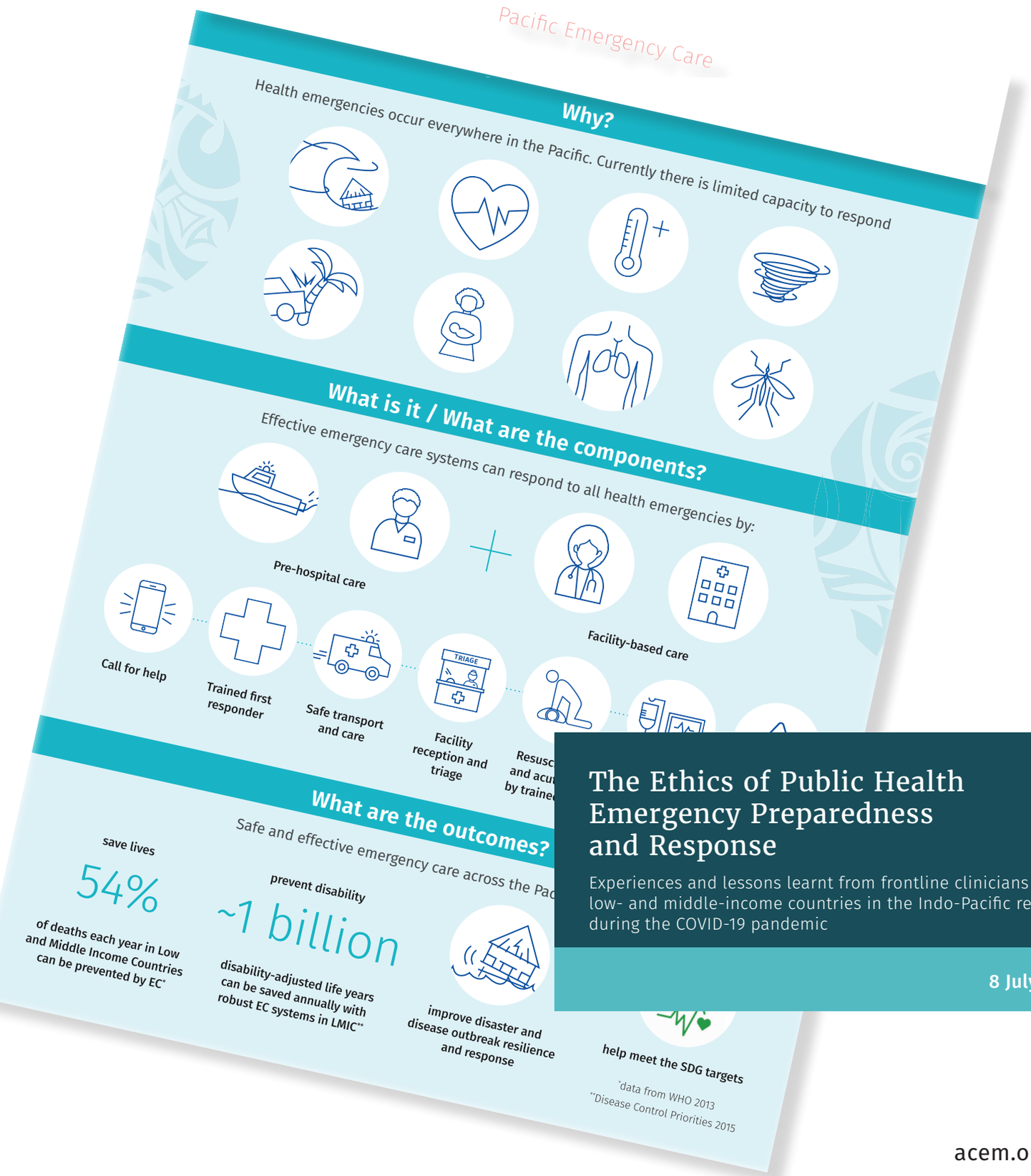
Australasian College for Emergency Medicine

Pacific Community
Communauté du Pacifique



The Ethics of Public Health Emergency Preparedness and Response

Experiences and lessons learnt from frontline clinicians in low- and middle-income countries in the Indo-Pacific region during the COVID-19 pandemic

8 July 2021

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About

The Australasian College for Emergency Medicine

The Australasian College for Emergency Medicine (ACEM) is the not-for-profit organisation responsible for training emergency physicians and the advancement of professional standards in emergency medicine in Australia and New Zealand. For the last two decades, ACEM has supported locally-led capacity development of low and middle-income countries (LMICs) to deliver safe and effective emergency care (EC), with a focus on the Indo-Pacific Region.

Our vision is to be the trusted authority for ensuring clinical, professional and training standards in the provision of quality, patient-focused emergency care.

Our mission is to promote excellence in the delivery of quality emergency care to all of our communities through our committed and expert members.

The Pacific Community

The Pacific Community (SPC) is the principal scientific and technical organisation in the Pacific region, proudly supporting development since 1947. We are an international development organisation owned and governed by our 26 country and territory members.

Our Pacific vision is for a region of peace, harmony, security, social inclusion and prosperity so that all Pacific people can lead free, healthy and productive lives. This is a shared vision for the Pacific under the Framework for Pacific Regionalism.

Our mission is to work for the wellbeing of Pacific people through the effective and innovative application of science and knowledge, guided by a deep understanding of Pacific Island contexts and cultures.

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Executive summary

The Indo-Pacific region ranges from the eastern Indian to Pacific Oceans, incorporating countries from both World Health Organization (WHO) regions of South-East Asia and Western Pacific. This region is characterised by cultural, geographical and economic diversity, as well as varying health systems, infrastructure and workforce capacity. Emergency care (EC) is the multidisciplinary, team-based provision of time-critical clinical interventions to prevent death and disability for all acute and urgent aspects of illness and injury. EC occurs at the scene of a health emergency, during transport (pre-hospital) and at facilities in emergency units and departments. For many, it is the first point of contact with the health system, and is therefore essential to achieving universal health coverage and health-related Sustainable Development Goals. Many countries in the Indo-Pacific region have limited capacity to provide safe and effective EC. Regionally-endorsed, evidence-based EC frameworks have recently been published and use the WHO health system building blocks adapted to the Pacific EC context[1].

The Australasian College for Emergency Medicine (ACEM) is the peak body for emergency medicine (EM) in Australia and New Zealand. ACEM membership includes EM specialists with advanced skills in resuscitation, diagnosis and management of patients affected by acute or urgent medical conditions, and who are pivotal in coordinating EC within health systems. ACEM's Global Emergency Care Committee (GECCo) and Global Emergency Care (GEC) desk are committed to improving the capacity of low- and middle-income countries (LMICs) to deliver safe and effective EC, with a focus on the Indo-Pacific region. The COVID-19 pandemic has had a significant impact on EC in all regions of the world, disrupting usual functioning and exposing ethical challenges. As the COVID-19 crisis surged globally, ACEM's GECCo rapidly focused on providing technical assistance and support to EC clinicians responding to the pandemic in the Indo-Pacific region; with research conducted as part of this response.

LMICs have few health care workers (HCWs) trained specifically for EC, and often rely on a limited health workforce that is highly committed but uniquely vulnerable. This research was designed to explore the experiences of such EC providers and other key LMIC stakeholders in the Indo-Pacific region responding to the COVID-19 pandemic, with a particular focus on identifying ethical issues. Rapid qualitative research methods were used to collect and analyse data. In partnership with The Pacific Community (SPC), data were gathered from key EC providers (physicians and nurses) and other stakeholders via online support forums and targeted interviews. In total there were 87 informants: 80 active participants in 13 ACEM online support forums (conducted between March and October 2020), and seven selected interviewees (who participated in in-depth interviews in February and March 2021). Informants lived and worked in more than 20 countries across the Indo-Pacific region (listed in **Annex B**). Data were coded and thematically analysed, applying analytical frameworks including the WHO health system building blocks adapted to the Pacific EC context[1] and ethics guidance related to the COVID-19 response[2].

Six key themes representing the ethical and clinical challenges in providing safe and effective emergency care during a public health emergency were identified:

Theme 1: *Emergency care responses are limited by underdeveloped, underprepared and under-resourced health systems*

Theme 2: *An effective response is dependent on listening to healthcare workers' fears and protecting their safety and wellbeing*

Theme 3: *Emergency departments are unique frontline response areas, required to respond to COVID-19 as well as maintain "business as usual"*

Theme 4: *Emergency care clinicians are experienced innovators in disaster response and triage, with flexibility and vision under pressure*

Theme 5: *Significant ethical challenges occurred for clinical decision-makers in resource-limited environments*

Theme 6: *Indirect effects and unintended health consequences are associated with the COVID-19 response*

Examples of the ways in which four key ethical principles (autonomy, beneficence, non-maleficence and justice) were applied, or relate to, all decision-making to have and EC responses to the COVID-19 pandemic were identified. Identified barriers and challenges to, and enablers and strengths of, EC responses in the Indo-Pacific region are summarised in Table 1. These barriers and enablers, as well as key lessons learnt were categorised in relation to each of the five Pacific EC Health System Building Blocks: human resources and training, infrastructure and equipment (including medications), data (information and research), processes, and leadership and governance.

Key lessons learnt from responses to the COVID-19 pandemic in Indo-Pacific countries may be valuable to other countries, particularly LMICs, adapting and needing innovative and low-cost strategies to overcome clinical, ethical and limited-resource challenges. There were many stories shared of resourcefulness and localised innovation. These ranged from HCWs and community members making face masks, and pharmacists creating salbutamol spacers from plastic bottles, to the use of plastic-covered metal screens to reconfigure the emergency department into distinct spaces and repurposing a major sporting facility for use as an isolation centre.

Collectively these findings have informed the development of overarching recommendations to improve preparedness of EC and responses to future pandemics.

Recommendation 1: Address ethical challenges for EC clinicians

Anticipating ethical issues associated with resource limitations may enable clinicians and local stakeholders to pre-emptively develop guidelines and resources to assist with pandemic decision-making and resource prioritisation.

Health services must prioritise the provision of personal protective equipment (PPE) for frontline HCWs. Inadequate PPE, and workplace cultures that do not promote staff safety, exacerbate the tension between a HCW's right to protection and their duty to provide care.

Leaders of healthcare systems have a responsibility to proactively support the mental health and wellbeing of staff, especially EC clinicians who are at high risk of burnout and compassion fatigue.

Recommendation 2: Prepare for, and develop capacity to respond to, public health emergency surges

Indo-Pacific countries should include frontline EC clinicians in task forces and working groups focussed on the clinical components of public health emergencies.

Appropriate priority should be given to maintaining essential services and routine care to minimise indirect effects and unintended consequences associated with public health emergencies. Surge response plans should incorporate all components of the health system and emphasise the importance of effective collaboration between primary care, pre-hospital, hospital and public health providers and units. The provision of external support to facilities undergoing patient surge events should be targeted to local needs and priorities. External stakeholders, development partner organisations and humanitarian agencies should target their assistance to local requests.

Recommendation 3: Strengthen health systems for routine EC

Indo-Pacific countries should apply lessons learned through the COVID-19 pandemic to ongoing systems strengthening initiatives. The pandemic has highlighted the essential contribution of EC to integrated and robust health systems, and an opportunity to reflect on local health system capacity identifying gaps in service provision. This should drive reforms and improvements determined through systematic assessment of current capability, with a focus on the essential "building blocks" for effective EC systems.

Contents

Abbreviations and acronyms

ACEM	Australasian College for Emergency Medicine
CHW	community health worker
CME	continuing medical education
DFAT	Department of Foreign Affairs and Trade, Australia
EC	emergency care
ED	emergency department
EM	emergency medicine
FACEM	Fellow of the Australasian College for Emergency Medicine
FNU	Fiji National University
GEC	Global Emergency Care
GECCo	Global Emergency Care Committee, ACEM
HCW	health care worker
HEOC	Health Emergency Operation Center
HIS	hospital information system
HREC	Human Research Ethics Committee
HR	human resources
HRH	human resources for health
HOD	Head of Department
ICU	Intensive Care Unit
ILI	influenza-like illness
IPC	infection prevention and control
INGO	international non-governmental organisation
LMICs	low- and middle-income countries
NDoH	National Department of Health
NGO	non-governmental organisation
NRH	National Referral Hospital
PHA	Provincial Health Authority
PICTs	Pacific Island Countries and Territories
PPE	personal protective equipment
SDGs	Sustainable Development Goals
SOPs	Standard Operating Procedures
SPC	Secretariat of the Pacific Community (also known as 'The Pacific Community)
SMO	Senior Medical Officer
UPNG	University of Papua New Guinea
UNOPS	United Nations Office for Project Services
WHO	World Health Organization

1. Background

1.1 Changing, and continuing, experiences of COVID-19 in the Indo-Pacific region

The Indo-Pacific region is a vast regional expanse ranging from the eastern Indian Ocean to the Pacific Ocean connected by Southeast Asia, including India, North Asia and the United States[3]. This region incorporates countries from both the WHO regions of South-East Asia and the Western Pacific. The region is characterised by cultural, geographical and economic diversity. It is important to acknowledge that each country in the Indo-Pacific region is unique: in-country political, governance and health systems vary widely, as do health infrastructure and health workforce capacity, and consequent impacts of the COVID-19 pandemic.

