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Introduction: Reusing PPE is not recommended but was common during COVID-19 pandemic. Limited guidance on proper PPE use and its reuse heightened the hazards to health care worker (HCW) safety. Emerging data on PPE use suggests that most HCWs were contaminated by donning and doffing of PPE while adhering to standards of care.

Method: A prospective observational study was conducted to understand HCW behaviors in donning, doffing, and reusing PPE. Emergency Department physicians and nurses were video-recorded donning, doffing, and reusing PPE within a simulated acute care environment. Participants performed five donning and doffing PPE procedures. PPE kit included gown, face shields, and N95 respirator masks. Participants had access to disposable gloves and hand sanitizer. Recordings were reviewed and coded independently by two trained coders based on checklist of key behaviors. Agreement between coders was high (81.9%). All participants reported completing PPE training.

Results: 28 videos of participants capturing 278 procedures were reviewed. None of the participants followed the CDC's order for donning across five scenarios. Majority of participants failed to perform hand hygiene before donning or re-donning PPE or when doffing PPE. For contaminant spread risk, 92.85% (n=26) touched patient-facing side of PPE during re-donning and/or doffing PPE (M= 3.75, SD= 2.37, Median = 4; 0-9 times). The most common area of self-contamination was hands (n= 111 across all participants in 5 donning/doffing sequences). Touching patient-facing side of PPE was more likely to occur during donning than doffing (70.5% vs. 20.1% of sequences).

Conclusion: The study found wide variation in PPE donning/doffing practices among HCW in violation of CDC guidance. This first study to review PPE reuse through a human factors lens, identified deviant behaviors that contribute to HCW self-contamination. Efforts are needed to redesign PPE and develop effective ways to train staff using PPE equipment safely.

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Impact of Access Block Is Increasing Mortality in Emergency Departments in Nepal

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Introduction: Emergency patients have to stay in the Emergency Department (ED) for hours to days to get ward admission for definite care in Nepal. Access block is a major issue in the ED of University Level Teaching Hospitals (ULTH) in Nepal. This study aimed to analyze the impact of access blocks in the EDs of Nepal.

Method: Meta-analysis of different publications on 'duration of ED Boarding' and 'mortality outcome of ED' of ULTHs of Nepal till November 15, 2022

Results: 9.7% of ED patients were admitted to the ward. The time period from ED arrival to respective ward team consultation is 5.7 hours, consultation to ward admission is 5.6 hours, and admission to ward transfer is 8 hours. The average ED boarding time is 18.1 hours. 38% of patients arrived in ED via Ambulances. The time period from ED arrival to ward team consultation for those who need transfer to another center are 6.9 hours, consultation to admission is 5.7 hours, and admission to transfer is 8.7 hours (ED Boarding time 21.3 hours). Meta-analysis of three major ULTH's showed mortality with respect to ED boarding time to be 17% in < 1 hour, 40.4% in 1 - 6 hours, 27.4% in 6-12 hours, 9.1% in 12-24 hours, 4% in 24-28 hours and 2.1% in >48 hours. Among them, higher age, greater mortality rate. The immediate causes of mortality comparing 2018 vs 2010 are Sepsis & Septic shock 32.2% vs 18%, Cardiac Causes 21.8% vs 14.8%, Aspiration Pneumonia 19.5% vs 14.8%, Severe Lung Diseases 12.7% vs 16.4%, Hypovolumic & Haemorrhagic Shock 9.2% vs 34.4% and Poisoning 4.6% vs 1.6%.

Conclusion: Prolonged ED boarding due to Access Block is triggering increased mortality in the ED.

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CHRONOS Project: The Transformation of Time-dependent Clinical Trajectories into Intelligent Ones Using an Innovative Technological Solution

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Introduction: The health system faces many challenges including the lack of personnel or resources and the overcrowding of emergency rooms. In this context, Real Time Locating Systems (RTLS) offer the possibility of improving the efficiency, safety and quality of care management. Clinical trajectories are currently very dependent on manual processes. We believe that real-time management systems that use geolocation can optimize time-dependent clinical trajectories, improve critical care and transform the health network for patients, caregivers and managers. Typically, RTLS tools require a significant investment in terms of installation, configuration, and integration.

