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Developing integrated guidelines for health care workers in hospital and primary healthcare facilities in response to the COVID-19 pandemic in Low- and Middle- Income Countries (LMICs)

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Executive summary

This project has fostered partnerships among researchers in Canada, the Philippines, and Sri Lanka to review, create, adapt, pilot, update, and evaluate a series of infection prevention and control (IPC) guidelines for use in low- and middle- income countries (LMICs). The study has resulted in several deliverables including guidelines, deskguides, and training videos for health care workers (HCWs). In the course of these activities, we have trained HCWs representing multiple levels of care, including both public and private hospital staff, primary care, and community level health workers in the Philippines. Similarly, we have conducted training sessions in Sri Lanka after having adapted our guidelines and created context-specific training materials and videos. We also have evaluated the feasibility and acceptability of the implementation of the guidelines in both settings, in addition to conducting reflexive research exploring the process of guideline adaptation and development.

Our main outputs are:

- 1) A series of COVID-19 IPC guidelines including Outpatients Consultation Deskguides in the Philippines, Outpatients Consultation Deskguides in Sri Lanka, Primary Health Worker Deskguides in the Philippines, Primary Health Worker Deskguides in Sri Lanka, Barangay Health Worker Deskguide in the Philippines, and Field Health Worker Deskguide in Sri Lanka. Deskguides are available at: <https://gisl.dlsph.utoronto.ca/COVID-19-resources/>
- 2) Training materials including a video training series and training modules comprised of powerpoint presentations and guidance documents contextualized to use in the Philippines and Sri Lanka.
- 3) Creation and dissemination of a training tool kit to deliver the training materials and an online training platform to monitor trainees.
- 4) Conference presentations and six published research articles describing the results of this project.

As a main project conclusion, we addressed the policy gap of understanding the health system constraints in LMICs and the knowledge and skill gap of HCWs in hospitals, public, and private primary care facilities, and the community/NGO in responding to the COVID-19 pandemic. We also provided insights on the process of adapting IPC guidelines to resource-constrained settings.

The research problem

COVID-19 has placed an enormous burden on health systems globally. In response to the demands of the pandemic, there has been an urgent need to capacity build HCWs (e.g., nurses, doctors, community health workers, and others) to reduce nosocomial transmission, strengthen triage systems, and rapidly identify cases to break chains of transmission in the community. The World Health Organization (WHO) has produced technical guidance documents for patient management, risk communication, infection control, etc. However, the guidance does not address health system challenges or implementation difficulties in resource-constrained settings such as LMICs. Further, while guidance provides valuable information for HCWs it must be complemented with training to ensure protocolization and uptake into practice. This is

particularly important in the context of COVID-19, which has been hallmarked by waves of infections, resource scarcity, and growing stigma.

Thus, our integrated response strategy aimed to update HCW skills, reduce patient overload at hospitals, avoid nosocomial transmission, protect HCWs, reduce community transmission and public panic, provide patient support, and reduce stigma. Our project objectives included:

- 1) To review available technical guidance, tools and experience at the international and national levels, as well as health systems of the two countries;
- 2) To draft role-specific guidelines and training modules for the Philippines, and pilot test in urban and rural settings in hospitals, public/private primary HCWs and NGOs;
- 3) To evaluate the feasibility and acceptability of the guidelines on HCWs and community members through interviews, focus groups, observations and questionnaire surveys;
- 4) To adapt the guidelines in the Western Province of Sri Lanka and assess feasibility and acceptability on HCWs and community members; and
- 5) To produce a generic version of the guidelines and disseminate the tools at the country and international levels for LMICs.

