions in provision and access to healthcare services from the health systems perspective. Indirect effects can range from health outcomes such as morbidity and mortality, service delivery outputs such as an expected change in utilization and access. By the same token, it can be used to support the design of strategies to mitigate indirect health impacts from health system disruptions.

Figure 2: Framework to Assess Health Systems Impact



The present study adopted the framework to identify the collateral health system impact of COVID-19 in the Philippines. This includes a review of academic and grey literature and qualitative inquiry with key informants in the Philippine health system.

Methods

First, a review of existing literature, both from academic and non-academic (i.e. grey literature) was conducted. Grey literature, including news reports, publications from non-governmental organisations, official government reports and websites were identified and considered. The conceptual framework in Figure 2 was used to guide the literature search process. Under each sub-factor of why services are affected (e.g. health workforce, service provision, patient access), we started by scoping out the extent of the **short-term** impacts of COVID-19 measures. The sub-points under the short-term impacts (for instance, “affected”, “impact”) were used as search terms and keywords to guide literature review.

A qualitative study was conducted through in-depth interviews with health system managers in different levels of care in the Philippines. The primary purpose of the interviews was to complement findings obtained from literature and understand experiences on the ground that may not have been reported in secondary data sources. The qualitative approach allowed for the gathering of information, experiences and challenges faced by the interviewees (29). In addition, the unique flexibility of the KIIs allowed participants to present rich data offering embodied perspectives and the interviewers to probe to detailed accounts of their experiences.

Participants were recruited through purposive and snowball sampling. There were two main categories of respondents: 1) Local health system managers such as the Municipal Health Officer (MHO) and Rural Health Physicians (RHP) who both work at the local government unit (LGU), 2) Medical centre chief or head of hospital to provide expert input and insights on the impact of policy actions on the ground. We recruited participants to cover at least all three island regions in the Philippines to gain a brief understanding of the situation on the ground. We also ensured that we got a variety of respondents across municipal income classes (1st to 6th class), and topography (island, landlocked and mountainous). We also interviewed one department head in a teaching hospital that was a designated COVID-19 facility to understand the effects at the tertiary level.

We conducted semi-structured interviews of participants via telephone or video calls from 12 September 2020 to 7 October 2020. The interview guide was constructed based on the health systems impact framework in Figure 2. All interviews were audio-recorded, with the acknowledgement and verbal consent of the interviewees before the interview. They were first asked to describe their municipality or hospital in terms of demographics, patient volume, common causes of morbidity and mortality and service delivery network before the pandemic to understand the local context better. After which, we validated whether their area followed suit with national community quarantine guidelines, and asked about different measures that were implemented as a response. After having a good understanding of the baseline pre-pandemic scenario, participants were then asked to describe observed changes in service disruptions, as well as behaviour, access to care and health outcomes of their

catchment population. They were also asked about their opinion and views on the appropriateness of lockdown measures implemented, how they adapted to these and key challenges they faced. All interviews were conducted by the lead researcher (DB) together with a scribe (TSG) and were done in English.

This study was reviewed and granted exemption by the Single Joint Ethics Review Board of the Philippine Department of Health (SJREB-2020-62).

Data analysis

Relevant data obtained through the literature review were first collated and organised in the relevant subsections. Anecdotal data and quantitative estimates (where available) of findings indicating the downstream impact of COVID-19 lockdown measures were collated and mapped to the framework.

Audio-records of the interviews were transcribed and analysed using thematic analysis to identify, analyse and report patterns within the data (30). The analysis of the interviews was done concurrently with the literature review and recruitment of participants to identify emergent themes from literature reviews and estimates for indirect health benefits calculation. Themes and quotes reported in the case study were anonymised, removing potential identifiers (e.g. roles/titles, location of practice).

Results

Overview of COVID-19 Situation & Mitigation Strategies Adopted

Government response to the COVID-19 pandemic

The Philippines has adopted a whole-of-government and whole-of-society approach to combat COVID-19. The Inter-Agency Task Force on Emerging Infectious Diseases (IATF-EID) (31), chaired by the Department of Health (DOH), with representatives from various other government departments, was convened in early January 2020 and directed much of the response and mitigation measures against the COVID-19 pandemic (32).