Method: The Nano Data Center (NDC) system developed by *Humanitas Solutions* is equipped with an advanced and low-cost IT infrastructure. It is self-deploying, self-configurable and allows geolocation and autonomous telecommunication with multiple interfaces (WIFI, Bluetooth, electrical). It requires a power source and operates without requiring access to technological infrastructures, which is the major difference with similar products based mainly on cloud computing and dependent on internet connectivity. We tested, as a pilot project, the deployment of the NDC system in a complex hospital environment (*Centre intégré de la santé et des services sociaux de la*

Montérégie-Centre, Quebec, Canada) in order to demonstrate its potential use.

Results: Using the NDC system, we were successful in establishing an autonomous communication network over several hospital floors. This innovation made it possible to support the real-time geolocalization of fictive patients and the creation of a real-time dashboard for monitoring clinical trajectories, analyzing data, and evaluating performance.

Conclusion: The next development phases of the CHRONOS project include real-time notification and transformation of clinical trajectories into smart trajectories. The independence of the NDC system in terms of infrastructures would allow its deployment in low-resource environments, such as temporary installations or remote areas. Thus, its potential benefit in creating connected environments in disaster situations.

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Emergencies as Catalysts to Invest in the Health Workforce

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Introduction: Emergencies provide opportunities for deep systemic intra-action and after-action reviews, followed by changes and adaptations that are aimed at enhancing resilience against future health emergencies. One of the most prevalent lessons learned from the COVID-19 pandemic is the need to intensify the investment in the health workforce. Diverse groups of health workers have brought their expertise from the benches to patients' beds, and the desks of the decision-makers.

Method: Match skill mix of health staff with the needed level of care: those with mild diseases can be cared for by basic nursing staff. Critical patients require advanced skilled nursing that is familiarized with advanced technologies such as ECMO, and use "out-of-the-box" thinking.

Developing the capabilities of the communities and civil society organizations to respond to emergencies. Cooperation agreements with partners that are not involved in medical care during "regular days" should be set before emergencies strike.

Formulate civil-military-police cooperation as well as the Good Samaritan Law is an important legal instrument to allow for humanitarian aid from within and outside the country.

Results: Matching the skill mix of the health staff with the needed level of care for basic nursing for minor patients as well as advanced nursing for critical patients, while using "out of the box" thinking to develop a high level of knowledge is important to maintain quality care during emergencies.

Conclusion: The COVID-19 pandemic and other emergencies provide us with the opportunity to switch from bouncing back to bouncing forward, and from just coping to anticipating and transforming. Investing in the health workforce would enhance preparedness and readiness so that emergencies will

not turn into disasters and crises. The presentation will highlight some of the new approaches and methods applied during the COVID-19 outbreak, as well as those applied in countries that are faced with wars and military conflicts.

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Development of Sub-National Policies for Making Hospitals Safe from Disasters: Study in Yogyakarta Province, Indonesia

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Introduction: Disaster and emergency management planning has an essential role to ensure that hospitals can continue to function in disaster response situations. However, there are several gaps for safe hospital policies and implementations between national and provincial/district level. The Special Region of Yogyakarta, as one of the provinces with high disaster risk in Indonesia, initiated a study to identify local policies needed for safe hospitals.

Method: Focus Group Discussion (FGD) series were conducted with several hospitals representing private, public, academic, and military hospitals located in the first ring of Mount Merapi, an active volcano located on the border between Yogyakarta and Central Java Province. The FGD participants consisted of the Hospital Disaster Plan team, hospital task force of COVID-19, emergency department and hospital management team. Three FGD were carried out with different topics of discussion in each session. The topics were hospital experiences in implementing Hospital Disaster Plans during COVID-19, hospital incident command, coordination and networking. In addition, they also conducted advocacy and public consultation

Results: The study that involved 12 hospitals and 40 persons, resulting in 11 specific additional policies for Yogyakarta safe hospital which include; six additional Standard Operating Procedure (SOP) in terms of donation management, volunteers' recruitment and cost claim; one initiated Memorandum of Understanding (MoU) for surge capacity; conducting functional exercise rather than full scale ritual simulation with management scenario, as well as develop two plans for cyber-attack and business continuity plan.

Conclusion: The pocketbook of Yogyakarta's safe hospital will be useful for more than 70 hospitals in implementing and developing their hospital disaster plan, improving coordination among hospitals in the disaster phase, as well as a lesson-learned process for other regions to develop their local-based safe hospital policies.

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