

Internal Medicine Residency Training in the COVID-19 Era—Reflections From Singapore

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On January 23, 2020, Singapore reported its first imported case of COVID-19 and within 2 weeks its first local cluster.¹ Informed by the severe acute respiratory syndrome (SARS) experience of 2003, the country's leaders and health authorities quickly sprang into action forming an inter-ministerial governmental agency² to lead a coordinated national response that has gained international attention.^{3,4} On the frontline of the response were Singapore's public health care institutions, including its academic medical centers. As residents provide the bulk of direct patient care in these settings, they would invariably be among the frontline staff mobilized, and their training would be indelibly altered by the arrival of COVID-19.

Here, we describe the impact of COVID-19 on the internal medicine residency program of the National University Health System in Singapore and reflect on the challenges and lessons learned during the early days of the outbreak response. During a traditional 3-year program, 100 medicine residents rotate through 3 acute care hospitals that serve the western region of Singapore. The primary site is the National University Hospital (NUH), a 1200-bed academic medical center that houses a full complement of tertiary and quaternary care services. Residency training follows a competency-based framework, and the internal medicine program is accredited by the Accreditation Council for Graduate Medical Education–International (ACGME-I).⁵ Our residents form the predominant junior staffing pool for the medical specialties' clinical services at NUH. Similar to other teaching hospitals, our medicine program is the largest, and there is no non-teaching service. As of April 15, 2020, Singapore had 3699 cases of COVID-19, of which 475 were admitted to our affiliated hospitals.

The residency program director and chief residents,⁶ working closely with the department of medicine and division of infectious diseases leadership, began intense planning in early January 2020 (TABLE). From our prior SARS experience, we knew it was paramount to respond quickly and sustainably.

The challenge was to handle the expected surge of suspected and confirmed COVID-19 patients and maintain the department's usual clinical services. Our planning also had to take into account the need for team segregation intended to minimize cross-exposure between health care staff. This resulted in a “pandemic roster,” where a team of 14 mostly postgraduate year 3 residents was designated as the “pandemic team” and separated from the main roster. Together with their attending faculty, pandemic team residents have admitted more than 2400 patients suspected to have COVID-19 into 5 designated “pandemic wards.” They have been responsible not only for identifying and managing those patients with confirmed infection but also, equally importantly, for maintaining flow through the pandemic wards by safely and efficiently deisolating those without COVID-19.

Unfortunately, such physical segregation may have negative implications on sustainability, morale, and social cohesion in the longer term. These were further challenged by the cancellation of our program's usual academic activities. Given transmissibility concerns, large group meetings among health care workers were discouraged.⁷ Our program's regular teaching sessions were suspended until further notice. While the cancellations helped free up limited time and manpower to manage the increased workload, they also brought our program's planned curriculum schedule to a halt. As a result, we refocused efforts into communicating the need behind such drastic measures and adapting innovatively. While large group didactic sessions took a back seat, bedside just-in-time learning began to feature prominently. Faculty members and residents began sharing knowledge about COVID-19 via designated group chats on instant messaging platforms like WhatsApp. Local know-how gleaned from treating COVID-19 patients was applied at the bedside to risk profile newly admitted patients. Training was also rapidly implemented to mitigate risk to residents such as personal protective equipment refresher sessions, comprehensive updates on hospital workflows, and protocols on managing suspected and confirmed cases.

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TABLE
Tips for Medicine Residency Programs in the COVID-19 Era

Areas of Concern	Suggestions/Tips
Clinical service provision	<ul style="list-style-type: none"> ▪ Segregate residents to cover pandemic and non-pandemic clinical teams ▪ Run both rosters independently of each other ▪ Prepare fellows and faculty members to step-down and cover resident duties as required ▪ To mitigate risks, provide rapid training to residents such as personal protective equipment refresher sessions, comprehensive updates on hospital workflows, and protocols on managing suspected and confirmed cases
Resident education	<ul style="list-style-type: none"> ▪ De-emphasize large group didactic teaching session ▪ Share knowledge about COVID-19 via designated group chats on instant messaging platforms ▪ Employ video conferencing tools to replace conventional face-to-face teaching sessions ▪ Use COVID-19 pandemic to teach ACGME-I competencies, particularly focusing on challenges of communication skills and systems-based practice
Resident well-being	<ul style="list-style-type: none"> ▪ Departmental and program leadership check in regularly with residents, especially those working at the frontline pandemic teams ▪ Rotate residents from pandemic team to non-pandemic team to mitigate burnout and distress ▪ Provide an option of paid hotel accommodation ▪ Make available the services of an on-site psychologist

Abbreviations: ACGME-I, Accreditation Council for Graduate Medical Education-International.

