Challenges of Residency Training at the Center of the COVID-19 Pandemic in Wuhan, China [version 1]

Zhanghong Lu¹, Stanley Hamstra², Jonathan Lio³

¹Renmin Hospital of Wuhan University
²Accreditation Council for Graduate Medical Education
³University of Chicago

Abstract
This article was migrated. The article was marked as recommended.

Soon after the identification of the novel coronavirus in Wuhan, the city experienced a massive outbreak of COVID-19 that severely strained the existing health system. All of the city's teaching hospitals repurposed buildings for COVID-19 patients, and recruited physicians and trainees of all backgrounds to care of these patients. The authors discuss some of the challenges faced by residency training programs during this period and how they were addressed.

Keywords
Postgraduate medical education, COVID-19, international medical education

Corresponding author: Jonathan Lio (nowx316@gmail.com)
Competing interests: No competing interests were disclosed.
Grant information: The author(s) declared that no grants were involved in supporting this work.
Copyright: © 2020 Lu Z et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite this article: Lu Z, Hamstra S and Lio J. Challenges of Residency Training at the Center of the COVID-19 Pandemic in Wuhan, China [version 1] MedEdPublish 2020, 9:224 https://doi.org/10.15694/mep.2020.000224.1
First published: 08 Oct 2020, 9:224 https://doi.org/10.15694/mep.2020.000224.1
Introduction
On December 31, 2019, the World Health Organization Country Office received report of a pneumonia of unknown etiology detected in Wuhan, China. Soon after the identification of the new coronavirus and human-to-human transmission, the city locked down to contain its spread on January 23. By the time lockdown was lifted 76 days later, there had been 50,008 infections from Covid-19 and 2,574 deaths in Wuhan (Health Commission of Hubei Province, 2020). During this time, the number of infections severely strained the health system, as health facilities expanded beyond maximum capacity and the city constructed new hospital buildings in record time. Medical education continued, but residency training programs faced serious challenges under the rapidly escalating outbreak. We describe some of these challenges and how they were addressed.

Changes to the Nature of Medical Work
In the early period of the outbreak, Wuhan faced a shortage of medical resources, lack of personal protective equipment (PPE), and massive patient volumes. The government designated forty-eight hospitals, including all of the city’s teaching hospitals, as Covid-19-care hospitals and repurposed entire buildings for Covid-19 patients. Physicians and nurses of different specialty backgrounds worked together to treat Covid-19 patients, including 38,478 physicians and nurses who came from other provinces to support Wuhan (National Health Commission of the People’s Republic of China, 2020). Few hospitals could accept non-Covid-19 patients with other medical issues during the outbreak. Meanwhile, residency program directors and clinical educators, already with little protected time before the outbreak, had even less bandwidth for anything other than clinical care.

Resident Stress and Well-Being
Confronting a novel infectious disease with a lack of knowledge and expertise, resident physicians experienced a high incidence of anxiety and depressive symptoms (Chen et al., 2020). Like other licensed physicians, residents were drafted to practice in difficult settings outside their training background, sometimes with decreased supervision. Strict implementation of social distancing policies disrupted residents’ usual social networks and many had difficulty with isolation.

Risk of Infection During Clinical Practice
In addition to challenges posed by an overloaded medical system and stress from working with anxious patients, resident physicians faced higher infection risks of Covid-19 compared to the public (Team, 2020). Moreover, if resident physicians were infected, most did not have family members near since they were transplants to Wuhan. A major teaching hospital reported that out of 1061 residents, 105 residents were furloughed for investigation of coronavirus in the workplace, and 11 residents were confirmed with novel coronavirus pneumonia (NCP). The infections mainly occurred in January when human-to-human transmission had not yet been identified and there was shortage of PPE.

Limitations of Educational Activities
Another consequence of social distancing policies was the prohibition of congregate educational activities. Plans made months or years in advance had to be delayed, adjusted, or cancelled. Due to changes in hospitals’ departmental structures, training programs suspended clinical rotations, and residents were assigned to fixed positions. Certain residents who had left the city before shutdown for Spring Festival vacation were furloughed as they could not return to Wuhan until several months later.