Bayanihan to Heal As One Act (Bayanihan Act) and Bayanihan to Recover as One Act (Bayanihan 2) were two consecutive legislations passed by congress granting the President additional authority and also to expedite the implementation of measures to address the collateral impact of the COVID-19 pandemic (33). Amongst the plethora of policies measures, the act allowed the reallocation of budget for fiscal stimulus, social amelioration programmes through cash aids for low-income households, hazard compensation for frontline health workers and laws against hoarding, profiteering during the pandemic (33,34).

The Philippines government has relied on non-pharmaceutical interventions (NPIs), like many other countries, to contain COVID-19 transmissions. In the initial phase of the outbreak, selective measures involving quarantine of returning travellers and travel restrictions to and from high-risk regions were imposed. These NPIs progressively included more stringent and broad-based interventions, involving community quarantines (31).

Lockdowns, termed 'community quarantines', have been Philippines' key strategy to limit COVID-19 spread. These quarantine measures are classified into four varying levels of stringency summarized in Table 1. The enhanced community quarantine, termed ECQ, is the highest level of quarantine measures imposed in areas with high transmission risk. Population mobility is severely restricted under ECQ as the entire population were placed on stay home orders, with suspension of public transportation and non-essential services and businesses (35). Mass gathering and movement across states and borders are prohibited unless for essential purposes, defined as those related to the provision of food, water, medicines, medical devices, public utilities, energy and others determined by the IATF.

Modified ECQ (MECQ) is reserved for high to intermediate risk areas, with some work and activities allowed to resume under strict guidelines. General Community Quarantine (GCQ) is implemented in areas of low to intermediate transmission risk. Modified GCQ (MGCQ) is the lowest level of community quarantine, with further socio-economic activities permitted with adherence to public health protocols and gatherings of up to ten persons. Under all levels, the public are to adhere to IATF-EID's minimum public health guidelines for COVID-19. This includes donning facemasks, observing hand hygiene and personal hygiene, frequent sanitation and complying with physical distancing guidelines in public spaces (36).

Community Quarantine Measures

ECQ was imposed in Metro Manila from 15 March to 15 April 2020 and was subsequently extended to the rest of Luzon Island two days later as local transmission of COVID-19 cases continually increased. The ECQ was later extended to 30 April as recommended by the IATF-EID. From 1 May to 31 May 2020, only select areas in Luzon were under ECQ or MECQ based on COVID-19 risk assessment (37).

The COVID-19 Government Response Stringency Index (Stringency Index) by Oxford COVID-19 Government Response Tracker (OxCGRT) is a composite measure that informs stringency of government policies and response (38). From the point of ECQ to April, the stringency index was at its maximum score of 100. However, the number of new cases of COVID-19 did not drastically decline but increased, even towards the end of May. As of 1 October 2020, there are 311,694 confirmed cases of COVID-19, with 50,925 active cases and 5,504 COVID-19 deaths. National Capital Region (NCR), Batangas, Bacolod City, Iloilo City, Tacloban City, Iligan City, and Lanao del Sur remained in GCQ status while the rest of the country was under MGCQ (39). Figure 3 shows the cumulative and daily confirmed cases and deaths from COVID-19 vis-à-vis the OxCGRT Stringency Index.