Although the education of future internists in an outbreak offers unique learning opportunities, our residency faculty's usual education roles were challenged. The unknown nature of an emerging infectious disease meant faculty and residents experienced similar learning curves. In addition to the loss of faculty's usual "content expert" status, there was significantly less time to dedicate to formal teaching while coping with increased duties. Faculty members who were able to adapt most effectively to this uncertainty offered positive role modeling to their residents and created opportunities for one-on-one teaching and reflective practice.

Senior faculty's memories of nosocomial transmission during SARS, coupled with reports of higher COVID-19 case fatality rates in older adults, created a tension between potential exposure of vulnerable senior faculty and exposure of trainees to a novel pathogen. Faculty also had to balance the educational value of managing patients with COVID-19 with the loss of variety in other clinical exposures. However, this was offset by ample opportunities and creative teaching in the competencies of communication skills, practice-based learning, and systems-based practice. COVID-19 also afforded rich case studies for professionalism and medical ethics in an outbreak setting such as public health exceptions to patient confidentiality, mandated isolation, and quarantine orders. After the initial 3 weeks, when both residents and faculty started to acclimate to life in the COVID-19 era, faculty members began employing video conferencing tools to resume regular teaching. This allowed segregated residents to join the sessions from their various locations via their mobile devices, and

interaction between faculty and residents to resume while maintaining physical distance.

Such an anomalous climate brought many uncertainties and concerns among the residents. The restriction of movement between the hospitals resulted in the cancellation of a major clinical examination required for residency completion. Additionally, residents' time off (in tandem with other health care staff) was severely restricted. Residents' overall work hours were initially extended with additional nights on call and time away from family and friends. Many residents also coped with family members worrying for them at home, burnout from being on "pandemic service" for extended periods of time, and uncertainty about how other rotations will be affected in the long run. In mitigation, after an average of 2 months, pandemic residents were rotated back into the main pool of residents and continued with previously planned rotations. This was done in a staggered fashion to ensure that the pool of available residents between both rosters remained at equilibrium, and there were sufficient experienced pandemic residents to guide new team members.

Boosting morale and resident well-being became paramount. The program director, chief residents, and department leadership regularly checked in with residents and communicated a message of solidarity and pride in our response efforts. Funds were released to purchase morale-boosting meals, including ice-cream treats, that brought big smiles to otherwise tired faces. Hospital communications regularly featured the work of residents on the pandemic teams, while the discharges of recovered COVID-19 patients were shared and celebrated. After the initial weeks,

we were able to ensure that residents adhered to ACGME-I work hour regulations, and those concerned about potentially bringing the virus home were given the option of paid hotel accommodation. An on-site psychologist was available for supportive counseling. Public support also poured in as notes of appreciation, self-penned songs, and goody bags found their way to residents at the frontline.

The disruption caused by the COVID-19 pandemic to the execution of our residency program cannot be overstated. Owing to exigencies of service, we had to grapple with deploying residents based on service rather than training needs, violating work hours, indefinitely postponing electives, core rotations, and examinations required for residency completion. Yet the crisis has brought forth spontaneous manifestations of selflessness and moral courage. It is the real life battleground where chief residents showed their leadership, senior residents demonstrated their unflinching professionalism, and junior residents learned from role modeling. Residents are and will continue to be an integral part of health care response efforts globally. Unfortunately, we may not be able to execute all the planned experiential learning and formative assessments usually required for their graduation. However, there is no doubt that this cohort of residents have done us proud by showing their resilience and mettle against an invisible enemy.

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