Ensuring the Safety and Well-Being of Resident Physicians
As there was a high risk of infection for physicians, we needed dedicated personnel to monitor the health and well-being of our resident physicians. At Renmin Hospital of Wuhan University, we designated one administrator to monitor the health and infection status of residents, and another to coordinate resources (e.g. food, daily necessities, medications, financial assistance, counseling) for resident physicians. Residents were required to report if they had close contact with NCP cases without adequate protection, and if they had any Covid-19-related symptoms. All tests and treatment for NCP were free for resident physicians in Wuhan. By April 3, more than 2,500 medical staff in Wuhan, including resident doctors, received a humanitarian assistance grant from the Chinese Red Cross Foundation (Chinese Red Cross Foundation, 2020).

Online Learning
Due to social distancing policies, Wuhan residency programs started to use online learning resources to help achieve their curricular goals, which included existing resources on websites, live videos of lectures, and online discussion on video conference platforms. The provincial government also provided online courses for each specialty, and required residents to pass the tests at the end of the courses. Nearly everyone obtained a perfect score on these tests, but a survey of 7,961 resident physicians in the province reported that learner satisfaction was only 60.9% and lecturer satisfaction was 72.1%. Additional training in clinical skills and procedures will be needed after the epidemic when social distancing restrictions are relaxed.
Adjusting Training Arrangements

Teaching hospitals adjusted the curricular training plan of residents according to the impact of the epidemic. The Chinese Medical Doctors Association added Covid-19 knowledge and skills to the national curriculum for all resident physicians in China, and approved the replacement of rotations required for graduation with experience in Covid-19 wards. Considering the course of the epidemic and policies enacted in response, we divided the Covid-19 epidemic into four periods in Wuhan.

**Early period:** Before January 22 and the identification of human-to-human transmission, residency program administrators followed and disseminated information from government announcements regarding Covid-19.

**Rising period:** From January 22 to February 19, when the number of Covid-19 cases started to increase rapidly and there was a shortage of PPE, clinical rotations for residents and congregate teaching activities were suspended, and the number and frequency of clinical shifts were decreased to reduce the risk of infection and PPE consumption.

**Falling period:** From February 20 to March 5, as the number of active Covid-19 cases began to decline, we started online learning to supplement gaps in the curricular plan.

**Recovery period:** After March 6, Wuhan city began to implement a plan to return to normal operations. For residency programs this included planning for normal clinical rotations, recruitment for incoming residents, and incorporating online learning into resident training and faculty development curricula.

Residents in Wuhan will be able to graduate on time as long as they continue to pass their end-of-rotation exams and their national graduation exams. Two of the four major university-affiliated teaching hospitals in Wuhan have implemented a competency-based education system due to a partnership with University of Chicago, and achievement of target milestones will be monitored for each class of residents. Other teaching hospitals may benefit from enacting a similar system to ensure their graduates are ready for practice (Hall *et al.*, 2020).

Conclusion

During the Covid-19 outbreak in Wuhan, teaching hospitals faced an overwhelming number of NCP patients, which altered the nature of resident physicians’ clinical and educational activities, and exposed them to higher risks of infection. Residency training programs attempted to address these challenges by coordinating resources for the health and well-being of residents, procuring online learning content, and adjusting the training curriculum based on the course of the epidemic. We have learned through painful experience the necessity of making contingency training plans for the next possible outbreak. As other nations deal with the increased demands on healthcare resources during the COVID-19 pandemic, as well as maintain adequate standards of training for residents, we hope our experience will help to identify and manage some of the unique challenges to be overcome.