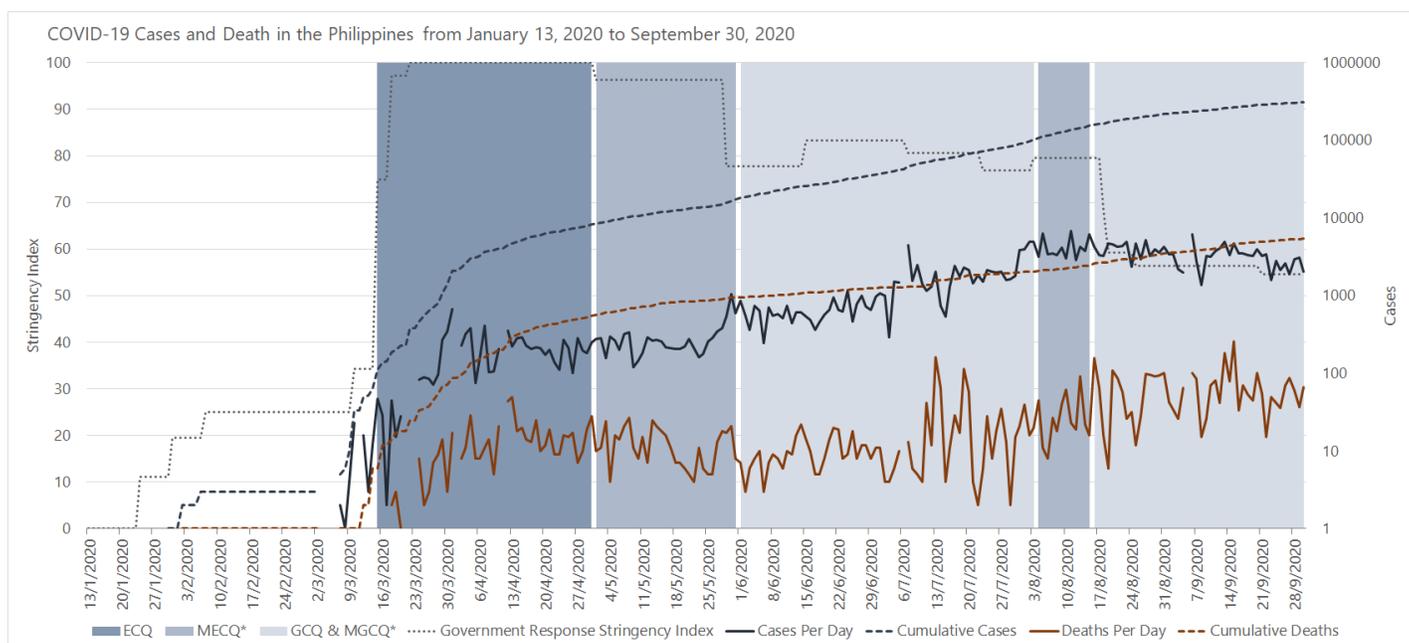
Table 1. Summary of key community quarantine measures across different stringency levels adopted in the Philippines

	Enhanced Community Quarantine (ECQ)	Modified Enhanced Community Quarantine (MECQ)	General Community Quarantine (GCQ)	Modified General Community Quarantine (MGCQ)
	<i>High-risk areas</i>	<i>Moderate to high-risk areas</i>	<i>For moderate to low-risk areas</i>	<i>Proposed for low-risk areas</i>
MOVEMENT AND GATHERING				
Population	All are expected to stay at home.		Population at high-risk (vulnerable elderly and youths) required to stay home	
Mass Gathering	Not allowed	Highly Restricted (5 maximum)	Restricted (10 maximum)	Allowed, limited to 50 percent of the venue capacity
Transportation	Public transportation is not allowed		Public transport is allowed with strict physical distancing guidelines and safety protocol	
Inter-island Travel	No inter-island travel		Inter-island travel (GCQ to GCQ) allowed with safety protocols	
SCHOOLS, WORKPLACES AND GOVERNMENT SERVICES				
Businesses and Workplace Arrangement	Work suspensions, exception for workers in offices or industries permitted to operate Businesses providing basic necessities are allowed to operate	Essential industries permitted to work at full capacity, with others operating at a 50% capacity	Essential industries permitted to work at full capacity, with others operating at 75% capacity	Full operating capacity for public and private offices. Alternative work arrangements for elderly persons or those with other health risks
Government Services	Skeletal workforce	Skeletal workforce	Alternative work arrangement	Physical reporting for work with safety guidelines
Schools	School premises closed	School premises closed	Skeletal workforce permitted in schools	Limited face-to-face or in-person classes may be conducted

Sources: Official Gazette of the Republic of the Philippines. Executive Order No. 112, s. 2020 (35); Official Gazette of the Republic of the Philippines. Omnibus Guidelines on the Implementation of Community Quarantine in the Philippines with Amendments as of July 16, 2020 (36)

The decision to impose, extend or lift a community quarantine in provinces, highly urbanised cities and independent component cities were determined by the IATF and Office of the President. Regional IATFs and their respective LGUs can decide for their component municipalities within their provinces, but the degree of stringency cannot be lower than what was recommended at the provincial level (35). LGUs are not to declare their own community quarantine measure without concurrence with their respective regional IATFs. As a result, across different localities and regions, the level of stringency may greatly differ.