Progress towards milestones

Milestone 1: First technical progress report (February 2020 - March 2021)

The following activities were completed during this phase:

Creation of COVID-19 Guidelines in the Philippines and Sri Lanka: We engaged in several rounds of review and discussion to create the final guidelines product which included several deliverables: 1)Management Guidelines for COVID-19 Infection Prevention & Control in the Healthcare Setting; 2)Outpatient Consultation Deskguide; 3)Primary Care Health Worker Deskguide; 4)Barangay Health Worker Deskguide; 5)Deskguide for Field Health Workers in the Context of Coronavirus Disease 2019 (COVID-19); 6)Deskguide for Outpatient Consultation in Hospital in the Context of Coronavirus Disease 2019 (COVID-19); 7)Primary care health worker desk guide in the context of COVID-19; 8)Management guidelines for COVID-19 infection prevention & control in the healthcare setting.

Creation of training materials in the Philippines and Sri Lanka: We created PowerPoint training materials to facilitate in-person training sessions. Additionally, International Care Ministries (ICM) staff in the Philippines engaged with a film crew and local celebrity to direct, film, and produce a series of training videos. A knowledge-testing quiz were implemented to check for comprehension of the guidelines training materials. We adapted the training materials in Sri Lanka. Two guideline training videos and four training slides have been developed for use in hospital setting and for field health workers.

Development of a training tool kit: A training tool kit was developed that provides a brief overview of the project during the initial engagement with the pilot sites. The tool kit was utilised by the project coordinators in each province as a communication tool during the planning phase of implementation.

Training in the Philippines and Sri Lanka: We have held training sessions with health care facilities in the Philippines and Sri Lanka. In total 190 healthcare workers have participated in our training sessions in the Philippines and approximately 60-70 participants including medical officers, nursing officers and supportive staff have undergone training sessions.

Evaluation activities: 1) Post-training surveys: we conducted post-training surveys to evaluate the feasibility and acceptability of the guidelines training. 2) We conducted pre-training interviews with key informants at each facility to better understand the implementation context. 3) In-depth study on NGO health workers perspectives in the Philippines: we have conducted interviews with ICM staff to explore their experiences and perspectives. 4) The Community Questionnaire surveyed ultra-poor community members in the Visayas and Mindanao Islands of the Philippines who have experienced respiratory symptoms in the past 3 months to understand their experiences with respect to seeking health care; self-isolation and safety precautions; financial and social support, and current health and ongoing symptoms. 5) We conducted key informant interviews and focus group discussion session among health care provider groups consisting of physicians, nurses, public health inspectors and public health midwives to understand their perceptions on the guidelines, including feasibility, acceptability, and implementation.

Milestone 2: Second technical progress report (April 2021 – March 2022)

The following activities were completed during this phase:

- We updated the guidelines in line with most recent WHO technical guidance and in consideration of the evolving COVID-19 response, such as vaccine roll-out, and the spread of both the Delta and Omicron variants in the Philippines and Sri Lanka. The updated version included advice on personal protective equipment (PPE) use in the context of Omicron and the role of vaccine booster shots. These were produced on June 3, 2023.
- We finalized training slides, training videos, and E-module course in October 2021, while the translation of E-module course to 2 local dialects is being developed.
- We conducted E-module training for primary health care workers and barangay health workers online and offline. Davao, Dipolog, and Kalibo are the three sites to start piloting the E-module rollout. As of December 13, 2021, 34 users in 6 provinces went through the whole E-module course online, and 2 offline training sessions were conducted including 80 health workers. ICM Staff reached 76 Local Government Units and Rural Health Units.
- We disseminated the training videos and other materials in Anuradhapura district. A poster for the use of Donning Doffing technique was printed. We also contacted with Education, Training and Research Unit in Sri Lanka to provide training for supportive health workers.
- We completed 28 interviews with ICM staff to explore their experiences and perspectives. The reports and manuscript are in progress.