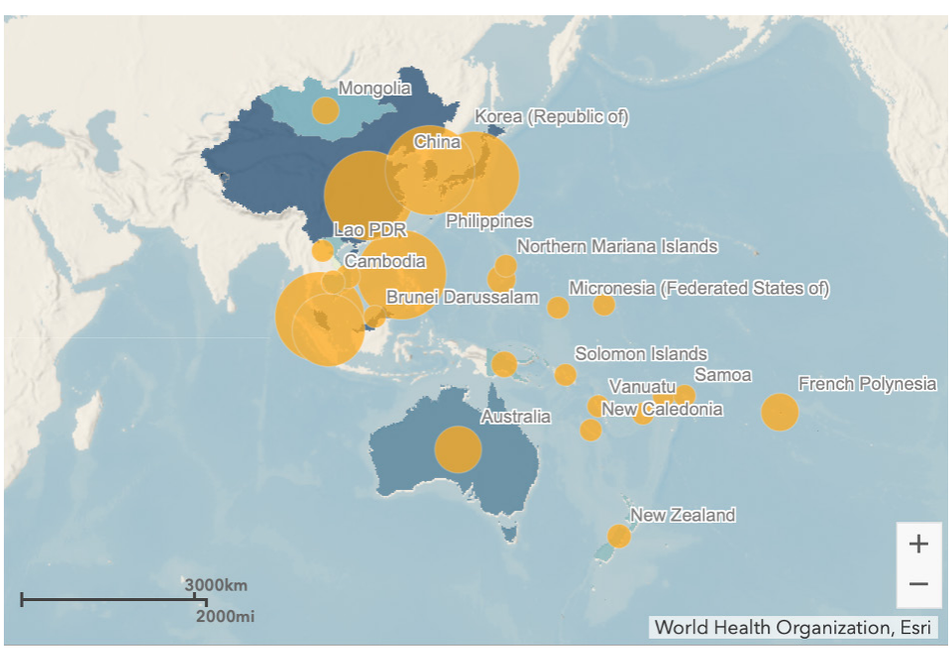
Many countries in the region have had limited capacity to provide safe and effective emergency care[4]. In terms of the ability to detect, communicate and respond to a communicable disease outbreak (as measured by the Global Health Security Index)[5], most low- and middle-income countries (LMICs) in the Indo-Pacific score below the average level and are considered to be among the least prepared countries[1]. Emergency care (EC) stakeholders in most Pacific Island countries have reported gaps in functional capacity for both facility-based and pre-hospital care and poor integration of EC in disaster plans[1].

The contemporaneous and unfolding nature of the COVID-19 global health emergency means that its full impact is still yet to play out in the Pacific Island and broader Indo-Pacific regional context[6,7]. Notably, at the time of writing, Papua New Guinea is facing a second wave of infections with surging cases and a significant number of deaths. Government and multi-stakeholder efforts to implement agile and comprehensive national policy responses are constrained by underlying socio-economic vulnerabilities and health systems pressures and weaknesses, as well as geographic and communication challenges[8–10].

The global community has much to learn from the Indo-Pacific region's resilience in the face of crisis events. The successful management of the COVID-19 pandemic by numerous Pacific Island countries offers helpful and positive lessons to the World Health Organization (WHO) and the broader international community, in particular other Small Island Developing States and both low- and high-income nations alike[11].

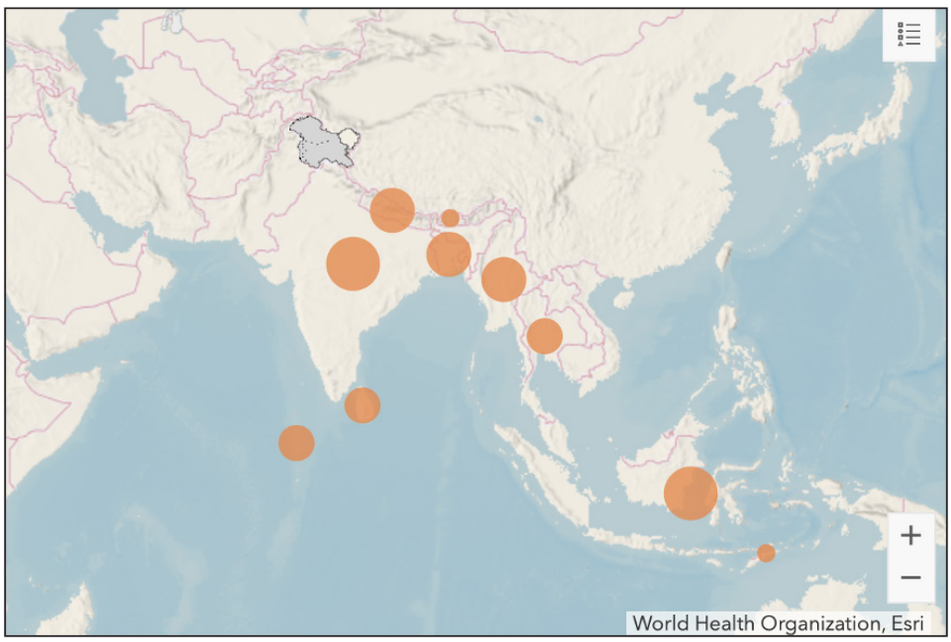
Figures 1 and 2 below show the current (as at 25 March 2021) COVID-19 cases across the Indo-Pacific region, represented by the WHO regions of South-East Asia and the Western Pacific. The orange and yellow circles indicate total cumulative cases per country on a national scale.

Figure 1: COVID Situation in WHO Western Pacific Region as at 25 March 2021, 10:00 GMT+8



Source: WHO COVID-19 Dashboard. WHO SEARO: World Health Organization, 2020.

Figure 2: COVID Situation in WHO South-East Asian Region as at 25 March 2021, time not reported



Source: WHO COVID-19 Dashboard. WHO WPRO: World Health Organization, 2020.

1.2 Emergency care in the time of COVID-19

Emergency care (EC) is the multidisciplinary, team-based provision of time-critical clinical interventions to prevent death and disability for all acute and urgent aspects of illness and injury throughout the life-course. EC occurs at the scene of a health emergency, during transport (pre-hospital) and at facilities in emergency units and departments. For many, it is the first point of contact with the health system and is therefore essential to achieving universal health coverage and the health-related Sustainable Development Goals (SDGs)[12].

The COVID-19 pandemic has had a significant impact on emergency departments (EDs) and facilities in all regions of the world. Several countries in the Indo-Pacific region have experienced surges of COVID-19 infections; while others have not seen an overwhelming demand for COVID-19 related care. The challenge for all health systems and EDs has been to maintain 'business as usual' while dealing with the burden of 'suspected' COVID-19[13], and either responding to or preparing for a possible outbreak. Whether responding or preparing, the COVID-19 pandemic disrupts usual functioning and exposes EC clinicians to an array of ethical challenges[14].

Many of these issues are consistent with ethical tensions identified by clinicians in previous public health emergencies[14–17]. While ethical tensions in public health emergencies are not unique to COVID-19, the extent of the current pandemic is unprecedented. A concerted effort is required to identify and address these issues in order to minimise the risk of moral injury and distress to EC providers, strengthen broader disaster risk management policy and planning, and inform development of ethical guidelines and training for HCWs in readiness for future public health emergencies[18].

1.3 Pandemic emergency care systems

Effective EC systems are critical to health and disaster management, particularly during public health emergencies and surge events when pre-hospital and facility-based services can be overwhelmed[11,19]. The COVID-19 global pandemic has illustrated how surge events can stress even mature and seemingly well-developed health and EC systems[20]. In LMICs with underdeveloped EC systems and limited access to EC, vulnerability to adverse population health outcomes is increased[21]. This includes an impact on acute aspects of non-communicable diseases, which are disproportionately prevalent in many LMIC countries, especially Pacific Island states and territories[22].

Among the essential building blocks underpinning health systems, human resources and training are critical[23]. EC clinicians are frontline providers for routine care, but are also expected to lead preparation, care delivery and recovery during surge events. Many LMICs have few HCWs trained specifically for EC, and often rely on a limited health workforce that is highly committed but uniquely vulnerable[1]. Commonly, EC leaders in LMICs work in professional isolation with limited access to support networks and ongoing development training[24]. Burnout is a known risk for all EC clinicians[25], and exacerbated when resources are limited[26]. The COVID-19 pandemic compounds these known stressors for EC providers, with real risks of virus exposure, illness and death[4]. Stigma associated with COVID-19 contact has also emerged as a major issue for HCWs in LMICs[13].

Research is limited on how best to adapt the COVID-19 pandemic response to resource-limited settings and values, particularly for and with the EC workforce, and especially in the Indo-Pacific region. Although guidance has been generated for HCW protection and the allocation of scarce resources during public health emergencies, the existing literature is not necessarily applicable to the LMIC context[15,16,18,27–32].

1.4 ACEM's response to COVID-19 in the Indo-Pacific region

As the COVID-19 crisis surged globally in 2020, ACEM's GECCo focused on providing technical assistance and support to EC clinicians responding to the pandemic in the Indo-Pacific region. This support included collaborative development of practical resources for managing COVID-19 EC responses in resource-limited settings (Annex C), and coordinating online support forums for EC providers across the Indo-Pacific region to discuss COVID-19 preparedness and response. The forums were conducted in partnership with The Pacific Community (SPC), an internationally renowned intergovernmental scientific organisation mandated with providing scientific and technical functions for its 26 member Pacific states and territories[33]. The forums have proved to be pivotal in facilitating South-South cooperation and learning. In addition, they provided a valuable platform for care providers in LMICs to share knowledge, innovations and adaptive behaviours, and to problem solve and professionally support each other during this stressful and complex time.

In the course of these forums, participants identified localised as well as shared ethical challenges. ACEM identified an urgent need to examine these issues in-depth, to augment current COVID-19 response capacity and improve resilience and readiness for future communicable disease outbreaks. This research project was designed to fill important knowledge gaps on COVID-19 and the responsibilities of EC clinicians, and contribute to greater understanding of the ethical tensions implicit in public health emergencies affecting the Indo-Pacific region. Importantly, this work will help facilitate context-specific ethical guidance that builds on existing COVID-19 resources and frameworks[18,27,28].

2. Research aim and methods

2.1 Research aim and design

The aim of this research program was to explore the experiences of EC providers and other key stakeholders in LMICs in the Indo-Pacific region responding to the COVID-19 pandemic, with a particular focus on identifying ethical issues. The research was led by ACEM in collaboration with the SPC and key regional stakeholders.

Rapid qualitative research methods were used to collect and analyse data. Data were gathered from key EC leaders and providers (physicians and nurses) and other stakeholders in Indo-Pacific countries in two phases: via online support forums, and through in-depth interviews with selected informants.

2.2 Ethics

The study design for the first phase of data collection was reviewed and approved by The University of Sydney Human Research Ethics Committee (Reference 2020/480); that research proposal, along with the protocol for the second phase of data collection, were reviewed by the WHO's AdHoc Covid-19 Research Ethics Review Committee (Protocol ID: CERC.0077) and declared exempt.

2.3 Data collection

Online support forums were convened by ACEM's GECCo using online video communication (Zoom[34]), fortnightly from March to July and then monthly from August to December 2020. Invitations to participate were widely disseminated to EC providers and stakeholders in the Indo-Pacific region via ACEM and SPC contacts and networks. Participants were informed verbally and in writing that the forum was being recorded and data (including comments in the chat) would be anonymously used in research, and advised of their right to contact ACEM if they did not want their data to be used.

Forum attendants included key EC clinicians (physicians and nurses), other clinicians and HCWs, EC program managers/coordinators and policymakers, as well as representatives from the WHO Fiji Country Office and ACEM Fellows who had previously worked in, and/or provide training or support to, EC colleagues in the region. In total, there were 437 attendances across 13 forums between March and October, with more than 80 individuals actively contributing (commenting about their in-country experiences) in one or more. Details of the included forums and characteristics of participants are listed in Annex B.

Secondary data collection involved semi-structured in-depth interviews with seven informants in the Indo-Pacific region (listed in Annex B), conducted and recorded using Zoom in February and March 2021. Interviewees were targeted because of their experience leading and/or coordinating EC in an LMIC in the region during the COVID-19 pandemic. Sampling was purposive and opportunistic, using personal ACEM GECCo and SPC networks. There was no minimum sample size as the aim was to have multidisciplinary representation (particularly a combination of emergency physicians and nurse leaders), and representation across the Indo-Pacific region and of women and men.

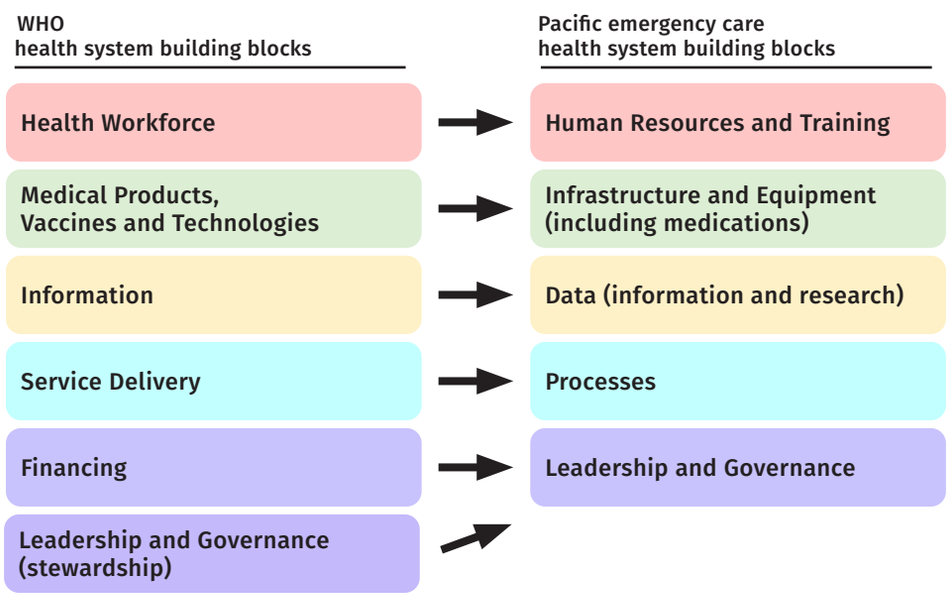
Interviewees were provided with a detailed Participant Information Sheet, and provided written consent prior to interview. They were asked to respond in their official capacity, speaking on behalf of their organization. Interviewees were offered the opportunity to review the interview transcript and to request removal or amendment of content if there were misunderstandings or they did not agree with the transcription.

