

# Hospitals of tomorrow

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How has the COVID-19 pandemic transformed the design, operation, and service delivery of health care?

The impact of the COVID-19 pandemic has either exposed or strengthened fragile health care systems across the globe. In the Philippines, the pandemic has placed further strain on our fragmented public health system and has put a huge amount of pressure on our hospitals and its health workers. Yet the key challenges that hospitals and health systems face during the pandemic have shaped the future structure and design of health care. The lessons we have learned from COVID-19 have led us to create measures that require resilience and flexibility from us to overcome the radical changes in the health system and prepare

us for an uncertain future.

On March 15, 2020, Davao City was placed under community quarantine to curb the spread of COVID-19.<sup>1</sup> Symptomatic persons and their contacts began to be referred to Southern Philippines Medical Center (SPMC), the primary designated health care facility in Davao City for the medical management of patients with suspected and confirmed COVID-19. Consequently, SPMC enforced several structural and operational modifications, including dedicating several wards and intensive care units (ICU) to patients with moderate to critical COVID-19, transforming the outpatient department (OPD) face-to-face (FTF) consultations to teleconsultations, forgoing elective surgeries (except caesarian sections), and conducting conferences, meetings, and seminars online.<sup>2</sup>

At the height of the infection surge attributable to the Delta variant in late September to late October 2021, 628 beds (111 ICU beds and 517 ward beds) in SPMC were dedicated for COVID-19 patient admissions.<sup>3-4</sup> This was approximately 42% of the institution's authorized bed capacity of 1,500.<sup>5</sup> (Note: This number of beds for patients with COVID-19 plus the remaining beds allocated for patients with non-COVID-19 illnesses may be less than the actual number of authorized bed capacity, considering the distance required between adjacent beds in order to maintain physical distancing.) In November 2021, as the daily number of new COVID-19 infections declined nationwide, SPMC was named by the city government as the lone COVID-19 hospital in Davao City, while private hospitals in the city ceased to admit patients with COVID-19.<sup>6</sup>

Since November 2020, when SPMC was designated as the main Regional One Hospital Command Center,<sup>7-8</sup> the institution's health capacity and utilization became critical as unvaccinated people were hospitalized at an alarming rate and countless health workers were

infected with COVID-19.

## SPMC MITIGATION STRATEGIES IN RESPONDING TO THE COVID-19 PANDEMIC

SPMC's harrowing experience, as well as the other COVID-19 hospitals' ordeal, during a surge, illustrated how an unprecedented pandemic crisis can change health care operations. The knowledge of the likelihood that another virulent COVID-19 variant or sub-variant would emerge, or that another deadly virus would arise, is changing the infrastructure of health care. Since the start of the COVID-19 pandemic, SPMC devised mitigation strategies to maintain or expand its capacity to care for patients and ensure the safety of its health workers.<sup>2</sup>

SPMC began introducing several structural modifications in the early months of the pandemic, but not without encountering substantial challenges in its implementation and delivery. Expanding COVID-19 bed capacity, particularly specialized beds for ICU setup, while trying to prevent infection spread to non-COVID-19 patients, posed a significant challenge for the hospital. Several wards and ICUs were converted into COVID-19 units, and existing spaces were repurposed into temporary or modular structures, to house the surge of additional patients.

SPMC started leaning on telehealth for alternative health care delivery, and this was seen as a huge transformative effort to keep health care providers and patients safe from contracting the virus. Since June 2020, SPMC has been implementing teleconsultation in its outpatient service delivery. Patients are directed to the SPMC Virtual Consultation Facebook page where they are triaged to their designated clinical department, and interviewed and examined virtually by the OPD resident-on-duty.<sup>9</sup>

Elective and non-emergent surgical procedures in SPMC were temporarily suspended to reduce the risk of viral transmission, to conserve personal protective equipment, hospital beds, and key equipment, and to allow the reassignment of surgical clinicians and staff

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### Received

13 January 2022

### Accepted

9 February 2022

### Published online

10 February 2022

### Cite as

Perandos-Astudillo CM. Hospitals of tomorrow. *SPMC J Health Care Serv.* 2022;8(1):1. <http://n2t.net/ark:/76951/jhcs8m99dq>.

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to COVID-19 response. However, when COVID-19 cases started to decline last year, elective surgery services were resumed, following a surgical triage algorithm with enhanced screening protocols and modified surgical techniques aimed at reducing the risk of infection to patients and clinicians. With the current Omicron surge, however, elective surgeries were suspended yet again.

Since the start of the pandemic, department and section meetings, conferences, duty endorsements, as well as seminars were all conducted online. This virtual work environment not only allows health care providers and other stakeholders to connect from anywhere, but also saves time and cost for travel, and more importantly, reduces the risk of infection among health care workers in SPMC.