**Take Home Messages**

- The outbreak of COVID19 in Wuhan severely strained the health system, disrupting residency training programs and placing residents on the frontlines in managing patients with infection.
- Residency training programs should provide dedicated resources for the health and wellbeing of residents in case of COVID-19 outbreaks.
- Contingency training plans should include online learning and ensure that residents graduate with the competencies necessary for practice.

**Notes On Contributors**

**Zhanghong Lu** is Director of Graduate Medical Education, Renmin Hospital of Wuhan University, Wuhan, China. ORCID ID: https://orcid.org/0000-0001-6038-1958

**Stanley Hamstra** is Vice President of Milestone Research and Evaluation, Accreditation Council for Graduate Medical Education, Chicago, IL. ORCID ID: https://orcid.org/0000-0002-0680-366X

**Jonathan Lio** is Assistant Professor, Department of Medicine, University of Chicago, Chicago, IL. ORCID ID: https://orcid.org/0000-0002-3723-2767
Declarations
The author has declared that there are no conflicts of interest.

Ethics Statement
Ethics approval was not required as this is a personal view/opinion piece.

External Funding
This article has not had any External Funding

Bibliography/References

Chen, Y., Sun, J., Hu, J., Chen, P., et al. (2020) Analysis of mental health of residents during COVID-19 epidemic. Clinical Education of General Practice. 18(3), pp. 237-244.

Health Commission of Hubei Province (2020) The epidemic situation of NCP in Hubei Province. Available at: Reference Source (Accessed: 14/08/2020).

Hall, A., Nousiainen, P., Campisi, P., Dagnone, J., et al. (2020) Training disrupted: Practical tips for supporting competency-based medical education during the COVID-19 pandemic. Medical Teacher. 42(7), pp. 756-761.

Team, T. N. C. P. E. R. E. (2020) The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China. Chinese Journal of Epidemiology. Chinese Medical Journals Publishing House Co., Ltd., 41(02), pp. 145-151.
Open Peer Review

Migrated Content

**Version 1**

Reviewer Report 16 February 2021

https://doi.org/10.21956/mep.20167.r31166

© 2021 Hays R. This is an open access peer review report distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Richard Hays
James Cook University

This review has been migrated. The reviewer awarded 4 stars out of 5

This article describes how the health and postgraduate residency training systems responded during the first wave of the 2020 pandemic, right in the heart of the first large outbreak. By the time it was published, many other centres could have (and many have) written a similar story. It is interesting that there are so many similarities in responses to such a major disruptor. I agree that a follow up article on what had to change more permanently would be of interest now, as specialty training has still not recovered fully.

**Competing Interests:** No conflicts of interest were disclosed.

Reviewer Report 20 December 2020

https://doi.org/10.21956/mep.20167.r31165

© 2020 Masters K. This is an open access peer review report distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Ken Masters
Sultan Qaboos University

This review has been migrated. The reviewer awarded 4 stars out of 5

An interesting article with a unique perspective from Ground Zero of the COVID-19 pandemic. With little warning and no other examples and models of dealing with the pandemic (apart from outbreaks of other
viruses), the medical teaching institutions had to implement emergency procedures. Most other medical schools had months to prepare for the pandemic, and still found the process extremely disruptive. Most importantly, though, although they have learned (and can teach) valuable lessons, the one question they cannot answer is: “How would we cope if we were at Ground Zero?” This paper gives some first-hand insight into the scale of the problem. Perhaps my only criticism of the paper is that it should have more detail, especially about “reasonable” assumptions and actions that turned out to be wrong or harmful, and also of the serendipitous or “by-chance” decisions and events that one might not normally consider important that turned out to be important. I say this only because I believe that these are the kinds of things that are forgotten, and yet could provide invaluable insight for the future. Perhaps the authors may wish to expand on these in a Version 2 of the paper. Alternately, if time allows, they may consider writing a whole new paper that gives a far more detailed account. We do not know where and when the next outbreak of a virus will be, but we know for certain that it will happen. The authors’ unique experience could prove crucial to our coping with it.

**Competing Interests:** No conflicts of interest were disclosed.