2.4 Data analysis and interpretation

Recordings of 13 forums (over 18 hours of discussion) and seven in-depth interviews (around 45 minutes each) were transcribed by research assistants and the data entered into the QSR NVivo data management program. The study used phenomenology to explore lived experience from participants' perspectives[35], and gender-based analysis to ensure it represented the experience and voices of women at the frontline and identified gendered dimensions of the COVID-19 EC response[36-38]. Safety science (in health) theoretical approaches also informed interpretation of HCW, patient and health system safety and risk management issues[39,40].

A hybrid inductive[41] and deductive[42] thematic analysis approach was used to interpret the collated data and identify themes important to the description of the phenomenon[43]. Deductive codes were determined by the research objectives and analytical frameworks, including the WHO health system building blocks adapted to the Pacific EC context (Figure 3)[1]. These Pacific EC system building blocks reflect the importance of facility infrastructure and EC processes such as triage for the Pacific context, and have been endorsed through regional consensus involving multiple Pacific Island countries.

Figure 3. WHO and Pacific Emergency Care health system building blocks



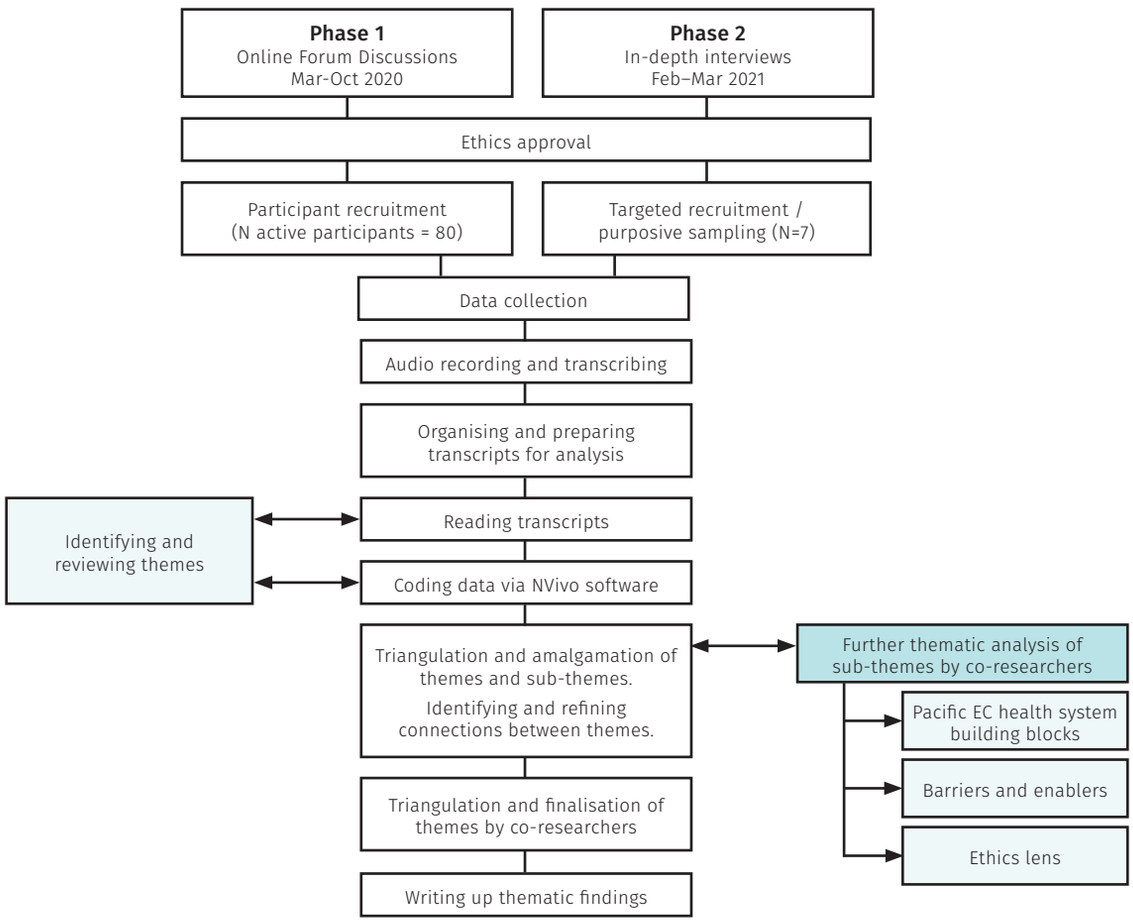
Source: Phillips et al. 2020

Inductive (data-driven) codes expanded an a priori code or described a new theme. Codes were integrated and categorised and preliminary themes identified and agreed upon by the research team. Due to the volume of data related to each of the five building blocks, paired members of the multidisciplinary research team were assigned coded data for a building block and tasked with reviewing key barriers and enablers and identifying sub-themes and ethical issues for inter-rater reliability. Each pair presented findings, with exemplifying quotes from the data, to a workshop of the broader research team. Themes were reviewed and verified through research team discussion, data triangulation and reference to the research questions. Refer to figure 4 for an overview of the data collection and analysis process.

Findings also were developed in relation to the four principles of ethical decision-making identified in ACEM's clinical guidelines for the management of COVID-19 in Australasian EDs[2] – autonomy, beneficence, non-maleficence and justice – along with other ethics frameworks and guidance documents related to the COVID-19 response[18,27,28].

Research team members contributed to the presentation of findings and development of recommendations in this report.

Figure 4. Data collection and analysis flow chart



3. Findings

3.1 Presentation of research findings

This study investigating EC responses to the COVID-19 pandemic in LMICs in the Indo-Pacific region analysed data from a total of 87 informants: 80 active participants in 13 ACEM online support forums, and seven interviewees. Informants lived and worked in more than 20 countries across the Indo-Pacific region (listed in Annex B). Study informants included EC clinicians (physicians and nurses predominantly), infection prevention and control (IPC) nurses/officers, medical superintendents, and clinicians from other specialties including intensive care, anaesthetics and paediatrics.

Six key themes representing the ethical and clinical challenges in providing safe and effective EC during a public health emergency were identified through the qualitative study:

Theme 1:
EC responses are limited by underdeveloped, underprepared and under-resourced health systems

Theme 2:
An effective response is dependent on listening to HCWs' fears and protecting their safety and wellbeing

Theme 3:
EDs are unique frontline response areas, required to respond to COVID-19 as well as maintain "business as usual"

Theme 4:
EC HCWs are experienced innovators in disaster response and triage, with flexibility and vision under pressure

Theme 5:
Significant ethical challenges occurred for clinical decision-makers in resource-limited environments

Theme 6:
Indirect effects and unintended health consequences are associated with the COVID-19 response

These thematic findings are presented in Section 3.2. Section 3.3 then sets out examples of ways in which the four key ethical principles (autonomy, beneficence, non-maleficence and justice) were applied, or relate to, decision-making and EC responses to the COVID-19 pandemic.

In Section 3.4**,** identified barriers and challenges to, and enablers and strengths of, EC responses in the Indo-Pacific region are summarised in Table 1, and then discussed in detail. Barriers and enablers are categorised in relation to each of the five Pacific EC Health System Building Blocks: human resources and training, infrastructure and equipment (including medications), data (information and research), processes, and leadership and governance.

A summary of 'lessons learnt' are in Section 5 with high-level recommendations informed by these findings following in Section 6.

3.2 Key themes

Several key themes were dominant in the collective experiences and learnings of EC providers in the Indo-Pacific region during the COVID-19 pandemic in 2020 and 2021. These themes represent fundamental issues or challenges in providing safe, effective and ethical EC during a public health emergency.

3.2.1 Theme 1: Emergency care responses are limited by underdeveloped, underprepared and under-resourced health systems

Informants reflected that underdeveloped health systems had compromised their ability to respond to the pandemic in an efficient and effective manner. Many reported under-resourcing and sub-optimal preparedness, with a lack of robust EC systems and processes. In many instances, capacity to provide safe and effective EC was restricted, with limited resilience to meet surge demands.

> *'We already operate in a disaster environment … You would rarely have enough equipment, enough wards … we are faced with the critical question every day on who to provide ICU care to.'*

An immediate response to the pandemic required rapid adaptation of health infrastructure and hospital processes. It also required EDs to identify and secure equipment and supplies, and prepare staff for an 'unknown' threat. Settings with more robust EC systems were better placed to enact these changes.

> *'From a hospital perspective it's been focused on active case detection, which is having an effective screening triage and identifying a space, giving the necessary training. We've also done a lot in identifying spaces we can use as isolation rooms, as well as cohort wards, for your suspected and your confirmed cases respectively. And we obviously are focused on IPC and training.'*

3.2.2 Theme 2: An effective response is dependent on listening to healthcare workers' fears and protecting their safety and wellbeing

A key theme in informants' descriptions of their countries' changing challenges and responses to COVID-19 was the "journey" HCWs experienced, from fear and panic, to confidence and readiness. Fears were reduced, and confidence and capacity grew in line with information-sharing, education and training and the availability of PPE.

Indo-Pacific countries faced challenges in ensuring the safety of clinicians and frontline HCWs, especially in the early stages when systems and staff were unprepared, processes were not implemented, and PPE and infection control supplies were lacking. For example, ED clinicians report exposure to clinical risk due to poor planning and/or processes, often resulting from the disconnect between their 'on the ground' experience and knowledge and hospital or health system management decision-making. The undifferentiated patient – a characteristic of the ED environment, unique within the hospital – posed significant risks to staff when screening, IPC and diagnostic approaches were not well established or properly implemented. HCWs expressed concerns that guidelines for use and levels of PPE were not related to the level of risk, but rather the available stock.

'There's still a kind of confusion around PPE. Nurses feel like the guidelines have been created, not in line with the hazard or the risk, but the supply.'

EC leaders faced significant challenges in managing and supporting HCWs who were fearful for their own safety, and of transmitting the virus to family or household members. Staff were also separated from family, felt under-valued and overburdened and/or experienced COVID-19 related stigma. In addition to improving information-sharing and psychosocial support, clinicians were forced to advocate for the protection of staff safety – for example, in one setting, to have hospital management "return" a staff change room that was reallocated for linen storage, so that staff could remove their uniforms before returning home and have them laundered at the hospital.

The unequal distribution of staff entitlements, including pay and risk allowances, was another significant stressor and cause of HCW dissatisfaction, reaching to levels that significantly impacted the availability and engagement of staff in some countries (further discussed in Section 3.3).

3.2.3 *Theme 3: Emergency departments are unique frontline response areas, required to respond to COVID-19 as well as maintain "business as usual"*

From the beginning of the pandemic, EC leaders were at the forefront of the response.

> *'Everybody looked to the Emergency Department to facilitate everything for all other areas.'*

A significant clinical and ethical challenge identified by many was coping with the demand for ED services and balancing the COVID-19 response with "business as usual" and ensuring access to timely and quality care for all patients.

> *'When the pandemic started, the hospital emergency operations centre was activated. And the emergency department, we were asked to man the COVID triage, to set up and to man a COVID triage, which is a separate building, separate from the [hospital]. … And also to, at the same time, run the emergency department.'*

> *'And at the moment because it's rainy season, we also have dengue, and acute gastro; so it's very challenging. Either you focus on COVID, [but] at the same time you have to focus on these day-to-day cases.'*

Informants identified challenges in managing these competing priorities in the setting of limited resources. For some, this was a significant cause of stress and concern.

3.2.4 *Theme 4: Emergency care clinicians are experienced innovators in disaster response and triage, with flexibility and vision under pressure*

While a whole-of-hospital response was required, it was often EC clinicians who were the initiators, planners, COVID-19 researchers and staff educators, and advocates; the first to identify and respond to challenges:

> *'Luckily we had our taskforce, so we had the medical consultant, the ED, surgeon, paediatrician and everybody at one place, so they quickly devised what we would do with a patient who presented at any place and time. And it was just a very steep learning curve. Because we had at times patients coming in, and there'd be arguments – this patient can't go here, can't go there – and at times ED would be left to look after the patient. But then we always kept on getting the influx of people from outside as well.*

'…sometimes we just had to stand our ground and voice our concerns, just to get everybody else to understand what is happening, and why we're fighting, in the best interests of the patient. That's how we developed our systems and our flow charts, and it worked, it's getting to work now.'

In response, there were many stories shared of resourcefulness and localised innovation. These ranged from HCWs and community members making face masks, and pharmacists creating Salbutamol spacers from plastic bottles, to the use of plastic-covered metal screens to reconfigure the ED into distinct spaces and repurposing a major sporting facility for use as an isolation centre.

