

## Public Health Brief Report

# One Residency Program's Response to the COVID-19 Pandemic and Educational Experiences Gained

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### INTRODUCTION

On December 31, 2019, the World Health Organization (WHO) was informed of a cluster of pneumonia cases in Wuhan, China. The causative agent, a novel coronavirus, was isolated in early January, and its genome shared by mid-January.<sup>1</sup> The WHO declared the virus a Public Health Emergency of International Concern on January 30, 2020<sup>2</sup> and a pandemic on March 11, 2020<sup>3</sup>. This was followed by a national emergency declaration in the United States on March 13, 2020.<sup>4</sup> This report highlights the effect this crisis had on a residency program, and how lessons learned may impact the future of graduate medical education.

The University of Texas Health Science Center at Tyler (UTHSCT), located in a somewhat rural region in Northeast Texas, has a long history of training residents in primary care and occupational and environmental medicine (OEM). The OEM residency is one of approximately 23 similar programs in the nation. It is a preventive medicine specialty devoted to prevention and management of occupational and environmental injury, illness, and disability as well as promotion of health and productivity of workers, their families, and communities. The UTHSCT's response to the pandemic was first initiated on March 5, 2020. Initial steps included: formulating protocols for business travel and return-to-work, updating infection prevention protocols, and implementing strategies to increase hospital capacity. As the crisis continued to evolve, the residents' educational activities were disrupted due to altered or cancelled clinical activities, reformatted Master of Public Health (MPH) classes, and travel bans to previously approved conferences, courses, and meetings. The OEM residents were incorporated in the emergency response from the beginning by their involvement in assisting the community and the hospital in the pandemic response, which provided a unique educational opportunity in occupational medicine and public health during a crisis.

### Restoring resources

As the number of cases increased, an immediate concern was the shortage of personal protective equipment in the community and hospital, particularly N95 respirators. After completing an inventory, it was discovered that while supplies of surgical masks and respirators were quite low, there was a stockpile of expired respirators (beyond shelf-life) which were acquired and stored during previous public health emergencies. The elastic bands to secure the respirator fit to the face were found to be degraded and a good seal could not be obtained. University Safety personnel, OEM department faculty, and OEM residents, in keeping with the U.S. Food and Drug Administration (FDA) emergency use authorization (EUA),<sup>5</sup> developed

an innovative process to retrofit the respirators. Defective elastic bands were replaced with commonly available materials after trialing multiple products. The new bands were attached to the corners of the duckbill N95 respirators using zip ties (Figure 1). Quantitative fit testing was conducted to validate prototypes prior to beginning production. A random sampling of respirators was later sent to a commercial testing lab to confirm that the filter material met the NIOSH standard for an N95 respirator. The residents also worked with faculty to review the literature and evaluate decontamination protocols. These efforts led to the establishment of a production team, which was steered by the chief resident, a junior resident, and staffed by workers from across the hospital. In just under two months, they produced approximately 80,000 retrofitted N95 respirators. Fit testing a random sample of each production batch resulted in a 100 percent pass rate at the project's conclusion.

### Sharing resources

In accordance with Center for Disease Control and Prevention (CDC) crisis capacity standards,<sup>6</sup> the first batch of 80 masks produced was distributed to police officers in the Tyler Police Department who lacked access to respiratory protection in the line of duty. Multiple deliveries were made to local first responders, as well as to regional institutions and healthcare workers, including the Northeast Texas Public Health District (NET Health) and a local low-income children's dental clinic. Upon request, the protocols and experiences were shared with an out-of-state hospital association which had the same brand of expired stockpile.

### Leadership role in the community

The Occupational Health Clinic (OHC) played a central role from the beginning of the pandemic. It led the entry point

**Figure 1: The chief resident of the OEM Program (Dr. Ashiq Zaman) leads the respirator retrofit process.**



screening process to ensure the safety of patients and employees. A clear process with algorithms was developed and modified over time to ensure that screening was performed effectively and also kept pace with changing recommendations by the CDC. The OEM residents contributed to this essential function by participating as screeners. When travel restrictions were implemented in early March 2020, the OHC became overwhelmed with phone calls from employees with travel questions. Before long, this expanded to return-to-work questions for illness and COVID-related exposures. Employees who had undergone COVID-19 testing contacted the clinic for guidance. It became apparent that standardized protocols and algorithms had to be developed to effectively manage the sudden influx of calls. The OHC medical director, with the help of one of the OEM residents, developed these processes, which eventually led to the creation of electronic surveys to reduce the number of calls. Over time, these surveys were automated to further reduce the time spent contacting employees and making determinations. Nearly three-quarters of the cases were automated by the surveys, permitting the clinic staff to address the remaining quarter of cases in an individualized fashion.

Additionally, concerns were raised for employees who were high-risk because of age and comorbidities, and whether their work duties should be modified, or they should work from home. A risk stratification algorithm was created to aid in these decisions. Some faculty clinic providers were high risk and had to work remotely. Innovation was required for them to continue to precept residents from home. The use of videoconferencing software allowed residents to enter exam rooms with the virtual physician and discuss patients before and after encounters.

The OEM residents also participated in the region's Emergency Operations Center (EOC) calls with the Local County Health Authority and local government representatives and elected officials. As part of their collaboration with the Texas Department of State Health Services (DSHS), they were also involved in the investigation of work site outbreaks and contact tracing. These processes all served to provide tremendous clinical learning opportunities for the OEM residents, from theory to practice.