Milestone 3: Final technical report (April 2022 – March 2023)

The following activities were completed during this phase:

- We updated the guidelines in line with WHO guidelines and new situations such as vaccination, Delta variant, and Omicron variant in the Philippines and Sri Lanka. The updated version with PPE use for Omicron variant and the role of vaccine booster shots were produced on June 3, 2022. We also updated the deskguides and other training materials after updating the guidelines.
- We implemented our planned training in the Philippines, and adapted more combined online and in-person training strategy to overcome these challenges. We got approvals from Local Government Units and Rural Health Units to conduct E-module online training and offline training.
- In Sri Lanka, we expanded the rollout of the guidelines and training in Anuradhapura district. We reached out to support staff across the country based on the request of the Ministry of Health (MOH). New training on updated guidelines with new instructions about PPE use for Omicron and vaccine booster shots were conducted for all clinical staff including physicians, nurses, other paramedical staff, and supportive staff.
- We printed posters for Donning Doffing technique to be used in primary healthcare settings/Field Health settings and disseminate training materials dissemination in public health offices and primary care health centers.
- Manuscripts describing the work and presenting results have been published in BMJ Global Health, BMC Health Services Research, Social Science & Medicine, and JBI Evidence Implementation.

Synthesis of research results and development outcomes

Our research results and outcomes fall under six key domains:

[National primary care responses to COVID-19: a rapid review of the literature](#)

We conducted this review in April 2020 and examined available national primary care guidelines for COVID-19 and explored the ways in which these guidelines support primary care facilities in responding to the demands of the COVID-19 pandemic. We concluded that at the time of review, national primary care guidelines for COVID-19 provided guidance on infection control and minimising the risk of spread in primary care practices, while supporting the use of new technology and coordinated partnerships.

[Public health guidelines for the COVID-19 pandemic: a rapid review](#)

We conducted a rapid review of the published academic literature to explore the content and domains of public health guidelines to inform any updates to our community-oriented guidelines. Results are described thematically under the three main public health domains of: health protection, public health services and health promotion. Our review found that key strategies to strengthen public health guidance include creating comprehensive user and context specific guidance communicated in plain language, ensuring that guidelines are supported by adequate resources and corresponding national or sub-national policies, while public health and health services research must be mobilized to evaluate guidelines implementation and effectiveness.

[Preliminary qualitative analysis from interviews with healthcare workers](#)

We conducted preliminary interviews with a sample of participants at each facility prior to receiving guideline training, to gain a baseline understanding of their experiences delivering health care services in the context of COVID-19. We found that many participants experienced a sense of uncertainty and anxiety in the early stages of the pandemic when little information was known about the virus, guidelines were changing rapidly, and personal protective equipment was in short supply. We identified a number of factors impacting the ability of participants to adhere directly to guidelines, which included: 1) the enabling environment (e.g., support from the DOH, city governments, politicians, and non-governmental organizations; the existing model of healthcare in the Philippines; infrastructure challenges); 2) fear and uncertainty about COVID-19, impacted by limited human and other resources; and 3) the “human factor” or errors, behaviours, and challenges of frontline workers.

[Autoethnographic study of the COVID-19 guidelines development process](#)

We conducted an autoethnographic study of the COVID-19 guidelines development process in Sri Lanka and the Philippines. We offer key enablers identified through this work, including flexible leadership that aimed to empower the team to bring their expertise to the process; shared responsibility through equitable ownership; an interdisciplinary team; and collaboration with local experts. We then elaborate on challenges including interpreting other guidelines to the country context; tensions between the ideal compared with the feasible and user-friendly; adapting and updating with evolving information; and coping with pandemic-related challenges. Based on key lessons learnt, we synthesize a novel set of principles for developing guidelines during a public health emergency. Guideline development during a pandemic requires a robust and time sensitive paradigm. We summarize the learning in the ‘SPRINT principles’ for adapting guidelines in an epidemic context in LMICs. We emphasize that these principles must be grounded in a collaborative or codesign process and add value to existing national responses.