Faced with an influenza epidemic simultaneous with the global emergence of COVID-19, healthcare leaders in an island nation developed an innovative and culturally-acceptable system to redirect the influx of concerned citizens with influenza-like illnesses (ILI) away from the overloaded hospital ED. Designated 'ILI centres' were established in traditional open-walled community centres, where patients could be isolated, triaged and tested for COVID-19 if they met the case definition.

Informants described how good governance, clinician leadership, clear communication, and multi-disciplinary representation and engagement in decision-making engendered a shared understanding of EC response goals and priorities. The best examples of this resulted in a sense of shared purpose, or common understanding of the challenges and the required responses, among clinicians and administrators that bolstered staff motivation and morale and underpinned effective implementation of plans and processes.

> *'It was kind of difficult [to enforce new processes] in the beginning, but people got to understand the reason and I think that was the important thing. … And we had strong clinical leaders in the emergency department which was very important to ensure that we follow the rules, and it's not the rules that are self-made, … it's a directive that we have to facilitate.'*

3.2.5 Theme 5: Significant ethical challenges occurred for clinical decision-makers in resource-limited environments

EC clinicians faced ethical challenges in relation to clinical decision-making and prioritising patient care and safety. Several informants expressed concerns about prioritisation and triage decisions if there was a surge of COVID-19 cases and intensive care unit (ICU) and isolation capacity was overwhelmed, acknowledging that management processes and guidelines for use of their limited resources would be needed. For instance, admission and intubation guidelines for COVID-19-positive patients – with inclusion criteria related to age, comorbidities, symptoms and oxygen saturations – would be required, instead of a case-by-case approach.

Given limited critical care resources and capacity in most Pacific countries prior to the pandemic, some EC clinicians were experienced in having to consider the 'hard ethical issues' of limiting care. They had learned the necessity of clear communication and shared decision-making between all disciplines, as well as decision-making transparency. Ethical challenges around the allocation and use of resources in clinical care were best resolved by multidisciplinary team discussion – 'discussions with my core brains trust' as one EC leader described it – and consideration of available evidence-based guidance.

Some informants related experiences of clinical recommendations – such as locations of isolation centres or wards – being overruled by the Health Ministry because of public perceptions or political pressure. Several reported disagreements with hospital management or other departments, and occasionally challenged health system administrators, response coordinators and Ministers in their advocacy for patient care or staff safety and entitlements. Some felt professionally isolated like 'the only fighter, the lone fighter'.

3.2.6 Theme 6: Indirect effects and unintended health consequences are associated with the COVID-19 response

Informants highlighted challenges to maintaining standards of patient care and efforts to prevent or minimise adverse impacts on health of in-country responses to the COVID-19 pandemic, particularly for individuals with pre-existing chronic diseases. Several informants reported evidence of adverse health outcomes for population or patient groups that they attributed to measures implemented to reduce the risk of COVID-19 transmission or redirect limited space and resources for COVID-19 screening, isolation and patient care, including closures of, or barriers and delays in accessing, hospital outpatient clinics and community health centres. These included increased incidence of cardiac disease in one country, and human immunodeficiency virus (HIV) in another. There were observed declines in childhood vaccination and increased childhood malnutrition – as parents were deterred by long lines at hospital pre-triage so did not attend clinics. In another setting, informants reported an increase in critical patient presentations, attributed to patients not being able to access outpatient clinics or community health centres to get medicines:

'... they have stopped the routine surgeries, the routine clinics, and all, which has increased our burdens – the number of these critical patients have gone up because they don't have the access to the clinics to get their insulins, to get their antihypertensives.'

Some EC clinicians had anticipated the impacts on non-COVID-19 patient health outcomes and advocated for action to address hospital access. For example, one spoke of the need for 'our lines to be sped up, by increasing the number of people doing triage and also the mechanics of how we do it ... to get people sorted quicker [so] the non-COVID line can get sent to where they need to go straight away'.

EC clinicians also described the discord between traditional cultural and family values and regulations that prevented or restricted family visits to a patient in hospital. Restrictions impacted on the common practice in Pacific countries of family members providing inpatient care, hygiene and food, creating extra burdens for HCWs.

> *'And if we don't have them it's going to affect our patient care, because we don't have enough hands, just physical hands, to do the manual labour that we need.'*

But it also raised ethical concerns for many, as they observed the negative impacts of isolation on patients admitted to the hospital.

'It is flattening the curve, but we have some unsupported patients who really needed their families.'

'[in our culture] … going days without seeing our family is odd and will cause a lot of depression and other mental issues.'

In response, clinicians were resourceful in using available technology to enable isolated patients to connect with family members (e.g. setting up a wifi-enabled booth in the ward and one in the hospital carpark to enable patients to communicate with visitors), and devised strategies to safely receive food from family members and pass it on to patients.

3.3 Applying ethical principles to emergency care pandemic response

The pressures and unpredictability of providing EC means EC clinicians, coordinators and policymakers are often confronted by difficult decisions and ethical challenges, a situation exacerbated by the COVID-19 pandemic. Globally, HCWs were required to continue providing "usual" care while also responding to new demands – including engaging in or leading in-country EC response to the pandemic. In LMICs, timely decision-making on EC in policy, procedures and services is further challenged by limited resources, including human resources.

ACEM guidelines for managing COVID-19 for Indo-Pacific EDs recommend that when making decisions emergency clinicians apply four well known and ethically rigorous principles that are applicable to the patient, clinicians and the broader community: autonomy, beneficence, non-maleficence and justice[2].

The ways in which EC providers in the Indo-Pacific region engaged and applied these ethical principles during the COVID-19 pandemic in 2020 and early 2021, as elicited from this research, are reported below.

3.3.1 Autonomy – the ability to choose but not in detriment to others

The ethical principle of autonomy was demonstrated in clinicians' willingness to act, when required, to initiate decision-making and to represent the concerns and interests of EC staff. Informants explained their discomfort when there was a disconnect between what was happening 'on the ground' (in the ED) and the decision-making processes of health system and/or hospital executive, particularly in cases where they felt clinicians' recommendations were being dismissed, or their clinical advice was actively undermined:

> *'the hospital management, the doctors who are managing this, [are] giving media false hope that exposure is actually good to build our natural immunities, so nobody should be panicking. So they [are] misinterpreting our concerns as panic. But … actually, they're panicking for their business. They're saying it's not good for business to do a pre-triage outside.'*

While exercising autonomy, in the sense of making choices that would benefit rather than be to the detriment of others, clinicians also emphasised the importance of collaborative, multidisciplinary decision-making – in consultation with patients and their family members where decisions related to individual patient care.

The principle of autonomy is also about the individual's right to self-determination, which must be balanced in Indo-Pacific communities where family, relationships and communities are central to identity and decision-making[44]. Regional clinicians demonstrated unique strengths and maturity in supporting the value and worth of each person, yet using collaborative discussion to reach consensus around care decisions and resource distribution.

3.3.2 Beneficence – obligation to provide care that is for the good of the patient and others including staff

Beneficence was most evident in the commitment of clinicians and HCWs to their duty of care. Despite their fear, threats to their personal safety and the safety of their family members, and the many other disincentives to participating in the response (noted in key themes, and further discussed in HR and Training), there was extensive evidence of HCWs' dedication to their work and to providing care. For some, this was related to cultural and/or religious values.

> *'In [our] culture and also in the Buddhist faith, there is good works and doing your duty, and honouring your fellow workers, teacher and country, is very high. People may be fearful, but they come to work, to play their part, certainly in the emergency department.'*

Informants lauded the willingness of HCWs, particularly nurses, to continue working despite experiencing stigma from their families and communities, excessive work hours and demands and, in one country, not being paid for three months and sleeping at the isolation centre in the absence of appropriate accommodation.

EC leaders inspired and motivated staff through their example and encouragement of beneficence.

> *'I said look at the 20 patients and the one on oxygen – if you guys are not here, who's going to care for these ones? We signed up to be health personnel and I know we have not got any extra pay or anything but if we don't do it, no one's going to do it.'*

‘ … it’s important for us all to stand up together and to work together to ensure that we tackle the initial cases well, so that we keep the rest of the community and the country safe as well.’

Such clinician leadership also reinforced the ethical principle of minimising harm of the COVID-19 pandemic – taking action to reduce spread, minimise disruption and learn what works[18].

Beneficence also underpinned lead clinicians’ commitments to support and prioritise the wellbeing of their staff, both to enable the maintenance of clinical services and because it was ethically right to prioritise and protect their physical and mental health. This extends to the obligation on governments to provide appropriate and adequate PPE.

3.3.3 Non-maleficence – options of care offered must avoid harm

Placing staff at risk of COVID-19 because of unavailability or inadequate PPE also violates the ethical principle of non-maleficence. Many EC clinical and nursing leaders spoke of the ethical dilemma they faced, acknowledging they put their own and their staff members’ health and safety at risk because they could not wear the recommended level of PPE.

EC leaders demonstrated application of the principle of non-maleficence in resisting a pressure to intubate that they felt accompanied the donation of ventilators. In the absence of clinical guidelines and with few staff experienced in intubation and care of ventilated patients, most followed expert advice and decided ‘not to be pressured into doing things that we were not familiar with until we ensure that there was enough training and we were comfortable with it’. Another informant agreed: ‘we don’t think it’s the time to start using them now, at such a critical time’.

Exercise of the duty to ensure care offered does not do harm was evident in the strategies implemented in one country to preserve patient confidentiality in light of pervasive COVID-19-related stigma. Citizens who were required to go into isolation because of a positive or suspected COVID-19 infection were collected by an unmarked ambulance at night to ‘keep everything quiet from neighbours’ and avoid the risk of patients refusing to come in for testing or isolation. In another country, clinicians took great effort to protect patient confidentiality and prepare patients if there was potential of them being identified via the government’s daily COVID-19 briefing to the media.

The ethical principle of non-maleficence also should be prioritised in decision-making about availability and accessibility of healthcare services. As noted in Key themes, closure of healthcare clinics and services or barriers to access because of the health system focus on responding to the presence or threat of COVID-19 did cause harm.

3.3.4 Justice – allocating medical resources fairly, according to medical need and each patient’s capacity to benefit

The availability and accessibility of healthcare services and resources to patients with health issues other than COVID-19 also relates to the ethical principle of justice. This research found that ensuring justice in allocation of available resources and access to care was dependent upon effective triage at the point of hospital entry, ensuring that patients with urgent care needs and who were most likely to benefit were prioritised.

As noted in key themes (3.2.5), several informants acknowledged the need to provide the best service possible with the available resources, which potentially would require the introduction or expansion of triage systems and criteria for prioritising admission and access to critical care if there was a surge in COVID-19 cases. They spoke candidly about how ethically challenging it would be for them and their colleagues to develop and implement limitations on care. Some informants expressed profound discomfort with the idea of deliberately withholding potential life-saving care in Pacific cultures where every life is valued and clinicians ‘treat people as [the] same as our own mother and father’.

Informants also noted how triage decisions and accessibility of health services impacted on patients with conditions other than COVID-19 and populations needing preventative health care or monitoring, raising their concerns about a legacy of unintended harms of the focus on responding to COVID-19.

Ethical guidelines recommend that allocation of medical resources 'should not be influenced by the race, culture, wealth or address of the person being treated'[2]. Some informants highlighted a need for guidance to manage potential conflict between expectations of the government and community and evidence-based clinical judgement in the allocation and use of critical care equipment, particularly when patients were "influential" or receiving treatment in private settings. One discussed the dilemma clinicians would face in implementing criteria for allocation of resources and the likelihood of retaining 'case-by-case' decision-making because of the country's hierarchical structure.

The ethical principle of justice also underpinned the efforts of HCWs, supported by the advocacy of their clinical leaders, to obtain payment of increased remuneration or risk allowances for their work at the frontline of the COVID-19 response. Not receiving promised allowances – or the same allowances that HCWs were aware that hospital executive or staff in other departments, or government employees in other sectors, e.g. police, were being paid – engendered feelings of unfairness, injustice and being undervalued, demotivating frontline healthcare providers and ultimately impacting on timely patient care (especially when HCWs would strike or not attend work in protest). This issue, mentioned by informants from several countries in the Indo-Pacific region, also speaks to government failure to respect the ethical principle of reciprocity – that those who take on increased burdens should be supported in doing so[18].

3.4 Barriers to, and enablers of, an effective emergency care response to the COVID-19 pandemic

The identified barriers and challenges to, and enablers and strengths of, EC responses in the Indo-Pacific region are summarised in Table 1, and described with examples of experiences and in-country responses, and illustrative quotes from informants, on the following pages. Barriers and enablers are categorised in relation to each of the Pacific EC Health System Building Blocks[1].

