Fig. 1. Paramedic wearing personal protective equipment for aerosol generating procedures.

presents to our ED, EMS is able to easily enter the room with the patient. This prevents a potentially infectious patient from travelling thought the ED and contaminating other areas. As found in a typical resuscitation room, we placed a stretcher in the room along with basic medical equipment (Image 1) such as bag valve masks, intravenous access sets, and suction. Oxygen is supplied by a portable tank. The code cart is kept just outside the inner door leading into the ED. Seen on the bed is a patient respiratory protection unit that we designed to help limit aerosolization exposure to staff [4]. In order to limit breaks in care and equipment contamination, the EMS cardiac monitor and defibrillator is left connected to the patient and used as the monitor during the resuscitation. If return of spontaneous circulation is obtained, the patient could then be transferred to hospital monitor. In order to limit contamination of other routinely used equipment such as video laryngoscopy and ultrasound, we switched to portable devices that can be easily cleaned and decontaminated after use.

Following patient treatment, the room can either be cleaned physically or easily rinsed with water thanks to drain in floor. Another option we have used for cleaning is an ultraviolent light emitting disinfecting device.

We hope by sharing this information, staff can be better protected when having to manage these potentially infectious patients in heightened risk patient care scenarios.

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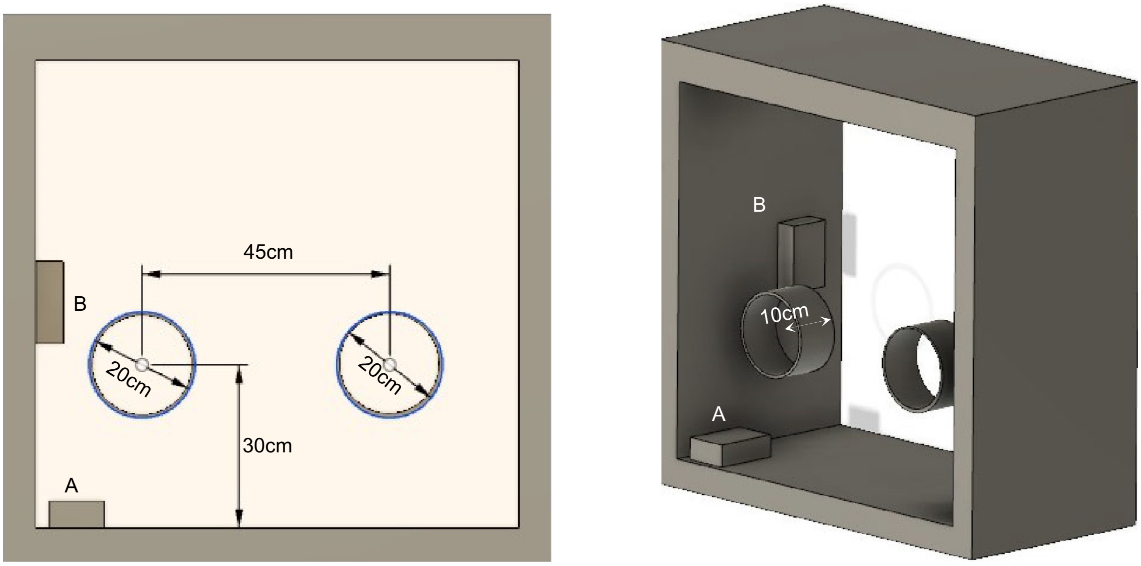
Acrylic window as physical barrier for Personal Protective Equipment (PPE) conservation

As COVID-19 cases increase, the global supply of Personal Protective Equipment (PPE) is becoming insufficient, particularly for medical masks and respirators followed closely by gowns and googles. The World Health Organization (WHO) released in February 2020 an interim guidance [1] on the rational use of PPE for coronavirus disease 2019 (COVID-19). The guidance state that to minimize the need for PPE, WHO recommends the "use of physical barriers to reduce exposure to the COVID-19 virus such as glass or plastic windows."

We, therefore, would like to present the one set-up barrier which can be transformed in a hospital area where patients will present first such as triage areas the registration desk at the emergency department or at the pharmacy window where medication is collected. The construction of this barrier ensures that the hospital will be able to conserve their supply of PPEs The constructed barrier, is made of an "acrylic window" designed to separate the clinician and the patient, it also features two fixed gloves through which the clinician can place both hands and be able to collect throat or nasopharyngeal swabs. The full diagram of the barrier is provided in Fig. 1.

According to the WHO guideline on infection prevention and control [2], the clinicians should perform standard, contact, and airborne precautions during the collection of respiratory specimens from patients with severe symptoms suggestive of pneumonia. This also includes



A	Indoor Walkie talkie
B	Outdoor Walkie talkie
Diameter of the circular opening: 20cm Distance between both circular opening: 45cm Height of between circular opening and table: 30cm Depth of the fixed glove connecter: 10cm	

Fig. 1. Full diagram of the constructed barrier.

placement of patient in a single room with negative pressure air handling, if available, and clinicians' use of PPE including respirator N95 or FFP2 standard, long-sleeved fluid-resistant gown, gloves and eye protection. If a negative pressure room is not accessible, we need to place the patient in a single confined room.