[Report on the implementation of evidence-based and role-specific COVID-19 Infection Prevention and Control training for health workers](#)

We describe the development of training materials, which were contextualized to local needs and targeted to different staffing categories including support staff. Key to program implementation was the role of champions in facilitating the training, as well as delivery of training sessions featuring multi-media videos and role play to enhance the training experience. A total of 296 health workers participated in the training program sessions. Of these, 198 were hospital staff and 98 were from the public health workforce. Of the 296 health workers who participated in a training session, 277 completed a pre-test questionnaire and 256 completed post-test questionnaires. A significant increase in knowledge score was observed among all categories of staff who participated in training; however, support staff had the lowest pre-test knowledge on IPC practices at 71%, which improved to only 77% after the formal class. Implementing an IPC training program during a complex health emergency is a challenging, yet necessary task. We concluded that leveraging champions, offering training through multiple modalities including the use of videos and role play, as well as inclusion of all staff categories, is crucial to making training accessible.

In-depth qualitative study on health emergency preparedness and response of NGO

We conducted 34 in-depth interviews with community-based health actors employed by the NGO. We identified four key activities that enabled the NGO and their staff to provide health and social services in communities in a safe and consistent manner as part of the organization's pandemic response. These include (1) ensuring adequate personal protective equipment (PPE) and hygiene supplies; (2) providing contextualized and role-specific infection prevention and control (IPC) training; (3) ensuring access to testing for all staff; and (4) providing support during quarantine or isolation. Learning from the implementation of these activities offers a way forward toward health emergency preparedness and response that is crucially needed for NGOs to safely leverage their workforce during pandemics.

Methodology

We identified and determined specific roles for HCWs in hospitals and primary care facilities involved in the COVID-19 response in the Philippines and Sri Lanka. We adopted the principals related to task shifting from doctors to other HCWs, patient support and health education, as we learned from the control of tuberculosis and other diseases. We developed the concise HCW guidelines based on the WHO technical guidance and any national guidelines to produce operational guidelines that are ready to be used by frontline health workers.

Hospitals: Based on the WHO technical guidance and latest national guidelines from China, the Philippines, Sri Lanka and other LMICs, we produced guidelines and teaching modules for HCWs in central hospitals with designated fever clinics for COVID-19 patients. We used available diagnostic tools, including laboratory blood tests, chest X-ray and computerised tomography (CT), where available, to prioritise patients for testing and treatment, based on updates from other countries. We included roles for surveillance and reporting, HCW protection, infection prevention and control, sample testing and early supportive therapies.

Primary Healthcare Facilities: The guideline targeted public and private primary care providers in the Philippines to prioritise those caring for patients with mild flu-like symptoms suspected of COVID-19 pending referral, due to the shortage of DNA testing assays. In the Philippines, we involved HCWs in public (City Health Unit and Rural Health Unit), and private sectors. We developed a guide for consultation, referral, infection control for home isolation, reporting and supervision tools. We also included the Barangay community health workers who are responsible for monitoring and supporting patients and their families during their isolation.

Communities: We developed a risk communication and engagement guideline for NGOs and Civil Society to conduct high impact public awareness and support campaigns. In the Philippines, NGOs play a unique role in linking communities with public and private HCWs. The guideline was designed to be integrated into ICM's existing TRANSFORM training program in low resource communities and address the topics of health promotion, infection control and psychological support in response to the widely observed fears of COVID-19. Intervention guidelines for Local Government Units (LGUs) and Barangays facilitated high impact public awareness campaigns. These materials were delivered through mass and social media communication channels.

Internet based tools: In addition to traditional printed materials, we developed a web-based operation system suitable for smart phones and tablets for effective communication linking HCWs and communities. The different roles of HCWs in each organization were clearly defined. Through the system, HCWs can reach their guidelines, report suspect and confirmed cases, and communicate for case referral and follow-up.

The setting: We included HCWs in a provincial or municipal hospital, two rural and two city health units (primary care providers), and their associated Barangay health stations. We also reached private primary care doctors through the local Health Department and universities. We selected one of the provincial operating sites of ICM. In Sri Lanka, we involved the National Infectious Disease Hospital, the national primary facility to treat COVID-19 patients, and three Medical Officer of Health units (public primary care providers). We also involved the public health program at the national and grassroot levels.