Table 1. Pacific EC Health System barriers and enablers

Pacific EC Health System Building Block	Barriers	Enablers
HR and training	Fear and safety concerns	A staff safety culture
		Professional duty and motivation
	Physical and mental health impacts	Psychosocial and other staff support
	Workforce shortages and gaps	Recruitment of volunteers
	Lack of information, recognition and/or engagement	Regular and open communication
	Inadequate compensation, unavailability or non-payment of allowances	Leadership, advocacy and donations
	Lack of knowledge and/or training	Education and training
	Stigma	
	Gender and cultural barriers	
Infrastructure and Equipment	Limited space and capacity to provide intensive care	Flexibility and adaptable spaces; donated infrastructure
	No or inadequate essential equipment and supplies	Donation of supplies and equipment
	Inappropriate use of PPE, poor continuity of supply	Storage and management processes
		Re-use and innovation
Data	Data unavailable or not shared	Access to necessary/useful data
	Lack of complete patient records	Clinician commitment to improved patient data
Processes	Underdeveloped health systems; gaps in EC systems	Effective triage and screening
	Access block and overcrowding	Effective management of ED space and patient flow
	Sub-optimal PPE use/management/fatigue	Safety culture and emphasis on IPC
	Lack of or inadequate testing	Appropriate testing equipment and criteria
	Incomplete or incorrect implementation of new processes	Consistency and clarity in communication and processes
		Simulation and rehearsal
	Inefficient communication and referral pathways	Effective communication
		Multidisciplinary decision-making
Leadership and Governance	Lack of government leadership and/or support	Collaboration – whole-of-hospital, and with public health services
	Disconnect between health system or hospital management and ED	Government/Ministry of Health leadership and support

HR and training

Fear and safety concerns

HCWs' fear of COVID-19 was a significant barrier to their willingness to be part of the frontline response to the pandemic. As was common worldwide, when the first cases of COVID-19 were diagnosed and little was known about the virus, HCWs in the Indo-Pacific region expressed fear of the unknown. At that time, clinical and nurse leaders said their greatest challenge was overcoming this fear: 'there was a lot of panic and chaos'.

> *'[Staff morale and motivation] is our biggest problem. … the nurses were scared, they didn't want to have anything to do with it, some were considering going on early leave. There was a lot of fear.'*

Informants recounted stories of staff (and patients) fleeing when a patient with suspected COVID-19 presented.

> *'… not only in the national hospital where I work, but in small CHCs, we have heard [reports] that the staff just run away as soon as people turn up with any respiratory symptoms – the staff just run away.'*

Many HCWs were unwilling to be rostered or volunteer to be part of COVID-19 screening and treatment teams. Concerns for safety were fuelled by inadequate PPE supplies, which was common across the region at the beginning of the pandemic. In several countries this led to widespread reluctance among HCWs to go to work, and further led to organised protests.

> *'Our real challenge now is the supply: masks, hand sanitiser and of course the full PPEs required … … the government promises to deliver these things but it comes in on an ad hoc basis, and that put a bit of challenge to our staffing. Our staff were feeling unsafe, especially our nursing staff. They protested not to come to work. They actually had a protest to the government to provide PPEs or they weren't going to go to work.'*

In many Pacific countries it is common for people to live in large, multi-generational households. Hence for some HCWs the predominant fear was transmitting COVID-19 to their family or household members.

> *'I think that is an area here where a lot of the doctors and the nurses are a bit hesitant about – [if] there is a positive case and you've been exposed to that case, is it safe for you to go back home? We've looked at the CDC guidelines and the WHO guidelines but I think it hasn't come out very clear to all the staff, so there's been a lot of apprehension about that.'*

> *'[Staff] are fearful of going home. And they're fearful of infecting family. And to that end, 90% of our staff now live in hostels near the hospital or in apartments donated by donors. … That's one of the ways of cutting down anxiety is knowing that your family is safe from you.'*

HCWs were not only fearful of infection, but of the potential economic consequences of not working, or of their death on their families. Informants in several countries reported that nurses in particular, who often were the main providers of income for their family/household, expressed concerns about the absence of insurance or compensation if they should contract and die as a result of COVID-19.

> *'So hearing of people dying in thousands elsewhere and they were worried about their welfare and the welfare of their families – would they be able to work, or if they died, what would happen, all these things. So they were concerned – if we're doing a risky job we should get paid certain allowances for it.'*

This issue is further discussed under Inadequate compensation and unavailability or non-payment of allowances.

A staff safety culture

Information and training, especially in IPC processes and the use of PPE, helped overcome fears for personal and family safety (see also Education and training). While 'repeated training' reduced fear, in some areas 'it's still there; even to this day most staff won't go and work in the COVID ward'. Other simple initiatives like requiring or encouraging nursing staff to work in pairs, to remind and support each other in correct use of appropriate PPE, hand hygiene and social distancing, evidenced a commitment to prioritising staff safety. In some countries hospitals reduced staff concern about the potential of carrying the virus from work to home by providing change facilities and laundering HCW uniforms.

Professional duty and motivation

Despite the prevalent fear, an identified enabler of effective in-country EC responses was the commitment to professional duty and motivation to care demonstrated by clinical and nurse leaders and, over time, many HCWs.

> *'I think medical staff see it as their duty, as their honour, and get in and do it.'*

> *'The staff, we love our job but, we have issues like with our leaders and our salaries and all this. They're trying to minimise our overtime, which is going to be very hard for us, because when the real crisis will come we will still need to, we will go beyond whatever they limit us to make. But … the nurses are still complying with our schedule.'*

In one country, clinicians provided care to COVID-positive patients in an isolation centre for almost three months without pay:

> *We brought in staff and recruited on the promise they will be paid. With the human resources machinery making promises without actual paperwork, these staff still worked. I am so thankful for those groups of workers …'*

Emergency physicians and nurses observed a willingness to fulfil their "duty of care" was more common among ED staff, potentially because of their training and experience in critical care, and that some were 'actually excited to respond' (notably mostly young and single nurses).

Physical and mental health impacts

A significant challenge in Indo-Pacific countries' EC responses to COVID-19 was preventing and addressing the impacts on HCWs' health and wellbeing. Concern about staff mental health and morale was a dominant topic of discussion in the online support forums. Participants shared the many and varied factors affecting staff health and wellbeing including fear and safety concerns (as discussed above); the stress and physical demands of their frontline work and/or managing patients with higher burdens of care; fatigue and burnout due to long shifts or being on call constantly (related to reduced availability of staff); separation from families; and feeling undervalued due to non-payment of allowances. Informants told of HCWs required to quarantine after frontline work or exposure to a possible COVID-19 case experiencing depression and anxiety, and of staff forced to live away from their families and/or villages feeling "homesick".

Psychosocial and other staff supports

In response, informants provided numerous examples of strategies and interventions devised to provide psychosocial support to frontline HCWs. In several settings, EC leaders ensured there was access to psychology/psychiatry professionals or mental health care support, encouraged staff to talk about mental health and provide peer support, and modelled self-care. Innovative models included the provision of a tablet in an isolation facility enabling staff to have a consultation via WhatsApp with a psychiatrist at any time of the day or night. Other simple and low cost strategies to enable staff to "debrief" and feel supported included end-of-shift feedback sessions, focussed on what went well, and opportunities to (safely) share food. In one Pacific Island country the ED Head convened a debrief session for nurses who had been quarantined after a potential exposure and also invited their spouses or partners to attend.

> *'And then I asked each of them to recount their experience, how they felt about the events, what they were happy for that worked for them, what they would like some improvements about, to prevent such an event happening again in the future.'*

As well as enabling staff and their spouses to share their experiences and receive psychosocial support, the ED Head ensured an adviser to the Minister of Health was present to hear their concerns and recommendations.

Practical support, like providing accommodation to frontline staff, improved wellbeing by reducing anxiety about transmitting the virus to their family or community.

Workforce shortages and gaps

Staff health and wellbeing were influenced by, and also exacerbated, pre-existing workforce shortages and gaps. Most countries in the Indo-Pacific region were already struggling with inadequate doctor:patient and nurse:patient ratios, and insufficient ED staff trained in critical care. EC workforce shortages and gaps were amplified after the declaration of the COVID-19 pandemic and first cases in-country by multiple factors including staff members' unwillingness to work (related to the barriers and challenges described above), being diagnosed with COVID-19, having to quarantine after frontline work or exposure to a patient with suspected COVID-19, and comorbidities or age (risk factors excluding them from involvement in COVID-19 testing or treatment), as well as the repatriation of international HCWs to their home countries.

> *'So our nursing power is really down, at this point in time … physically they're down because we lost nine [international] nurses, who were emergency nurses, specialist nurses. And then we requested to the management if they can replace [the] emergency nurses, but it hasn't come forward. In return they gave us four novices, which is another big headache for us. We have to start all over and train – not at this point in time, especially in this disaster.'*

The loss of the most highly trained and experienced emergency physicians and nurses from the frontline response also impacted on capacity for training and upskilling of other HCWs.

Recruitment of volunteers

Recruitment of additional medical and nursing staff as well as lay volunteers was a strategy in several countries to boost resources, particularly in isolation wards or facilities and quarantine centres. However, many of the staff 'lost' from the ED were the specialist and most experienced staff members (given the decision in most countries to move staff with comorbidities or over the age of 50 to other departments for their own safety), while the recruits were "novices" and non-medical volunteers. Further, informants explained that recruitment of volunteers was challenging after volunteers contracted COVID-19.

Lack of information, recognition and/or engagement

Failures to provide HCWs with information, recognise their commitment and extra burdens and/or involve them in decision-making were identified barriers to staff participation and engagement.

> *'The staff, I think, are potentially one of our biggest problems. They're really unhappy. They're frightened. They haven't been engaged with.'*

Regular and open communication

Hence, regular and open communication was an enabler of effective and safe EC, ensuring HCWs were informed and felt empowered. Informants described the value of regular staff briefings to share the latest knowledge about COVID-19 and information about plans and developments at government, hospital and department levels, and also boost awareness of processes and safety measures, reducing staff fears and anxieties.

Inadequate compensation and lack or non-payment of allowances

A commonly-mentioned barrier to HCWs' active participation in the EC response was the absence or non-payment of increased compensation or special allowances in recognition of their increased personal risk.

> *'[HCWs] were concerned that if we're doing a risky job we should get paid certain allowances for it. So a lot of work has gone in trying to compensate them for the work they do, if they come into contact with COVID patients or they contract COVID. To date that has been difficult to finalise on paper because a lot of these allowances were not captured in the public service guidelines [and therefore policy change was required].'*

> *'… the government here keeps promising extra payments to them, there's no transparency around that, they're not going to get their extra payments. And I think that's going to cause a lot of problems. Staff are already saying that they're not going to come to work when we get positive cases.'*

HCWs were frustrated by government promises to pay risk allowances or compensation that were not honoured, excessive delays in receiving payments, and by inconsistent or inequitable distribution, with HCWs in some departments or at certain levels receiving allowances that were not available to others, or benefits paid to government employees in other sectors but not healthcare.

> *'I think the biggest problems we have faced is something I was completely unfamiliar with: when they declare a state of emergency, the staff get paid – should be paid – allowances, extra pay. So they declared the state of emergency, but none of the staff have received any allowance. But other government departments, like police, they're getting their allowances. And some of the senior people within the [hospital] management are receiving allowances. Which everyone's fully aware of. … So staff are really angry, they're not coming to work, they're coming in for an hour or two then leaving. And it's something we can't do anything about.'*

As noted above and supported by informants in other countries, there were occasions when HCWs' dissatisfaction with non-payment of allowances led to action such as refusal to attend work and organised strikes, which in low-resource settings caused workforce shortages and disruption to services and timely patient care.

Further barriers to HCWs receiving appropriate remuneration and allowances were the limited time and capacity of clinical leaders to complete the required paperwork (to request increased compensation or risk allowances) due to their clinical load, and in some countries the impact of state of emergency regulations prohibiting union activity.

Leadership, advocacy and donations

However, in several countries, clinical leaders demonstrated leadership and successfully advocated for appropriate remuneration or compensation, as well as appropriate accommodation for staff required to quarantine.

> *'And so I asked [the nurses] to have a meeting and they came up with a list of things that they would like addressed. And a lot of them were around their own safety, safety for their families. They wanted to know if there was, if the government would provide some sort of insurance should they die in the process of looking after COVID patients. … And so I, I also sit on the national meetings, so I was able to bring up their concerns nationally.'*

In one country, HCWs working in an isolation facility were unpaid for three months and not provided with appropriate accommodation until the constant advocacy of an EC leader – including sharing photos of nurses' sleeping area in the isolation centre and lobbying elected leaders – garnered government response.

Private hospital and clinic closures, or reductions in patient volume, in response to COVID-19 meant less private work and the loss of a significant proportion of their regular income for many clinicians and HCWs. Informants acknowledged the importance of donor support for staff, including provision of accommodation, food and petrol for their cars, as 'not just a blessing, but it's almost a necessity, to keep the doctors and nurses here working'.

Lack of knowledge and/or training

One of the earliest identified barriers to an effective and safe EC response to COVID-19 was HCWs' lack of knowledge and experience in responding to a communicable disease pandemic. Informants spoke of the sudden and 'drastic' changes required in triage and IPC processes, and hence need to rapidly deliver training in infection control and effective use of PPE.

> *'… they were very scared because they had one positive case, everybody fled from the hospital and health centres. They didn't know how to wear the PPE, they didn't know about hand hygiene and respiratory hygiene.'*

Strengths were evident in clinical and nurse leaders' immediate efforts to inform and upskill their staff, despite the limited information available at the start of the pandemic and the initial panic and focus on available space and infrastructure. EC leaders sought information and guidance from colleagues in other regions to increase their own understanding of the virus and effective responses, translate guidelines and protocols to their settings (with respect to their systems, space and supplies, as well as staff capacity and language/s) and identify appropriate training programs and delivery platforms.

Availability of online training, such as the WHO modules, and training videos that could be accessed and viewed on mobile phones, for example, were identified enablers, supporting rapid and effective upskilling of HCWs.

> *'I had no idea what COVID was, but I was able to assume a position of leadership and get everyone to sit in the same room and try and address as many of their concerns as possible.'*

HCW fear was reduced, and confidence increased, in line with training and knowledge-sharing: 'After the training, it was very exciting to see the healthcare workers smiling … After they learnt about the PPE and how to look after themselves, they were happy and confident.'