Figure 3: Cumulative and daily confirmed cases and deaths from COVID-19 with Oxford COVID-19 Government Response Tracker (OxCGRT) 'COVID-19 Government Response Stringency Index (Stringency Index) from 13 January 2020 to 30 September 2020.



Source: COVID-19 cases and death counts are obtained from: <https://ourworldindata.org/coronavirus/country/philippines?country=~PHL>. Stringency index data is obtained from: <https://ourworldindata.org/policy-responses-covid> (40).

Note: The shaded area of the graph represents the main community quarantine measure imposed in the Philippine in descending order of stringency, with the darkest shade of blue presenting ECQ; followed by MECQ and the lightest representing GCQ & MCQ.

Health Systems Impact of COVID-19 Mitigation Strategies

Effects on patient access and health service delivery

Transport and border restrictions introduced by community quarantine measures have universally impacted health services access and delivery. Rapid surveys conducted by various agencies reflected reduced access to basic services and health facilities in the earlier phase of the pandemic (Table 2). Care seeking behaviours in both providers and patients have also changed as a result of NPIs and the fear of contracting COVID-19. On the supply side, the measures to contain COVID-19 have siphoned away significant manpower and resources that provide routine essential services.

Table 2. Impact to access to healthcare services in various reports

Organization/ Agency	Region	Survey Period	Sample Size	Related Findings
UN Women Rapid Assessment Survey (41)	Not stated	23 April 2020	1,883	Seeking medical care and supplies <ul style="list-style-type: none"> • 66 percent of women and 75 percent of men indicated that they were unable to seek medical care when needed • 69 percent of women and 81 percent of men indicated difficulty accessing medical supplies/hygiene products/food
National Economic and Development Authority (NEDA) (42)	All regions, 47.6 percent from NCR	5 April to 8 April 2020	389,859	Accessing health facilities <ul style="list-style-type: none"> • 38.5 percent of respondents indicated that they encountered difficulty in accessing health facilities • 49.1 percent encountered difficulty in accessing pharmacies
World Vision Philippines (43)	42 municipalities and 6 cities in 20 provinces	16 May to 6 June 2020	985	Accessibility of health services compared to before COVID-19 Pandemic <ul style="list-style-type: none"> • Essential health service: 26 percent decline • Maternal centres: 13 percent decline • Mobile health clinic: 12 percent decline Only 25 percent of the household survey respondents are able to meet health care and medical expenses of household members, including children

Respondents from the qualitative interviews unanimously agreed that patients requiring specialist care, both emergent and non-emergent, were impacted the most by community quarantine measures. Specifically, these are the patients with complicated or high-risk pregnancies, stroke, and myocardial infarction. Many of these emergent cases were cited to die in transit as they were either not brought to the appropriate secondary and tertiary facilities due to travel restrictions, or rejected by emergency departments of the nearby hospital as they were only accepting COVID-19 patients. The extent of this disruption varied greatly, although this was more evident in the geographically isolated municipalities (i.e. mountainous or island) where the nearest facility requires both land and sea transport. Community quarantine protocols required special passes for these patients to be transported, which cannot be immediately given for those needing emergent care. Non-emergent cases needing specialist care (e.g. peritoneal dialysis, diabetes patients) faced challenges in getting the necessary approvals as they were not considered as having life-threatening illnesses. Demand-side factors also played a role in the reduced access to speciality services. Respondents shared that the majority of patients were discouraged from seeking hospital care due to fear of getting COVID-19, in addition to the tedious process of obtaining approvals for travel.