We conducted a rapid review and developed role-specific guidelines for HCWs in the Philippines. We established a national Coordinating Committee involving key policymakers from the Department of Health at national and provincial levels, public hospitals, local university, and ICM. Based on this, we also established a Working Group involving researchers from the team and local HCWs in the hospitals and health units to draft guidelines.

We tested and assessed the integrated response strategy in Philippines. We used face-to-face training and piloted the web-based information management system, which was built as an added module onto ICM's existing data systems. Implementation of the guidelines continued in the Philippines after our pilot. We evaluated the feasibility and acceptability of the integrated response guidelines using a mixed methods approach (qualitative and quantitative elements, including knowledge testing of HCWs, questionnaire surveys, interviews, focus groups and observations) with a broad cross section of HCWs and community members.

Project Outputs

The project has created new knowledge through the creation of contextually appropriate role-specific deskguides and training series in both the Philippines and Sri Lanka. We describe our project outputs in knowledge creation, training, and capacity-building.

Knowledge creation

The project has created new knowledge in several ways, notably through the creation of contextually appropriate role-specific deskguides and training series in both the Philippines and Sri Lanka.

- **Management Guidelines for COVID-19 Infection Prevention & Control in the Healthcare Setting:** This document is for managers, health workers, and administrative staff in healthcare facilities and is meant to supplement the national guidelines stipulated by the Department of Health. It aims to provide guidance on the early detection and management of suspected and confirmed cases of COVID-19. Chapters include: 1)

Isolation Area Management; 2) Healthcare Staff Management; 3) Hospital Workplan Requirements; 4) IPC for COVID-19; 5) Management of Hospital Supplies.

- **Philippines: Outpatient Consultation Deskguide:** This document provides information on outpatient consultation in hospital in the context of COVID-19. Topics covered include screening, diagnosis, and management; nursing care; advice for mental health; advice for protecting yourself and others including donning and doffing of PPE. Additionally, it includes case definition information.
- **Philippines: Primary Care Health Worker Deskguide:** This document provides information for primary health care workers in the context of COVID-19. Topics covered include screening, diagnosis, and management; nursing care; advice for mental health; advice for protecting yourself and others including donning and doffing of PPE. It also includes information on suggested layouts of the primary care facility and a facility cleaning and disinfection plan. Additionally, it includes an optional tool for severity assessment and case definition information.
- **Philippines: Barangay Health Worker Deskguide:** This document provides information for barangay health workers in the context of COVID-19. Topics covered include key information on COVID-19, advice on home quarantine or isolation; information on the role of barangay health workers in contact tracing; advice for people with possible COVID-19 and close contacts; information on how to support and reduce stigma; advice for mental health and information on protecting yourself during community visits.
- **Philippines: Healthcare Worker Video Training Series:** This series includes a comprehensive suite of COVID-19 guidelines training videos which included: an introduction by a local celebrity, a front-line healthcare worker Dr. Elaine Joseph, and ICM Director of Research Dr. Lincoln Lau; in each chapter there were informational slides describing the guidelines, expert narration on the guidelines, and role play scenarios to illustrate the guidelines. Sri Lanka:
- **Sri Lanka:** Our materials are four deskguides, training videos based on deskguides, and presentations. We disseminated these materials to public health staff in 320 Medical Officer of Health areas in the entire country including Medical Officer of Health (Physicians), Public Health Nursing sisters, Public Health Midwives, Public Health Inspectors, and other supportive workers. Training videos were disseminated throughout the country as it was uploaded to National Epidemiological unit website. This is the reference material for all medical staff in the country. Hand washing technique poster was distributed among all field health staff institutions in the country.
- **Feedback from ICM and MOH:** 1) The deskguides were useful during the early phases of the pandemic as there were many information and instructions coming during a short period. 2) At the latter stages of the epidemic, there were drastic changes in quarantine measures, indications for testing and patient management. The deskguides and instructions were dynamic with the incoming flow of information and case loads. The key IPC strategies were consistent throughout the epidemic and having them as posters was practical. 3) The training videos were used nationally in Sri Lanka and were critical for all staff categories, especially for supportive community health workers who were the least trained medical staff categories. The training materials ensured them know how to best protect themselves, their patients, and their communities. 4) The general IPC guides and

videos are planned to be used in future for training new recruits of supportive health staff categories. Further, the training materials can be used whenever as refresher training material for any health staff category at hospital and community health settings.