One hospital tasked their registrars with reviewing the emerging research papers and sharing findings.

> *'In some of the papers we were able to see that … it doesn't necessarily mean when you're exposed you will get infected. And the importance of social distancing and handwashing, and wearing of masks, does have an impact. And so gradually, with time, the fear became less and less amongst the staff.'*

Stigma

COVID-19 related stigma was identified as a significant burden experienced by many HCWs, particularly at the onset of the pandemic.

> *'Initially, like for the first suspected cases, there was quite a lot of stigma. … I won't say it has completely gone away, but I'd say that it has reduced in intensity.'*

Stigma towards ED staff and frontline HCWs was enacted by staff in other areas of the hospital, reducing collaboration and peer support, as well as by HCWs' families and communities. Clinicians reported staff whose families 'refused to have them back into the house'. A nurse who contracted COVID-19 was subject to personal attacks on social media.

HCWs' experiences of enacted stigma impacted on the availability of human resources in the EC response to COVID-19, with reports of staff refusing to volunteer or be rostered for frontline tasks, such as triage or managing patients in quarantine.

Gender and cultural barriers

Similarly, informants identified gender and cultural barriers to HCWs' participation in the EC response to COVID-19. It was noted that in countries with patriarchal cultures some female HCWs were 'advised' by their male partners or relatives not to participate in the EC response to the virus.

Separation from families was reported to be particularly dangerous to the mental health and wellbeing of female HCWs, with reports of female staff experiencing 'homesickness' and heightened anxiety, and a pregnant HCW in quarantine suffering significant mental health distress.

Infrastructure and Equipment

Limited space and capacity to provide intensive care

The first identified barrier to preparing EC to respond to COVID-19 in terms of infrastructure was the lack of space in many hospitals and healthcare facilities. Few had existing intensive care units or resuscitation areas, or the space to accommodate and utilities (such as electricity supply) to support them.

> *'The only thing that was a mismatch was – right, okay, now we got the ventilators, where do we run them from?'*

Flexibility and adaptable infrastructure; 'donated' infrastructure

Efficient preparation for the EC response was reported in countries that had existing infrastructure and 'space' that was suitable for use, or could rapidly be repurposed for use, to manage patients with diagnosed or suspected COVID-19. Informants reported deliberations about options within existing infrastructure to house isolated cases – in hospital departments not in daily use or separate from the main building, or other facilities, separated from the hospital campus. Informants acknowledged the value of expert guidance from the WHO, other agencies, and colleagues in other countries in identifying infrastructure and equipment requirements.

Where possible, most countries chose to set up screening, isolation and intensive care facilities separate to the main hospital. Examples included health centres away from the main hospital, recently-built facilities that had not yet been fitted out for use and, in one country, a national sport centre that was offered for the purpose.

> *'Our facilities were not ready, in terms of preparation … we've decided that we will handle our COVID patients somewhere outside of the hospital.'*

The use of public health teams to set up and staff screening centres or fever clinics, separate from the hospital or at least outside the ED, was identified as a good model for countries in the Indo-Pacific region with limited space and ED staff. The development of designated 'ILI centres' in village community centres described in Section 3.2.4 was a particularly innovative, culturally-acceptable solution.

Within the ED, most countries were able to restructure space – within the limitations of often limited floorspace – to separate respiratory and non-respiratory patients. Informants advised that even in countries with no confirmed cases, creating separate 'COVID' and 'non-COVID' zones improved staff confidence and understanding of processes. Innovative use of low cost and movable equipment to divide space included the use of plastic-covered metal screens (for ease of cleaning) in one country, providing physical barriers to direct and restrict staff movements.

> *'The resus, instead of things on the floor, we've just got plastic screens providing barriers to stop people from going in. And it's fairly cheap. Initially they were blue pipe, put together with plastic on it. Now people have donated metal. It's not high tech.'*

No or inadequate essential equipment and supplies

At the start of the pandemic most EDs did not have the equipment and supplies needed to be prepared for the potential presentation of patients with COVID-19.

> *'In terms of intensive care, I don't think we'll be able to do that here. We don't have ventilators, we don't have a lot of stuff here.'*
>
> *'The ED setting itself, as well as equipment, we don't have level 4 PPEs that you need if you're trying to intubate. We don't even have video laryngoscopy. And we don't have negative pressure settings in our ED.'*

Supplies of PPE were limited or inequitably distributed in many countries; informants reported some facilities or hospital departments stockpiling and/or overusing PPE while others had inadequate supply. Similarly, there was considerable variation in oxygen sources in countries across the region, and reported challenges in obtaining cylinders and concentrators and distributing them to provincial facilities.

> *'We have bought 100 cylinders and we ran through 30 in the first week.'*

The COVID-19 testing equipment needed to inform clinical care processes and decision-making about IPC requirements, isolation and quarantine was not available in many countries in the early stage of the pandemic. Arrival and set up of equipment was delayed in many countries, and several still have limited resources and capacity for testing.

Donation of supplies and equipment

With the support and coordination of WHO agencies and regional offices, and the SPC, countries were able to obtain the necessary PPE and IPC supplies as well as diagnostic and clinical equipment from donors. An informant from a small Pacific island nation described the coordinated efforts of agencies and donors to 'put as much of the needed supplies as possible on that plane that leaves on Friday'.

Informants expressed their gratitude for the response of global and regional agencies and NGOs.

> *'Some good news … a conglomerate of UNICEF, WHO and World Bank have ordered 40 ventilators, but more importantly they've arranged for 16 oxygen concentrators to go to each provincial hospital.'*

> *'Fortunately, we've had some donations from other good Samaritans like [a global NGO], and they gave I think two packs of PPE per ED doctor. So we're keeping that as our surge capacity should our hospital supply run out.'*

However, many informants reported a 'mismatch' between what was received, and what was required to meet local needs and/or what could be utilised given in-country infrastructure and resources, particularly staff capacity.

> *'The mismatch came we got the four ventilators and then realised that we don't have enough staff to run those ventilators.'*

Some donated equipment was not suitable for use by staff in the region, for example PPE and masks being too small for most.

Inappropriate use of PPE, poor continuity of supply

Once core equipment and supplies were received by countries across the region the next challenge was managing distribution and use given barriers and delays in obtaining further supply. Border closures and international flight and cargo restrictions also impacted the availability of supplies required for non-COVID EC, including antibiotic and ICU medicines. Panic use of PPE (wearing full PPE when it was not recommended) resulted in shortages, at a time when there were concerns about if or when supplies would be replenished.

> *'PPEs are a big issue here; we tend to run out. So the government is sort of trying to, looking at the possibility to purchase more from outside …'*

> *'We do have major issue with low PPE supplies due to closed borders. We have ordered PPE and some donations [are] on the way. However, still trying to get them into the country by boat … as flights are still closed."*

Creation of storage space within the ED – or processes to ensure access outside of normal business hours – was necessary to ensure access to PPE and IPC supplies as required. Other strategies to manage PPE use included reinforcing the WHO guidelines, ongoing education, and leaders demonstrating appropriate practice. In many countries PPE was not secure or well managed, led to rapid depletion of supply.

Storage and management processes

In contrast, a strength in responding to these challenges was identified by one in-country informant who related the support of the hospital pharmacy team, providing real time reporting of stock levels.

> *'The pharmacy put up an Excel spreadsheet with all the different types of equipment, and then they gave a presentation as to the different stock levels, whether there was enough to last for two weeks, supply enough for three months, or six months, and so forth. So that gave a better representation of the current stock on the ground.'*

Re-use and innovation

In addition to reducing use of PPE and/or extending the time period of use (with reports of staff wearing the same kit for duration of a 12 hour shift), many countries sought advice on appropriate cleaning and disinfecting of PPE items to enable re-use. In several settings, community and/or staff members began making items of PPE, such as face masks; in one, emergency trainees were making plastic face shields.

> *'All of our clinical equipment, our masks, everything, are re-used, they always have been. So we clean them down with soap and water and then alcohol, and re-use them. Because we wouldn't have enough stock.'*

Data

Relative to the other EC building blocks, the volume of responses that related to the "Data" building block was low. This vacuum of discussion regarding data was, in itself, informative. It reinforced the pervasive inattention to valid, accessible, useful and timely data required to inform EC systems in general. Although this access to data became more important and urgent in response to the COVID-19 pandemic, the prioritisation of EC service delivery became even more all-consuming.

Data were unavailable or not shared

In some settings EC leaders struggled to obtain data needed to inform communications with their colleagues and HCWS, and their communities, about COVID-19 and inform care and response planning.

> *'... our government has not brought back any results from our request to get the strain tested and tell us what strain is in the country. I can't rebut any of the people on social media and explain why we are not getting as many severe cases, why the numbers are so low – the main question is what strain we have and I can't tell that. The government ... said they have sent it but they've never told us; it's been a year now.'*

Access to necessary/useful data

Clinicians expressed a need for data to be shared in a transparent and timely manner within the ED (between doctors and nurses), intra-hospital (between departments, and from executive to department leads) and across the health system (from government to all sectors, and between pre-hospital and hospital, and hospital and public health).

For example, being able to obtain and analyse information about where HCWs were assigned, as well as guidelines about PPE levels according to risk, ensured allocation of appropriate PPE.

> *'The right allocation actually occurred when we provided data. Like, we have this number of people working here that were categorized as first liners ... So COVID brought fear, but when we actually sat down and looked at what we can do, and [that] was really guided by the initial supports that ACEM was sending out – those guidelines, a couple of early Zoom sessions – they gave us some oversight into the problem, and we modelled our preparations around the advice that was coming from those sessions.'*

Lack of complete patient records / *Clinician commitment to improved patient data*

One informant described the lack of data from and about the ED prior to his appointment, and his efforts to improve collection and analysis of data about patient presentations and processes to inform decision-making and recommendations about care and allocation of resources.

> *'... before COVID this department did have data but it [was] just basic and not extensive like what we have now. ... it would all go through the Hospital Medical Records and they would generate some really generic data ... [now] we use data that we have to make recommendations.'*

Processes

Underdeveloped health systems; gaps in EC systems

For countries with fragile health systems before COVID-19, limited pre-existing capacity was a major barrier to rapidly responding to the emerging pandemic. Informants' experiences made clear that gaps and weaknesses in EC and primary care – described as 'pretty much non-existent' in one country – compromised in-country capacity to effectively respond to public health emergencies.

> *'Before COVID we didn't have any sort of patient flow system if you work here; so it's like any Tom, Dick and Harry will just come in.'*

Effective triage and screening

Effective use and rapid up-scaling of triage and screening processes were crucial to the EC response to the pandemic. Settings with pre-existing triage capacity were better placed to apply these systems to the pandemic context.

> *'In the facilities [staff were] trained on triage, sorting and receiving patients and the basic fever triage. All facilities in [major city] started fever triage, which also helped their assessment for acuity of patients and smoothed ambulance referrals.'*

Effective implementation of new processes required flexibility, adaptability and rapid training of staff. ED staff often were responsible for screening at hospital entry. Settings without established triage and reception processes found this more challenging to initiate.

> *'So what we did was we just build a tent in front of ED, so using extra volunteers who are trained there. Basically what we do is just to sort those who are presenting with respiratory symptoms or not with respiratory symptoms. Those with no respiratory symptoms will be directed straight to ED but those one with respiratory symptoms … we call them suspected and this patient will be taken away immediately to a designated area … where we have a COVID team.'*

Access block and overcrowding

The term "access block" is used to describe the situation where an ED is unable to move an admitted patient to inpatient wards after assessment and treatment in the ED is complete, often because of a lack of inpatient bed capacity. Overcrowding, which occurs as a consequence of access block, results in poorer ED functioning due to an excess number of patients in the department.

> *'[Even before COVID-19] our emergency department, it's almost like full up and overflowing with patients, and some are lying outside. They created an observation room and it's now like a ward, because the wards are always full –bed occupancy rate is more than 100 percent always – so that in a way is like a new ward beside the emergency department.'*

In many countries hospital access was adversely affected by the COVID-19 response and care requirements. In one setting with a high-volume of COVID-19-positive patients, access to ED care for incoming patients was delayed by other patients "stuck" in the ED fever or isolation areas for up to three days pending transfer to ICU or the designated COVID-19 hospital, due to unavailability of beds and/or transport staff.

In other countries, the commissioning of hospital wards and health facilities for isolation of COVID-19 positive patients or suspected cases contributed to crowding in EDs and worsening access block when restrictions eased, surgery resumed, and "regular" patients returned.

Informants also acknowledged that the COVID-19 pandemic had highlighted the longstanding problem of ED overcrowding and access block during surge events: 'it's actually turning a spotlight on patient flow, which we needed anyway'.

Effective management of ED space and patient flow

Informants reported that processes and protocols were implemented to effectively manage the (often limited) space in the ED. New and modified processes to control ED space were essential to minimise crowding, minimise risk and optimise patient flow as well as patient and staff safety. Restrictions to limit the number of visiting staff and medical rounds were most effective if they 'came from the top' and were respected by all medical and surgical teams.

There were several examples proffered of simple and low cost innovations devised to address process challenges. In one hospital, to overcome the problem of ambulances offloading patients into the ED without proper handover or screening, staff applied red tape on the ground across the ambulance entry, indicating where the ambulance was required to stop and wait: 'Low tech, but red tape on the ground seems to make people stop!'. In another hospital, the head of the ED sent a "safety tip" to team members via the Viber app each morning, to reinforce IPC and staff safety processes. Clinicians in a large isolation facility (a repurposed sport centre) streamlined communications and record-sharing processes by using hand-held radios and photographing clinical documentation rather than passing documents between staff.