In contrast, when asked about the interruption to routine primary care services, these were described as “minimal”, as the rural physicians found ways to adapt to the restrictions. Possible inconsistencies from the results from the cross-sectional surveys (Table 2) may be attributed to the surveys not delineating the level of care (primary or specialist care in tertiary centres), and most were conducted in the NCR, comprising of high-urbanized cities where the extent of disruption may be drastically different. Interviewees also cited that many municipalities implemented telemedicine either through a dedicated hotline for phone or radio-based consultations. Other channels such as social media were also tapped to disseminate information about their community’s COVID-19 situation. Barangay Health Workers (BHW) and Public Health Nurses played a more active role in the local health system; they delivered prescription medicines and family planning commodities to patients’ homes, scheduled vaccination visits, and did-prenatal check-ups at the barangay level. One participant cited that this even improved the implementation of the referral system as they would contact the BHW first, whose concerns were brought up to the assigned nurse before it was raised to the MHO.

The extent and impact of disruptions varied largely depending on access to care at baseline (pre-COVID-19), municipal income class, topography and severity of COVID-19. Poorer municipalities and those with indigenous populations were mentioned to be disproportionately affected. One respondent from a municipality in Mindanao added that margin for impact was already poor to pre-COVID and most patients, particularly those in remote barangays, were most affected.

“... patient access to healthcare was already very poor even before ECQ... the indigenous peoples have more difficulty accessing care since their needs have never been met even before COVID-19, so they were already at a bigger disadvantage.” – 004-RHP from Mindanao

Effects on health information systems and human resources

The impact of COVID-19 on health information systems activities, including record-keeping, data collection and surveillance, were found to be mixed. In areas operating with a lean health care team, task-shifting were noted to be common, with staff performing additional duties related to COVID-19 on top of their usual role.

“For example, for me as a MHO, there was a time I had to do the swabbing, I had to do sample preparation. So, I was functioning as a med-tech (medical technician). There was a time where my midwife was acting as a nurse, to make (provide) direct care for the patient, there was a time where my administrative aide, which is a non-clinical or non-healthcare person, (we) had to delegate some tasks, medical tasks to those persons. So, a lot of task shifting was done to accommodate changes due to COVID...”
– 001-MHO from Luzon

The expansion of roles contributed to significant delays in reporting of indicators and balanced scorecard to the Department of Health. Another informant shared that vital statistics data that needed validation of paper records were delayed due to the movement restrictions from one island to another.

Conversely, the first-class municipality shared that most of their regular operations pushed through without significant disruptions, except for special projects such as medical missions and research activities. The physician from a first-class municipality in Luzon even shared that they were able to hire additional staff such as contact tracers and encoders so that data recording and reporting were not impeded.

Changes to service delivery networks

The service delivery networks of health systems have been widely impacted by the shifts in behavioural patterns of both patients and providers. At the patient level, barriers to access onsite care due to border and transportation restrictions and the fear of contracting COVID-19 drastically reduced patient volumes at health centres, particularly at higher level care facilities. At provider level, interviewees shared that they adapted by implementing programs and innovations in health care delivery while still adhering to the quarantine protocols. The most common change cited was the reinforcement of the referral system to avoid unnecessary visits to the health unit. This approach leveraged the existing community health care staff by designating specific roles at the barangay level. Complementing the reinforced referral systems, Barangay Health Emergency Response Teams (BHERTs), composed of a barangay (community) executive officer, *tanod* (guard) and health workers, were mobilised by the government to support community efforts against COVID-19 (44,45). BHERTs tasked to provide surveillance, monitor home quarantines, contact tracing and support COVID-related healthcare needs to minimise disruptions to care during the pandemic and lockdown measures.

An interesting observation was that some municipalities saw a reversal in outpatient volume and deliveries at the rural health unit once COVID-19 cases were stabilized. These facilities faced increased case load compared to their usual, pre-COVID levels as patients preferred accessing care in a smaller facility rather than go to a hospital. Alluding to this observation at the primary/rural care setting, the chief of a tertiary care facility highlighted that patient volumes, which was contributed by largely by primary care outpatients consults pre-COVID, may not return back to baseline as patients begun to seek care at the right levels.