The significance of knowledge creation:

In the Philippines, community health workers and NGO workers are an important part of the health workforce. These workers can extend the reach of health care and public health into communities. Our outcomes show that these workers welcomed IPC training. They reported that it helped them to overcome their fears and supported them while working in communities. In this project, we extended health systems resilience in communities and comprehensively understood the challenges faced in community-based health crisis response. We got the following outcomes of guidelines from health workers' perspectives in the Philippines: 1) ensured adequate personal protective equipment (PPE) and hygiene supplies; 2) provided contextualized and role-specific infection prevention and control (IPC) training; 3) ensured access to testing for all staff; and 4) provided support during quarantine or isolation. We concluded that barriers to health systems resilience in communities can be lowered that through policy development, training approaches and future research. This ensured equitable delivery of and access to essential health and social services even during complex and prolonged emergencies.

In Sri Lanka, the work highlighted that IPC training must include all categories of staff in hospitals, including service staff, who may have to take on roles that put them at increased risk of infection during an outbreak. Training participants had a mean score of 77.14% for the pre-test knowledge assessment and a significantly higher mean score 84.06% on post-training knowledge assessment ($P = 0.001$). Both physicians and nurses had more than 80% scores on pre-testing, public health staff had an average score of 75% on pretest, which improved to 84% after training. Support staff had the lowest pre-test knowledge on IPC practices at 71%, which improved to only 77% after the formal class. Our project shows an increase in knowledge across all staff categories, emphasizing that even those with a baseline knowledge of infection prevention and control (IPC) can benefit from such training. Further, our results emphasize that during complex emergencies, IPC training must be extended to all staff as the conceptualization of who is 'front line' and at risk for infection expands.

The outcomes of our project underscored the importance of engaging with the most local level of health systems to ensure that all staff are trained, protected and well-equipped to safely work during outbreaks. The findings highlighted health workers globally are crucial to detecting and responding to emerging health threats in communities. Keeping health workers safe on the job requires IPC guidelines that reflect the reality of an evolving threat and the resources at hand, as well as empower people to protect themselves and others.

Training

In addition to the six healthcare worker guidelines training sessions described in detail above, we have also held two qualitative research training sessions with ICM research staff. We first held a session on qualitative interviewing skills and data collection techniques, we then held a session on qualitative data analysis. These have been conducted online using zoom and have included interactive elements for researchers to practice and apply their skills.

Capacity-building

The study has contributed to capacity building in several ways. We have strengthened institutional capacity of our research organization(s), University of Toronto and University of Waterloo through recruiting research staff. This includes graduate students and recent graduates on the research team – Victoria Haldane, Zhitong Zhang, Amy Kipp, Qi Ma, Sarah Ge, and Niranjala Perera. Particularly, Victoria Haldane has developed her administrative and project management skills which has strengthened her work as a research assistant, in addition to pursuing and leading on research methods such as collaborative autoethnography. Our graduate students and recent graduates have begun to work together in smaller groups to drive aspects of the project and spearhead areas of interest to generate new knowledge as a result of the study. Additionally, we have built up research capacity at our partner institution ICM. We have provided qualitative research training and have included ICM research staff in the data collection, and now data analysis process. Indeed, ICM research staff have conducted interviews in the Philippines in local languages and have been instrumental to the success of the qualitative study. Further, multiple ICM staff have developed and demonstrated exceptional administrative and project management skills even under challenging and rapidly changing situations. In Sri Lanka, we have supported capacity building in several ways, namely through training of the local staff on the guidelines, but also through their involvement with the research activities associated with creating and evaluating the guidelines. It should also be noted that our research team includes women in all roles, from trainees to Co-PIs to collaborators. Our work actively strengthens and capacity-builds women in research.