Simple zoning processes were commonly used to separate high-risk from low-risk patients, typically by dividing the ED into respiratory and non-respiratory patient areas. Clear demarcation of areas, and effective triage of patients prior to entering the ED, were enablers of safe and efficient separation of patients.

Sub-optimal PPE use/management and fatigue

Informants related examples of inappropriate use of PPE, including inadequate protection or, more commonly, overuse or use of levels not recommended for the setting. This highlighted a need for more and repeated education, particularly as case definitions changed, and development of context-specific guidelines and protocols for use.

Continuance of both clinical and IPC processes and standards was threatened by fatigue and, in some countries where there had been no or fewer COVID-19 cases, increasing complacency.

> *'We're still trying our model with having the separate respiratory room but we're not sticking to it as well as what we were. … we're getting a bit complacent, because we haven't had a case.'*
>
> *'We have very low to no community transmission and there's been a slide in the level of PPE that's worn within the department. … it is a kind of fatigue with the PPE, and the low community transmission has meant it's hard to maintain any kind of vigilance around what we should be wearing.'*

Informants described cleaning staff also suffering fatigue or complacency and needing reminders to restock hand sanitiser and maintain cleaning and disinfection processes to the required standards.

Safety culture and emphasis on IPC

IPC was most effective when hospital managers and/or ED leaders were committed to building a safety culture and consistently emphasised the importance of IPC processes.

> *'So, we've done training, we're doing daily safety awareness. I think it's having a positive impact. … there wasn't so much of an awareness of safety before, we just carried on doing what we usually do. But now in some of the conversations I see the safety concepts coming up more than before. So I'm taking that as a sign of the positive impact of what we're doing.'*

Some facilities introduced new processes to reduce the risk of virus transmission between the hospital and home, providing change rooms and showers for staff to use after shifts and laundering their uniforms.

In others, hospital or department managers realised the benefits of enhanced IPC to routine EC, and thus made efforts to establish enhanced precautions as part of the 'new normal'.

> *"Previously our IPC backbone in the health system has been very weak. Like gaps have been glaringly apparent to us … but what has been apparent in COVID-19 is the simple measures that we can put in place, with minimal funding and with minimal effort – so that's handwashing basins, at every pre-triage area, in every clinic; having a system where there is spacing between patients; having a system where every patient with a cough should get a mask. So those very basic things, that's adopted and that's going to become a norm [here].*

Lack of or inadequate testing

Capacity for testing to inform clinical care processes and decision-making about IPC requirements, isolation and quarantine was hampered by a lack of equipment or limited testing capacity (as reported above). Centralisation of testing – only at a national health laboratory for example, and not in locations where there were suspected cases – was identified as another barrier to efficient and safe EC responses. Further, some informants in settings with no or low community transmission described a reluctance to test, or a need to 'do it quietly', because of concern about creating staff 'hysteria'.

Appropriate testing equipment and criteria

By the end of 2020, most countries had developed in-country capability for COVID-19 testing. However barriers to testing and the timeliness of results for decision-making remained. Turnaround times of up to 72 hours in some countries impacted significantly on ED staff testing, with concerns that the delay would lead to increased anxiety and PPE use while awaiting results.

Informants in some countries reported that COVID-19 testing criteria for patients had become too narrow, meaning not all patients with respiratory symptoms were tested, placing staff and other patients at risk.

> *'That's the drawback of the system – we're not actually initiating any responses until we get a positive case. But we won't know we've got a positive case until we've tested, and then we're already looking after them.'*

Incomplete or incorrect implementation of new processes

Failure to properly implement triage, diagnostic and IPC processes put staff, and other patients, at significant risk from undifferentiated patients in the ED.

Implementation of new and modified processes to respond to the threat or presence of COVID-19 was hindered by competing priorities for clinicians (maintaining "business as usual" as well as increasing focus on COVID-19) and diversion of ED staff to other COVID-related coordination roles and tasks.

> *'And then the other challenge that we faced was, with the onset of the pandemic, there was a lot of meetings that had to be attended, and programs organised for COVID, and we were trying to ensure that the balance of business continuity still remained. Because there were still sick patients presenting to the emergency department.'*

Processes to maintain routine care were essential to minimising adverse impacts on other patients attending the ED due to COVID-19 mitigation measures (as identified in 4.2). Informants acknowledged the necessity to focus on COVID-19, but also the need to sustain processes to respond to patients presenting with other prevalent health conditions such as tuberculosis and dengue fever.

Consistency and clarity

Effective implementation and uptake of new processes in response to COVID-19 was greater when there was consistency and clarity, ensuring that 'everybody understands the same concept'. Clear and consistent guidelines, procedures and protocols were essential to minimise care variations and reduce risk. Several informants noted the value of having global guidelines that could be adapted to local health systems and capacity.

Simulation and rehearsal

Participating in simulation exercises and rehearsing processes highlighted gaps and problems in patient flow, procedural and communications issues.

> *'I'm very thankful that [simulations] were carried out, because that helped us a lot. They provided some insights for us in COVID triage, helped us to rearrange some of the flow that we had.'*

Informants also noted that simulations supported knowledge retention, familiarity with processes and confidence of staff in unique and local clinical contexts.

Inefficient communication and referral pathways

Complex patient admission processes and underdeveloped referral pathways and handover process were barriers to efficient and safe patient transfer, prompting ED staff to develop local guidelines and procedures.

> *'Before they send a case or refer a case whoever is referring will update the ED first, "Look we are sending this case over to you guys and this is what we (referral hospital) have done". Actually, we don't have these things as a national guideline. I have created one because at the end of the day the burden comes to us; so no other choice, we have to develop something to help, to ease this burden of work that we actually have in our department.'*

Effective communication

In contrast, effective communication and handover processes were identified as enablers and essential to a timely and efficient EC response. This was particularly important for the ED, as the "front door" of the hospital, with responsibility for arranging admission and initial inpatient management. Informants described efforts to streamline communications to facilitate transfer of patients to wards without multiple reviews.

Multidisciplinary decision-making

Various models with respect to hospital admission criteria, ceilings of care and treatment rationalisation, as well as broader collaboration with ICU, were described. But a commonly identified enabler of effective and safe processes was multidisciplinary, and interdepartmental, coordination and collaboration with involvement of ED staff.

Development of criteria for interventions such as intubation and decisions about critical care processes required 'a lot of consultation' and discussion among all specialists, 'so that the burden of the decision does not rest on one person'.

An enabler to efficient and widely accepted clinical decisions and changes to processes was collective decision-making by a whole-of-hospital taskforce or meeting of stakeholders.

> *'So we've had a few meetings with the medical team and the anaesthetists in trying to talk through how patients flow through the hospital, and where patients will come to.'*

Collaboration – whole-of-hospital, and with public health services

Informants felt responses were more efficient and effective when there was whole-of-hospital "buy-in", underpinning effective collaboration between departments. Multidisciplinary taskforces were common – one, for example, included the hospital's ED, medical consultant, surgeon and paediatrician – and enabled collaborative and rapid clinical decisions. Another informant described the value of interdepartmental communication and knowledge sharing:

> *'With the medical team, we have twice a week we have a meeting with all the other clinical heads as well, just to discuss what each department is planning for the department. And sharing what has worked in the department and what has not worked.'*

Partnership with public health agencies and staff enabled a more efficient response and retention of clinical staff in the ED.

> *'Yes, the ED itself has been the frontrunner in a lot of things because the general understanding for the population here is that if you're sick for any small ailment, or big thing, just present to the ED and you'll get sorted out. However, in this we want to keep people away from the hospital. So in terms of systems, fortunately we've been working our public health team. We've started fever clinics as well, but they're not run next to the ED; they're run in subdivisions. And our public health doctors and nurses are manning that.'*

Leadership and Governance

Government/Ministry of Health leadership and support

Indo-Pacific countries' EC preparedness and response to the COVID-19 pandemic was significantly determined by the level, or lack, of leadership and support provided by the government, health ministry and policymakers, as well as health service management. Some countries reported high levels of support from the government and health ministry:

> *'In fact the whole country, the whole ministry dropped everything else and focussed only on COVID and preparing the country for a possible epidemic, which thankfully has never come.'*

Political will and leadership was key to activating the country's EC response and securing the required funding, equipment and supplies.

> *'Once we got political support we managed to mobilise a lot of resources, because then they liaise with donor partners to pour in funding and support.'*

> *'Since COVID happened what I have seen is that things suddenly escalated. For example, I think in the last 12 months I have realised that we have received a lot of support and attention, especially from our stakeholders and even the government.'*

Government decisions to enact country protection measures to prevent COVID-19 outbreaks, including border closures, quarantine of repatriated citizens, restrictions on community gatherings, curfews and lockdowns, gave EC coordinators time to prepare systems, space and staff.

> *'We still have no cases here in [country] and I think that's a big blessing for us, because obviously we're not prepared … It's going on three, four weeks now, our border has been closed. There were a lot of issues in terms of decisions to close it or not to close it. But there was pressure from us, in the hospital, to close it because obviously our facilities were not ready.'*

Alternatively, informants reported that in some countries, '[there's] a lack of leadership at the moment too, so it's quite difficult'.

Political influences, and mismanagement of funds allocated for COVID-19 health system preparedness, were alluded to as barriers to the most effective and timely EC response.

> *'But our system of governance, the weakness of it, is when the leaders get involved and then there's money involved, and a lot of funds being pushed in for the COVID response – usually the funds get misused, especially if you have weaker administrators. Politics plays a big role in [this country] in how we implement.'*

Emergency care leaders in high-level coordination/advisory roles

In several countries the expertise of EC clinical and nurse leaders was acknowledged through their highlevel engagement on national emergency response coordination committees. Many EC leaders in the Indo-Pacific region had experience in disaster or public health emergency management – including responding to outbreaks of cholera, dengue and measles, and cyclones and flood events – that was recognised as particularly valuable in planning responses to the COVID-19 pandemic. As one informant reported: 'I have the skillset of operationalising strategies and doing it quickly and getting documents and planning documents out, so the department keeps asking me back'.

EC leaders were often at the forefront of planning and implementing the COVID-19 response, advocating for the infrastructure, system changes and resources needed and willing to 'argue with national health ministers'.

> *'The emergency staff are leading transport. They're on all the care committees. They're on the national committee. And they're actually the people putting forward good evidence-based care. And trying to override political decisions, as opposed to health science decisions.'*

Disconnect between health system or hospital management and emergency department

Informants reported that implementation of EC systems and processes was negatively impacted where there was disagreement or a "disconnect" between ED clinicians and health system and/or hospital management, or between the national Health Emergency Operations Centre (HEOC) and 'what's actually happening on the ground'. Some clinicians reported being excluded from EC response decision-making, or gave examples of their recommendations to improve processes and patient care being ignored or dismissed.

> *'... they haven't really involved us clinicians. We're not really involved in the COVID-19 program and rollout. So, we've attended meetings but they've all kept it up with the [government] officials.'*

> *'Just sometimes I question why we're separate, why we're splitting our resources, splitting our staff, splitting our clinical equipment. Maybe we should be trying to manage it back at the ED. But, that's up to [the country's HEOC].'*

In some countries there was not a national emergency response plan, or clinical guidelines; in others, guidance and standard operating procedures (SOPs) were developed but were not being implemented at the hospital level.

> *'We're just seeing patients in ED, we're trying the social distancing methods, and basic hand hygiene and all that. But it's pretty much, there isn't much happening here in terms of implementing the processes to prevent COVID-19 and all that. We've got SOPs coming out of our ears but they're not followed.'*

> *'I think the issues with that, those plans, haven't been disseminated down to ground level, so a lot of the nurses and doctors are not too sure what's happening. ... And there's no plans being made of where patients will go.'*

Coordination and collaboration between health services and agencies

In contrast, informants shared experiences of effective and mutually respectful collaboration between clinicians and administrators, and effective liaison and coordination of efforts between EC and other health services and agencies. For example, an informant described the liaison and communication between the emergency operation committees of the hospital and the public health agency (managing peripheral health centres), enabling discussion about cases and coordination of patient transfers when required.

In the Pacific Island country context, there were examples of clinicians and public health staff working together in the major cities, which extended to outreach support to outer islands or remote communities.

In one country a joint public health and hospital ED team 'made our own roster' and travelled to outer islands by boat to deliver care, supplies and community education.

Interdepartmental communication (hospital level) and frequent meetings

Governance and implementation of EC responses in the hospital setting were enhanced by effective communication of information and protocols to all staff, and inclusion of a wide range of stakeholders, representative of all disciplines and departments, in discussions and decision-making.

> *'The thing about the Emergency Operation Centre [is] it is operated by different people and backgrounds, so there is usually a doctor in the team, plus a nurse as well, and also someone that is in the, who operates with our consumables and equipment items.'*

> *'With the medical team, twice a week we have a meeting with all the other clinical heads as well, just to discuss what each department is planning for the department. And sharing what has worked in the department and what has not worked.'*

Stakeholder engagement in hospital planning and response (clinical governance)

In another setting, the Head of the ED and ED Nurse Unit Managers were included in a stakeholders group that was briefed by the hospital management every morning. The importance of nurse leadership was highlighted as key to engendering teamwork, raising safety concerns and ensuring all staff understood the reasons for new practices and regulations. Frequent meetings between management and clinicians, which included nurse leaders, were a critical component of effective clinical governance. The informant noted that the Nurse Unit Managers were particularly active in raising issues and staff concerns at the stakeholders meeting.