As the pandemic progressed, the Designated Institutional Official (DIO) met weekly with the program directors to continuously evaluate the Accreditation Council for Graduate Medical Education (ACGME) pandemic status. It was agreed that the institution fell in 'Stage 2' GME Pandemic Status. During those meetings, the DIO continuously shared ACGME updates and guidance. Resident well-being was closely monitored by frequent individual meetings. Counseling and support were also offered by the psychiatry team.

As stay-at-home orders expired in the region and the state started re-opening, numerous community stakeholders asked the department for guidance. Faculty and residents worked together in developing guidance materials. One example was a video that explained the difference between masks and respirators and demonstrated proper donning and doffing. They also participated in worksite walkthroughs to assess risk and offer

recommendations for workplace safe reopening.

## CONCLUSION

What initially appeared to be an educational setback provided the residents with an unexpected educational opportunity. They acquired new skills in emergency preparedness and response, employee health, industrial hygiene, risk assessment and communication, quality improvement, public health surveillance and disease prevention, as well as many other ACGME competencies and sub-competencies for this discipline. The ability to remotely precept by utilizing videoconferencing technology has not only continued in our clinic, but it has become an effective and lasting solution that allows remote faculty to remain actively engaged in clinical education. Discussions are also currently under way to permanently include these educational experiences in the curricula by expanding and re-structuring coursework and didactics that are focused on emergency/disaster planning and response.

The training of residents during this pandemic required innovation and adaptation in order to maintain a robust educational experience, one that will forever impact the vision for Graduate Medical and Public Health Education within the program and institution.

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## Book Review

### The COVID-19 Catastrophe by Richard Horton

Carol A. Galeener, PhD

In this slim volume Richard Horton, Editor-in-Chief of the highly respected British weekly medical journal, *The Lancet*, chronicles the early days of the COVID-19 pandemic, and lays out what went right – and what went wrong -- in the response. By the time this book was written in May of 2020, there was a good deal of both to tally up. This balanced view helps to maintain the objectivity needed so that a more informed, more mature approach can be taken for the next pandemic... and surely there will be a next pandemic. We just don't know when or what kind.

On the positive side, the response to the epidemic was quite timely and, with some notable exceptions, quite transparent. The first cases were reported in early December, 2019 in China, presenting as possibly a novel type of pneumonia. Shoe leather epidemiology efforts in Wuhan, Hubei Province incriminated a live animal market on the presumption that the new disease was zoonotic. A health alert was issued on the last day of 2019 and the market was closed down the following day. That same New Years Day, the World Health Organization established a team to investigate. Within two weeks clinical guidance for case management had been issued, Chinese scientists had isolated the virus and published its genome, and the first case beyond China's borders appeared in Thailand. By the end of January, WHO had issued a Public Health Emergency of International Concern, a significant signaling event. The SARS and Ebola outbreaks had taken many months to get to the same point. China proceeded to restrict travel, including that during the Lunar New Year, the largest regularly occurring human migration on the planet.

By the time the American President signed limited travel restrictions on people traveling from China on January 31st, it was too late; the virus had already been in the U.S. almost two weeks. (Holshue, *et al.*) In any event, the much-vaunted "ban" exempted U.S. citizens, permanent residents and their family members. Unheeded that it should be restricted, the virus was already traveling about the world and in slightly mutated form made its way across the pond to the Northeast U.S. corridor some weeks later.

Questions remain about the timeliness of China's response, to the exploding epidemic, particularly at the local level, but it was clearly a marked improvement over its disastrous response to SARS-CoV-2 some 17 years before. Capacity had been built and the lessons of the prior epidemic had been taken. "Shelter hospitals" were now built within days and these continued to function through the height of the epidemic. This is where people who tested positive for the virus were

quarantined and kept from infecting other family members or close associates. It was an approach the Chinese had adopted in their planning.

Problems arose in large measure because instead of cooperation, some of the key nations the international public health community counted on for leadership opened a three-front war: on the virus, on other nations and WHO, and in a sense against the troops in the trenches. All of these fronts involved deflection of blame and distortion of information. Some blamed China for everything from hiding the truth to deliberately devising and unleashing the virus on the world. Horton issues a scathing indictment of Britain's NHS that stood idly by or even outright endorsed politicians who were re-writing history and misleading the public and health care providers. He also is particularly vitriolic on the subject of Trump's impending withdrawal of the U.S. from WHO, claiming that it should be viewed as an illegal "crime against humanity."

He is clearly not a man to mince words, but he is a man of penetrating insights. Those insights can become valuable takeaways if we choose. He suggests, for example, that one reason there were initial problems in responding to the virus was that the pandemic planning that had been done in Britain made certain assumptions that proved not to be the case. The virus that materialized was not, in fact, an influenza virus, but the confirmatory bias that the planning introduced made it difficult to accept the actual circumstances. This is a valuable takeaway to guide all of the tabletop exercises that will surely follow for decades to come.

One of the most disturbing aspects to the epidemic is the descent of nations into a Tower of Babel situation, an "infodemic" in which information is used to distort truth in order to undermine an enemy's democratic institutions. This approach is seen increasingly as a successor to the Cold War because it is cheap and fast, powered by an army of teenage hackers with internet access. No need for expensive hardware and standing armies. Convince the gullible that some organization wants to track your every move by lacing a vaccine with a computer chip and many will refuse the vaccine. Up the body count.

Horton recognizes that the virus will not simply go away, "miraculously" or otherwise. So, there is ample opportunity for a second volume. Let us all hope that it does not become a book series.

## REFERENCE

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