### HOSPITAL DESIGN AND HEALTH CARE OPERATIONS DURING THE PANDEMIC AND BEYOND

Despite the highs and lows in COVID-19 cases, it is imperative that health care facilities gradually reintroduce non-COVID-19 services that have been hampered due to the pandemic. Health care structures and processes must be designed in ways that allow for seamlessly switching between pandemic or non-pandemic mode.

The structure and design of hospital buildings can be modified to allow for greater flexibility and to maximize capacity within the hospital itself. The hospital entrance, interior layout, and exit can be reconfigured to avoid cross-contamination,<sup>10</sup> and existing buildings can be customized to provide extra capacity or higher-level of hospital care (e.g., conversion of ward to ICU), when needed. Existing hospital buildings, especially those that are isolated from the main hospital area, may be modified by augmenting their ventilation and air-conditioning systems in order to repurpose them into isolation zones for patients with COVID-19.<sup>11</sup> Retrofitting existing patient rooms to provide constant negative pressure<sup>12</sup> and installation of high-efficiency particulate air filter units in rooms<sup>13</sup> can also reduce the risk of disease transmission.

Treatment of non-communicable dis-

eases—such as hypertension, diabetes, or cancer—has been partially or completely disrupted since the pandemic began. Although virtual consultations have become a substitute avenue for health care delivery, a partial and careful reopening of the OPD to cater to non-COVID cases can prove to be beneficial, especially for patients who do not have access to the internet or those who have low technological literacy.<sup>14</sup> It will probably be more efficient for health care in the long run to continue utilizing teleconsultations as the default mode of consultation, and to reserve FTF consultations only for cases when in-person visits are absolutely required. Teleconsultations not only curb viral spread, but also provide health care access to patients in underserved areas, lessening the need for expensive transportation and accommodation costs associated with FTF consultations.<sup>15</sup>

Elective surgeries, especially for solid cancers, have been compromised for quite some time now, and patients with solid tumors that may or may not be malignant, have experienced longer pre-operative delays.<sup>16</sup> Non-urgent surgical cases may eventually become urgent, increasing the risk of complications, and even mortality. Studies show that nosocomial infection rates during admission for elective surgeries have remained low during the pandemic.<sup>17</sup> <sup>18</sup> Hence, resumption of elective surgery services and invasive procedures should be implemented in a safe and monitored manner. Performing surgeries may be considered safe, as long as hospitals have appropriate resources to resume elective procedures, and they have sufficient spare bed capacity and adequate staffing to accommodate more patients.<sup>19</sup> <sup>20</sup> It is vital that elective and non-emergency surgeries continue in accordance with national and international safety guidelines for resuming elective surgeries. This approach can reduce the consequences of delays in surgical care on the health of patients and possibly reverse hospital revenue declines.<sup>21</sup> Yet, we must also anticipate reverting to pandemic mode during instances of COVID-19 surge, in which the hospital must immediately enact changes.

Utilizing virtual platforms for the

conduct of conferences, meetings, and seminars in the hospital will save at least part of the time, money, and resources spent for the conventional FTF formats of these activities. Virtual meetings also tend to encourage greater attendance and wider coverage, and allow for easier documentation and online distribution of contents or proceedings.<sup>22</sup> Enhancing the efficiency and productivity of webinars and virtual conferences is fraught with challenges, as it requires more creativity and on-demand content to become more interactive and engaging. Barring these issues, work, management, education, and training activities conducted online can now become a staple in health facility operations.

Additional modifications in hospital operations and service delivery can include the streamlining of financial and administrative transactions in order to achieve seamless integration of information across different units within the hospital.<sup>23</sup> This can increase workplace productivity and creativity, and help cut the COVID-19 chain of transmission by creating paperless transactions to avoid direct contact with patients and other health care workers.

Hospitals that have not been designated to accept COVID-19 admissions can ensure their support by accommodating patients with probable and confirmed COVID-19, especially during a surge of new infections. This will allow COVID-19 hospitals to deliver optimal health care services to patients who have non-COVID-19 illnesses, especially those patients coming from geographically isolated and disadvantaged areas. Partnerships between public and private health care facilities and collaborations with other sectors can boost the capacity of our health care system.

Further into the future, health care facilities and supporting services should become a network that allows maximum use of technology in health care delivery, providing a more accessible and more dynamic patient care through telemedicine, while affording higher levels of care in the hospital to those who need them. The overarching idea about restructuring hospitals during the COVID-19 pandemic shall take a more

permanent foothold in order to gain a more resilient response to any future epidemic or pandemic.

The COVID-19 pandemic has given rise to many trials and tribulations to an already encumbered health care system. However, it has also accelerated the

transformation and innovation of hospitals and health systems. It has brought together health care leaders and clinicians to better execute complex decision-making and effectively implement health care operations during this crisis. With no end in sight and until we

gain optimal control of this pandemic, we must constantly prepare for a resurgence of SARS-CoV-2 infection, or a possible emergence of a new, highly contagious virus, by strengthening the capacity, responsiveness, and resilience of our health care systems.

#### Article source

Submitted

#### Peer review

Internal

#### Competing interests

None declared

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