“... our most common outpatient consults unfortunately, though we are a tertiary care center, it's still hypertension, presbyopia and diabetes. So, it's still a primary care outpatient mostly...”– 006-Chief of Tertiary Care Facility

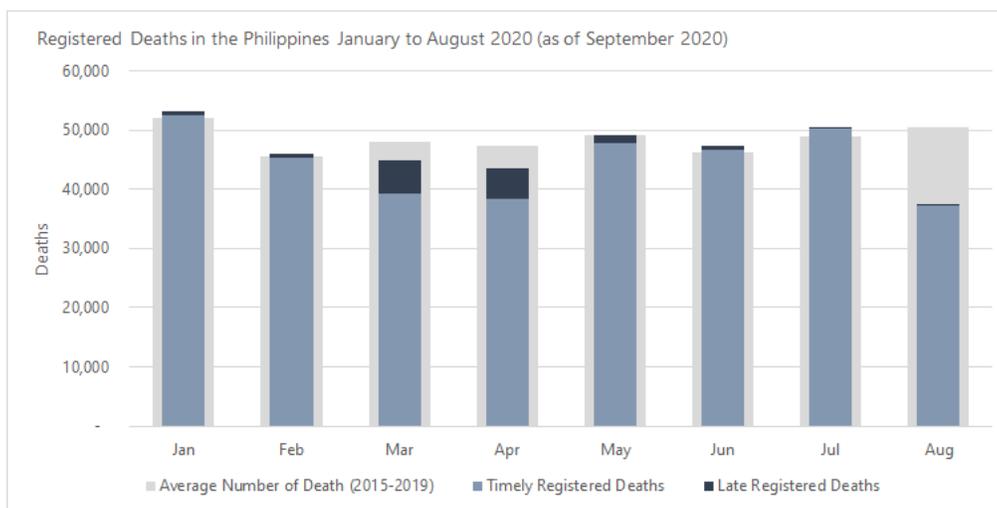
“I think now the challenge is how to bring back all those patients.... which, of course, not all of them, the ones that we can truly serve. And we realize that maybe we will not have as many as we did before, because everyone came here, the big hospital mentality, they have a cough, they wanted to come to (our hospital) in cases it's pneumonia, right, or a UTI just in case it's a something more severe. Maybe people realize they can go to other (lower tier and level) hospitals, because that's what they're doing now.”– 006-Chief of Tertiary Care Facility

This emphasizes the need for a more organized service delivery network, which is one component of the Universal Health Care Law that has been put on hold since the start of the pandemic. There is no formal gatekeeping mechanism in the existing system; patients are free to seek care in secondary and tertiary facilities without a referral from a primary care physician. However, given the restrictions brought about by COVID-19, strengthening primary care and community-oriented practices becomes an imminent priority.

Excess Mortality

During the imposition of ECQ measures in the Philippines, there was a reduction in the number of deaths registered in March and April, accompanied by a gradual return to baseline and a slight increase in July when compared to 2015 to 2019 average (Figure 4) (46). Daily average deaths registered in March and April 2020 declined by 100 deaths as compared to 2015-2019 average. This increase in number of late registered deaths as compared to 2019, corroborated with accounts from rural health physicians that were interviewed for the study that collection and reporting of vital statistics were delayed. This reduction reverted to normal in May and an increase in mortality in June and July 2020 as compared to averages in the preceding five years. Registered deaths in August 2020 was substantially lower, although the preliminary report from the Philippine Statistics Authority cautioned that more late registrations may be account for later (46).

Figure 4. Registered deaths in the Philippines from January to August 2020, as of 30 September 2020



Positive impact of mitigation measures

The impacts of lockdown measures on the environmental aspect of health have been largely positive in several countries (9,47). While access to health services have been dampened by lockdown measures, it has also brought about positive impacts that led to reduction in mortality and morbidity from traffic accidents and plausibly air pollution. Death attributed to land transport accidents accounts for 12,487 (~1%) of all deaths recorded in the Philippines in 2018 (15). Reduction in traffic-related deaths and injuries due to restricted mobility and travel was observed in the Metro Manila during the imposition of ECQ. Road crash statistics from Metro Manila indicate 80 percent reduction in cases of fatalities in April 2020 under ECQ, compared to 2018 and 2019 average. Non-fatal injuries saw a larger reduction of over 80 percent from April to June 2020 (48–50). The absence of routinely published statistics on traffic accidents from other regions, limits our assessment of traffic mortality from other regions of the Philippines with varying population densities and traffic.