The isolation device is the design of Tseng Yu-Chi and Tseng Kai-Chen. The design shows that a negative pressure room is not required, but it needs to ensure that air does not circulate to other areas. The whole specimen collection process involves two persons: (1) clinician A performs the swabbing (Fig. 2); and (2) Clinician B donned in standard PPE is located outside the exam room to check on the fixed gloves regularly and delivers the specimen to a designated location for further examination. All surfaces that are possibly contaminated, especially the examination area, including the fixed gloves, will then be wiped with disinfectant.

With the use of this barrier, the use of PPE for clinician A will be significantly reduced. A standard PPE for Clinician A includes a long-sleeved fluid-resistant gown, gloves, disposal face shield, N95 respirator, hair caps, and shoe covers; the barrier ensures that PPEs are preserved and can be used several times. As PPE supplies might not be

Fig. 2. Clinician standing inside the room while communicating with the patient outside using wireless walkie-talkie.

able to keep up with the surge of COVID-19 patients [3], and witnessing hospitals around the world struggle with the use of their daily allotments with some even rationing their PPE to units or departments. Implementing and constructing this cost-effective approach can assist healthcare facilities in reducing their use of PPEs and not be burdened with a possible shortage in the future.

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COVID-19: New York City pandemic notes from the first 30 days

1. Introduction

The COVID-19 pandemic has evoked dramatic global disruption as health and governmental agencies struggle to manage this historic medical event. As of April 4, 2020, over 200 countries and territories have been affected, with over 1,000,000 cases and 60,000 deaths worldwide [1]. The United States currently is the country with the highest prevalence of COVID-19 cases, with New York City (NYC) serving as the epicenter of this pandemic [2].

Emergency medical services in NYC face unprecedented challenges in patient acuity, bed management, and hospital operations, while experiencing high levels of provider stress and fatigue. While robust literature on emergency medicine responses to natural disasters and pandemics exists [3], the unique challenges of the pandemic in NYC will likely be experienced by other emergency departments (EDs) across the country, as the disease continues its anticipated trajectory. Here, we report an overview of our experiences and response, as a NYC ED at the center of this pandemic.

The volume and acuity of suspected COVID-19 cases in our ED accelerated rapidly over the course of four weeks. New York Presbyterian Hospital-Columbia encompasses an adult and pediatric academic quaternary medical center, in addition to community sites in upper Manhattan and Westchester, with a collective annual volume of approximately 250,000 visits. For the month of March, we have seen approximately 850 cases of COVID-19 with the majority arriving from March-15th-30^{thz}. Faced with rapid acceleration of volume and acuity, broad challenges have included: optimization of physical space and staffing, the development of management strategies for high numbers of patients requiring respiratory support, minimizing transmission risk to other patients and healthcare staff, determining best strategies for redeployed non-emergency medicine physicians and staff, and finally, frontline staff fatigue and well-being.

2. Strategies and general approaches

2.1. Taking a "comprehensive healthcare" approach

Our strategy included integration of ED, hospital, city, state, and national leadership to coordinate the delivery of efficient care during this pandemic. With the support of institutional leadership we orchestrated a multi-departmental response to the crisis. To accommodate the anticipated ED volume and acuity, flexible approaches to staffing from within and outside our ED were implemented. Due to low pediatric volumes and cancellation of elective procedures/surgeries, we harnessed an influx of available critical care beds, physicians, and support staff. We designated an incident commander to help lead efforts and support clinical staff 24 hours per day. In collaboration with the hospitalist service, transfers of care (e.g. "sign out") to admitting teams were done in the ED, with redeployed off-service clinicians managing admitted patients to allow emergency clinicians to treat new patients. In collaboration with ambulatory care providers, "cough and cold" clinics were established outside of the ED to rapidly evaluate low acuity patients with viral symptoms, helping to reduce ED volumes. In addition, they performed a medical screening exam, facilitating transfer to specialty clinics for isolated low acuity complaints (e.g. orthopedics, gynecology). Finally, patient bedding was adjusted to reduce transmission risk, with suspected COVID-19 patients placed into isolation rooms and positive cases cohorted together.

2.2. Coordinating care with other critical care services to optimize patient care and reduce provider risk

The volume of patients requiring high-risk aerosolizing procedures during COVID-19 has been significant. Recognizing the high volume of emergent airways, we developed protocols with the anesthesia service to assist with ED intubations that included the use of HEPA viral filters and appropriate PPE. Additionally, a COVID-19 "SWAT" team consisting of surgical chief residents and attendings was organized and available to perform procedures such as central lines and arterial lines. Given the increased need for difficult goals of care conversations, we involved palliative care, social services, and ethics consultations early and often for critically ill patients, including pre-intubation.

2.3. Consider remote/telemedicine opportunities for low acuity patients and follow-up care

Telemedicine has played a critical role in our COVID response, providing another pathway for determining need for acute care, while also decreasing ED patient volume and potential viral exposure. Telemedicine has also allowed us to extend our footprint of care into the home, through a follow-up program involving video visits with oxygen concentrators and pulse oximeters distributed to patients during their index ED visit.