'Apart from that, in terms of any decisions that are made in the department so far, it's always a dialogue between the nursing division and the medical division. So we have a clinical excellence committee meeting in the department, we meet to discuss any decision that needs to be made. And if it has to be an emergency meeting, it happens there and then.'

Evidence- and expert-informed policy and planning

Another enabler of an effective EC response identified by several informants was the availability – and willingness - of COVID-19 response leaders to seek and use evidence-based guidance and resources developed by expert agencies such as the WHO.

'And you have to have a government that is responsive to the technical advice that was given, and [our] government was very responsive to the advice that they gave. We were fortunate to have an epidemiologist in public health, in the country office, that was constantly searching the internet and the world, getting information out of WHO, on how to handle the pandemic. And that was translated right down to the policy level.'

'In a small country where hospitals don't have autonomy, the biggest lesson learnt was – many of the small island countries have a WHO Country Office, that has resources and expertise.'

'Whenever we're not sure about anything, and we call up any of the emergency physicians and we ask what is being done, and they send us papers about it and have offered advice that has been like a lifeline for us here.'

4. Limitations

Research and analysis time frames were short. This was due to delays in receiving formal approval to proceed combined with the challenge of recruiting research personnel and key informants for in-depth interviews over the Pacific region's summer holiday period (December 2020-February 2021). Consequently, there was a limited timeline for data collection, particularly engagement of key informants (research phase 2 interviewees).

The requirement for interviewees to be identified and to speak 'on record' as an organisational representative may have been a further deterrent to study participation. Thus, the seven interviewees comprise a small cluster of frontline EC providers from Pacific Island countries and territories only. Nonetheless, they provide an important EC frontline voice from across the three Pacific regions of Melanesia, Micronesia and Polynesia. Multidisciplinary and wider Indo-Pacific regional representation was achieved through the online forums, thereby ensuring that the research findings are a rigorous and robust reflection of regional experience.

5. Conclusions

5.1 Lessons learnt

Lessons from the EC response to COVID-19 in Indo-Pacific countries may be valuable to other countries, particularly LMICs, adapting and needing innovative and low-cost strategies to overcome clinical, ethical and limited-resource challenges.

Key lessons identified by this study's informants, or that emerged through the research team's data analysis, are categorised in relation to the Pacific EC Health System Building Blocks.

5.1.1 Lessons learnt: Human resources and training

1. Moving from fear and panic to confidence and readiness to respond to public health emergencies was enabled by clear and open communication, education, training (including simulations), leadership and peer support.
2. HCWs need to feel safe, engaged, valued and protected to overcome fear and reluctance to participate in the public health emergency response.
3. Some HCWs will remain resistant and unwilling to work at the frontline; rather than force them to engage in training, it was more effective to focus on protecting and supporting the HCWs who were willing to work in COVID-19 areas.
4. Proactive and transparent information-sharing was necessary to empower and engage staff, and dispel COVID-19 myths.
5. Securing staff entitlements including appropriate remuneration, risk allowances, income protection and insurance agreements, mental health care, and appropriate accommodation and support for staff quarantine required clinician leadership and advocacy.
6. Continuing education and training was, and will be, necessary to maintain staff safety, reduce the risk of burnout or complacency, and ensure preparedness for future public health emergencies.

5.1.2 Lessons learnt: Infrastructure and equipment (including medications)

1. It was most effective – and safer for staff and patients – to "do the basics well" and not be pressured to implement interventions until there were clear guidelines and staff were trained and comfortable.
2. Effective IPC precautions (to protect staff and patients), screening processes (to determine transmission risk) and triage systems (to identify urgency and care needs) were key to a safe and effective response to a communicable disease outbreak. It was acknowledged that these processes should be used not only during the COVID-19 pandemic but in routine practice.
3. The availability and appropriate use of PPE was key to staff safety (actual and perceived) in managing patients with infectious disease – and required adequate supply, training and support, and ongoing monitoring of practices (donning, wearing and doffing) for all workers.
4. Proper implementation of screening, IPC and diagnostic processes was essential to protect staff (and other patients) from undifferentiated patients presenting at the ED.
5. Having infectious disease screening and isolation facilities separate from the ED prevented further impacts on ED operations

5.1.3 Lessons learnt: Data (information and research) and Processes

1. An emergency response plan, clinical guidelines and SOPs are necessary, ideally prepared in advance and country-specific, and need to be properly implemented.
2. A whole health system approach and planning is essential, including public health, pre-hospital, ED and inpatient teams. A well-functioning pre-hospital system is necessary to maintain patient care during public health emergencies.
3. Settings with more robust emergency care systems were better placed to respond to the pandemic and scale-up their capacity for triage, risk assessment and clinical management. There was an intrinsic link between 'routine care' capability and preparedness for public health emergencies.
4. Adequate testing capacity and appropriate testing criteria were necessary to ensure staff safety as well as sustainability long term.

5.1.4 Lessons learnt: Leadership and Governance

1. Involvement of ED clinicians in response planning and national taskforces helped ensure the incorporation of EC processes and recognition of the burden on EDs at the frontline of the response.
2. A whole-of-hospital response, along with effective and interdepartmental collaboration and communication, is crucial – and was achievable if the hospital executive demonstrated leadership and engaged all departments.
3. Sharing evidence, experiences, strategies (what worked, what didn't) and resources with colleagues across the region provided peer support, encouragement and ideas.
4. Many of the clinical and ethical challenges experienced during the pandemic were not unique to COVID-19, and reflected the experiences of clinicians who have responded to other public health emergencies (such as measles outbreaks).
5. Expert partner organisations are a critical support to aid evidence-informed policy and practice, and to provide technical assistance where local capacity is limited.
6. Expert partner organisations are a critical support to aid evidence-informed policy and practice, and should provide technical assistance where capacity is limited.

6. Recommendations to improve preparedness and future responses

The research findings and 'lessons learnt' have been distilled into recommendations to improve the preparedness of health and EC systems, particularly in LMICs, for future public health emergencies. Upon completion of the broader research program, it may be possible to reach more specific conclusions.

Recognising that the COVID-19 pandemic is continuing; that many countries, including in the Indo-Pacific region, are experiencing second and third waves with significant cases and mortality; that vaccine distribution is likely to be delayed in many LMICs; and that future pandemics and public health emergencies are inevitable, ACEM provides the following high-level recommendations.

6.1 Address ethical challenges for EC clinicians

1. Many of the clinical and ethical challenges experienced by clinicians in responding to the pandemic are consistent with those of other public health emergencies. Pro-active approaches to preparedness and planning can help ensure an efficient and effective response. Anticipating the ethical issues associated with resource limitations may enable clinicians and community members to pre-emptively develop guidelines and resources to assist with decision-making and resource prioritisation.

2. It is critically important that health services prioritise the provision of PPE for frontline healthcare workers. Inadequate protective equipment, and workplace cultures that do not promote staff safety, exacerbate the tension between a HCW's right to protection and their duty to provide care. It also undermines staff confidence and negatively impacts on staff morale.

3. The pandemic has highlighted the risk of moral injury and distress that comes with responding to a public health emergency. Healthcare systems have a responsibility to proactively support the mental health and wellbeing of their staff, especially EC clinicians who are at high risk of burnout and compassion fatigue.

6.2 Prepare for, and develop capacity to respond to, public health emergency surges

1. The involvement of EC clinicians in surge response planning has helped build collaboration and enhance integration between health system components. Indo-Pacific countries should include frontline clinicians in taskforces and working groups focussed on the clinical components of public health emergencies.

2. Appropriate priority should be given to maintaining essential services and routine care to minimise indirect effects and unintended consequences associated with public health emergencies. The WHO provides a range of resources to assist facilities and countries in this regard.

3. Surge response plans should incorporate all components of the health system, and emphasise the importance of effective collaboration between primary care, pre-hospital, hospital and public health providers and units. Wherever possible, clinical guidelines and processes should cover the continuum of care, and incorporate laboratory and public health functions.

4. The provision of external support to facilities undergoing patient surge events should be targeted to local needs and priorities. Care pathways should reflect local capacity, and, in the setting of limited resources, priority should be placed on providing essential care to the greatest number of patients. External stakeholders, development partner organisations and humanitarian agencies should target their assistance to local requests.

6.3 Strengthen health systems for routine emergency care

1. Indo-Pacific countries should apply lessons learned through the COVID-19 pandemic to ongoing systems strengthening initiatives. The pandemic has resulted in many positive reforms, particularly in relation to IPC, and wherever possible these should be incorporated with routine practice.

2. The pandemic has highlighted the essential contribution of emergency care to integrated health systems. It has also provided an opportunity to reflect on local health system capacity, and identify gaps in service provision. There is an opportunity to use this knowledge to drive reforms and improvements in the post-pandemic recovery phase. Priorities should be determined through systematic assessment of current capability, with a focus on the essential "building blocks" for effective EC systems. Resources such as the WHO Emergency Care Systems Assessment (ECSA) tool, along with relevant regional standards, might inform this process.

3. The pandemic has also highlighted the safety and infection control risks associated with ED overcrowding and access block. Recovery phase reforms should include optimisation of patient flow processes to enhance timeliness and efficiency of care, and redesign of clinical spaces to facilitate effective IPC. Implementation of streamlined referral pathways that minimise access block should also be considered.

4. The importance of strong health information and effective data management systems for timely and reliable data was emphasised as essential for delivery of EC. Ongoing investment in health information systems that prioritise efficient, accessible, useful and timely information that can inform care and future pandemic response planning is highly recommended.

6.4 Recommendations for future research and knowledge exchange plans

Further data collection, and supplementary analysis of data collected for this project, is underway as part of an overarching research project exploring the experiences of frontline clinicians in LMICs in the Indo-Pacific region during the COVID-19 pandemic.

Future outputs of this research program will include:

- an abridged report/resource for all stakeholders, summarising key findings and 'lessons learnt'
- research reports (manuscripts) published in peer-reviewed journal/s; importantly these will put research findings in context of existing knowledge, including about responses in LMICs
- publication and dissemination of this report to support humanitarian practitioners to analyse the barriers and enablers to effective COVID-19 response and increase awareness of context-specific ethical consideration, regarding public health emergency response
- Ongoing advocacy activities for investment in EC systems development, in aligment with the World Health Assembly resolution 72:16, endorsing EC as an essential tool to achieve universal health care.

Annex A: The research team

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Annex B: Data sources

ACEM GECCo COVID-19 online support forums

ACEM and GECCo international network members were invited to regular fortnightly on-line support forums, initiated in response to the declaration of the COVID-19 pandemic. Discussion topics and themes were aligned with ACEM's guidelines 'Managing COVID-19 across the Indo-Pacific: A guide for emergency departments with limited resources'. Over 400 attendees from more than 20 countries participated in the forums during 2020.

This table outlines the participant numbers and LMIC participants from the first twelve forums.

OSF #	Date (all 2020)	Total participants	Participants from LMICs
1	31 March	46	21
2	15 April (x 2 sessions: AM and PM)	65	32
3	28 April (x 2 sessions)	75	42
4	12 May	37	16
5	26 May	54	38
6	9 June	42	26
7	23 June	16	9
8	Excluded due to no participants from PICTs		
9	21 July	24	14
10	4 August	13	3
11	1 September	47	34
12	6 October	18	10

Characteristics of forum participants

Forum participants lived and worked in many countries across the Indo-Pacific region:

Australia
Cook Islands
Federated States of Micronesia (FSM)
Fiji
Kiribati
Marshall Islands
Myanmar
Nauru
Nepal
New Zealand
Palau
Papua New Guinea (PNG)
Philippines
Samoa
Solomon Islands
Sri Lanka
Timor-Leste
Tokelau
Tonga
Tuvalu
Vanuatu

Participants included EC clinicians (physicians and nurses predominantly) as well as IPC nurses or officers, medical superintendents, clinicians in other specialties including intensive care, anaesthetics and paediatrics, and other clinicians and healthcare workers.

Targeted interviews

Seven EC providers and leaders in the Indo-Pacific region participated in semi-structured in-depth interviews to inform this research project.

Name	Official position	Country
Dr Vincent Atua	Emergency Physician and Director of Medical Services, Vila Central Hospital (VCH), Port Vila	Vanuatu
Dr Gustodio Alves de Jesus	Head of Emergency Department, Guido Valadares National Hospital, Dili	Timor-Leste
Sr Helen Murdoch	Director of Nursing Services, Ministry of Health and Medical Services, Tarawa	Kiribati
Dr Garry Nou	Emergency Physician, Gerehu General Hospital and President of the PNG Society for Emergency Medicine, Port Moresby	Papua New Guinea
Dr Penisimani Poloniati	Acting Head of Emergency Department, Vaiola Hospital	Tonga
Dr Trina Sale	Head of Emergency Medicine Department, National Referral Hospital, Honiara	Solomon Islands
Mamatuki Sosefo	Nurse Unit Manager – Emergency Department, Colonial War Memorial Hospital, Suva	Fiji

Annex C: ACEM COVID-19 resources

From early March 2020, GECCo members collaborated with EC leaders in Papua New Guinea (PNG), Solomon Islands, Timor-Leste and Vanuatu to produce practical resources for managing COVID-19 in resource-limited EC settings.

Resources include a guide for ED surge response, and infographics targeting HCW safety, translated into a number of Pacific languages. ACEM has also developed detailed guidelines relevant to Australia and New Zealand EDs, including a section on the ethical implications of the pandemic[2].

All resources are available on the ACEM website:
acem.org.au/covid-19

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