Capacity-building in our partners in the Philippines and Sri Lanka:

In the Philippines, we extended the capacity of infection prevention and control for health workers in the following settings: 1) health workers providing care in inpatient healthcare settings, namely public and private hospitals; 2) health workers providing care in outpatient healthcare settings, namely outpatient departments in public and private hospitals; 3) health workers providing care in primary healthcare settings including rural health units and 4) community health workers in community sites, including barangay health stations.

In Sri Lanka, we extended the capacity of infection prevention and control for health workers in the following settings: 1) health workers providing care in inpatient settings, namely public hospitals; 2) health workers providing primary care; 3) health workers providing care in outpatient settings, namely in outpatient departments of public hospitals and 4) field health workers providing community care.

We list main outputs achieved:

- Website: Guidelines are available on the Global Implementation Science Lab website - <https://gisl.dlsph.utoronto.ca/projects-on-COVID-19/>
- Website: ICM Healthcare Worker Video Training Series: <https://www.caremin.com/covid-training>
- Conference Presentation. “Developing guidelines to strengthen health care workers’ capacity of managing COVID-19 in low-and-middle income countries.” COVID-19 Return to the Workplace (RTW) Conference. June 16, 2020.
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- Website: training videos available on National Epidemiology website in Sri Lanka: <https://www.epid.gov.lk/web/index.php?lang=en>
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Problems and Challenges

There have been numerous challenges to both partnering with healthcare facilities, as well as to holding training. In the Philippines, the national COVID-19 response has been largely decentralized and fragmented, with provincial governors having considerable power to implement and enforce public health measures. As community transmission progressed, strict travel bans, and police-enforced prohibition of internal movement were imposed in provinces where our study is located. This posed four challenges to our study:

- Rising case numbers exerted pressure on healthcare facilities making it difficult to arrange training sessions;
- Local social norms value in-person relationship building and friendship as a basis for ongoing collaboration, physical distancing and the demands of responding to the pandemic posed a challenge to reaffirming and/or establishing relationships with healthcare facilities. In particular, It was a challenge for the team to reconnect with the pilot site contact when lockdown eased and some sites withdrew their interest to participate;
- ICM staff in the Philippines were restricted from travelling to facilities to hold training sessions. In efforts to adapt our work in light of these restrictions, we developed a ‘hybrid’ model with in-person training supplemented by online sessions. However, internet connectivity was an ongoing challenge to video streaming and the online quiz.
- Various lockdowns in the Philippines and Sri Lanka during the pandemic has seriously delayed the progress of project activities. Specifically in Philippines, lockdowns happened unexpectedly at the federal and provincial levels that prohibited travels of ICM staff to healthcare facilities, and also made large gathering for training sessions not practical. Other natural disasters, such as the typhoon in December 2021, also significantly delayed our activities in the Philippines. Some pilots lost connectivity and cannot conduct the online training. Plus, barangay health centres are busy with vaccination drives and increasing workload due to the health departments approval of booster shots to priority group. The training for barangay health workers is significantly impacted by weak internet connection in community. Some barangay health workers don't have smartphone to access online training and some barangay health workers don't have email address to the final assessment online.

Administrative Reflections and Recommendations

Three years since the start of the COVID-19 pandemic, we see its continuing and evolving impact, particularly in LMICs. From vaccines to new variants to (de-)implementing public health and social measures, the landscape has continued to change and with it so have health system responses. Given these changes, we regularly update the guidelines, and continuously collect feedback from country partners. We applied for a no-cost extension of the project given the difficulty of implementing the research during the periodic lockdowns that characterized the first two years of the pandemic in the Philippines and Sri Lanka. Secondly, IDRC has a policy requiring open access publication but we budgeted a very limited amount for publication, we had to request open access publication costs when we produced additional manuscripts about our work.