Related to traffic volume, air quality in the Philippines have also improved from the quarantine measures (51,52), as observed in other countries that instituted lockdown measures as well (9,53,54). In Metro Manila, tropospheric nitrogen dioxide (NO₂) dropped by approximately 52 percent in comparison to 2019 levels under ECQ and particulate matter 2.5 (PM_{2.5}) levels decreased by 180 percent ten days following the start of the ECQ (52). Modelling estimates examining from China and Europe suggest that improved air quality from quarantines may contribute to reduction in deaths from cardiovascular and respiratory diseases (55). While this observation may be plausible, we were unable to identify empirical evidence detailing mortality or morbidity reduction attributed to air quality improvements during the pandemic from the Philippines.

Discussion and Conclusions

This paper presents an attempt to understand the collateral impact of COVID-19 and quarantine measures in the Philippines through a review on academic and grey literature, supplemented by a qualitative survey. The findings presented in this study highlights that the immediate and longer-term health impacts brought by quarantine measures are intricately connected and needs to be considered in pandemic response measures. Estimating the collateral impact of COVID-19 and NPIs across major disease burdens groups is an incredibly complex endeavour. The heterogeneity across and within localities in sociodemographic factors, population density, LGU's decision to impose CQs, as well as a constellation of other factors adds on a layer of complexity in estimating indirect impacts of COVID-19.

Beyond the economic aspects of a lockdown, it is evident that imposing a lockdown brings along a heavy societal cost that is entangled with immediate and long-term health outcomes. Discussions on imposing lockdown have often been weighed by the trade-offs between the public health (anchoring on COVID-19 cases and death) and economic dimension. However, this trade-off should not be viewed as a dichotomous one. Community quarantine measures should not be seen as an intervention that imposes a set of restrictions inflexibly. There should be responsive surveillance systems in place to monitor the effects and provide timely feedback to policy makers. Clearly, flattening the epidemic curve goes hand in hand with social protection measures and other policies directly responding to the needs of the population.

We had a strong interest in reporting all health impacts in terms of mortality as it is the most objective measure and allows for better comparability with other settings. Excess mortality data has been used to estimate the direct and indirect mortality attributed to COVID-19 (56). Excess mortality is defined as the difference in the number of deaths arising from death from all causes compared with the expected deaths in a specific time period, usually with reference with mortality data in the previous years. Reports examining excess mortality have helped elucidate the age groups and geographic regions that have been disproportionately impacted by COVID-19 (10).

In our analysis of death statistics, we were unable to attribute any particular cause in the reduction of registered deaths identified in March and April 2020. Unlike most countries which experienced excess mortality (not due to COVID-19) from factors such as health systems overload, the reduction in registered deaths in the Philippines was rather peculiar. On closer inspection, there was an increase in deaths in the National Capital Region and CALABARZON region (46). It is unlikely this reduction is due to surveillance bias and there will be additional late registered deaths. Factors that have led to this reduction could be due to the reduction in traffic-related accidents, mortality from metabolic respiratory and cardiovascular NCDs commonly aggravated by air pollution (55), and unhealthy lifestyle and behaviour. These early figures must be interpreted with caution, given that there is still a lag in reporting and may further contribute to additional deaths in the more recent months.

It is likely that the findings observed in the first six months since the start of the COVID-19 pandemic are just the tip of the iceberg. Health effects in the medium and long-term must be continuously monitored and evaluated, and learnings from this exercise can be used to mitigate the longer-term effects. Our findings are mainly hypothesis generating and require further testing and validation through an in-depth analysis of actual, more granular data on mortality and health service delivery when they become available. A larger study involving a nationally representative sample of hospitals and municipalities is warranted. Another limitation is that reports and studies presented in this review come from a wide range of sources, both published and grey literature where quality is also varied.

While it is without a doubt that the COVID-19 pandemic brought about severe negative impact to the country, it cannot be denied that there were lessons and realizations that could be leveraged to bring about positive impact for the future. Key findings on the need for coordinated service delivery networks were emphasized, and must be prioritized together with other reforms stipulated in the universal health care program. However, it must be noted that strengthening the health system requires more than just the cooperation of health care facilities and health professionals. Good health governance and a whole-of-health approach is also needed to improve the local health systems to be more resilient, adaptive, and responsive to the needs of the people.

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